



CHANGES OF PHYSICAL AND ORGANOLEPTIC PROPERTIES OF DRIED
BANANA CHIPS DURING ACCELERATED STORAGE

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Accelerated Storage

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Abstract

Banana chips are among the famous forms of dried fruits. It is well known that storage conditions affect the quality of banana chips; however, quantitative information on how the quality of the chips varies during storage is still limited. The aim of this study was to investigate the changes of physical and organoleptic properties of banana chips during accelerated storage at the temperatures of 30 °C, 40 °C and 50 °C. Moreover, the effect of the use of moisture absorber in a storage package on the quality changes was investigated. The quality changes of the chips were investigated in terms of the color, texture (hardness and crispness), moisture content and water activity. The results showed that the color of banana chips stored at a higher temperature was darker and browner due most probably to enhanced rate of Maillard reaction. The hardness of the chips stored at a higher temperature was also higher. Nevertheless, the chips had lower crispness due probably to phase transition during storage at a higher temperature. Moisture absorber had no significant effect on all the quality changes of the stored chips. The quality changes of banana chips were noted to be adequately described by the first-order kinetic model.

Keywords: Dried banana chips/ Shelf life/ Kinetic model/ Color / Texture/ Water activity

หัวข้อโครงการศึกษาวิจัยพิเศษ	การศึกษาการเปลี่ยนแปลงทางกายภาพและประสาทสัมผัสของกล้วยแผ่นอบแห้งในสภาวะการเก็บแบบเร่ง
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บทคัดย่อ

กล้วยแผ่นเป็นรูปแบบของผลไม้อบแห้งที่เป็นที่นิยมชนิดหนึ่ง เป็นที่ทราบกันดีว่าสภาวะการเก็บรักษาส่งผลต่อการเปลี่ยนแปลงคุณภาพของกล้วยแผ่น อย่างไรก็ตามข้อมูลการเปลี่ยนแปลงคุณภาพของกล้วยแผ่นในระหว่างการเก็บรักษายังคงมีอยู่อย่างจำกัด วัตถุประสงค์ของโครงการนี้จึงเป็นการศึกษาการเปลี่ยนแปลงสมบัติทางกายภาพและประสาทสัมผัสของกล้วยแผ่นระหว่างการเก็บรักษาในสภาวะเร่งที่อุณหภูมิ 30 40 และ 50 องศาเซลเซียส อีกทั้งศึกษาผลของการใช้ของสารดูดความชื้นในบรรจุภัณฑ์ที่มีต่อการเปลี่ยนแปลงคุณภาพของกล้วยแผ่น โดยคุณภาพที่ทำการศึกษาประกอบด้วย สี เนื้อสัมผัส (ความแข็ง และความกรอบ) ความชื้นและแอคติวิตีของน้ำ จากผลการศึกษาพบว่าสีของกล้วยแผ่นที่เก็บรักษาที่อุณหภูมิสูงจะเข้มขึ้นและเป็นสีน้ำตาลอย่างรวดเร็ว ซึ่งอาจเกิดจากการเกิดปฏิกิริยาเมลลาร์ดที่รวดเร็วมากขึ้นที่อุณหภูมิสูง นอกจากนี้ยังพบว่ากล้วยแผ่นที่เก็บรักษาที่อุณหภูมิสูงจะมีค่าความแข็งสูงมากขึ้น แต่ค่าความกรอบลดลง เนื่องจากกล้วยแผ่นอาจเกิดการเปลี่ยนวัฏภาค สำหรับสารดูดความชื้นนั้น ไม่มีผลต่อการเปลี่ยนแปลงคุณภาพของกล้วยแผ่น

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CHAPTER 1 INTRODUCTION

1.1 Introduction

Banana is one of the most commonly consumed fruits in tropical countries, especially in Thailand. Banana is a rich source of nutrients with a good taste. Due to its sensory characteristics and high nutrition, banana is well appreciated by consumers (Silva et al., 2013). Nevertheless, after harvesting banana rapidly deteriorates. Prolonging its shelf life by appropriate processing mean is therefore necessary. Several preservation techniques have been used to transform banana into more shelf-stable products, including snacks. Some processing methods, including frying, can be used for such a purpose. However, some limitations in terms of consumers' health problems (i.e., obesity and heart disease) due to oil contained in the products are undesirable. Therefore, an alternative processing technique such as drying has been investigated to produce fat-free banana snacks.

Hot air drying is a traditional technique, which is widely used in the food industry. However, the presence of oxygen and the required long drying time lead to degradation of a product, both in terms of physical and chemical characteristics. Low-pressure superheated steam drying (LPSSD) has therefore been developed as an alternative drying process to improve the product quality, especially in terms of appearance and texture of the dried products (Nimmol et al, 2007a; Nimmol et al, 2007b).

After drying, a product is usually kept in a suitable type of packaging. However, adverse changes of quality such as changes of color and texture might occur during storage. Monitoring of these changes is thus of importance.

Accelerated shelf life testing (ASLT) is one of the methods that can be used to estimate the shelf life of a product. Basically, ASLT is the method for predicting the chemical kinetics and can be applied to quantify the effect of various important factors, including temperature, during storage (Robertson, 2000).

Since limited information is so far available regarding the changes of physical and organoleptic properties of dried banana chips prepared by LPSSD during storage, the aim of this work was to study the changes of selected physical and organoleptic properties of the chips during accelerated storage at 40 and 50 °C; results were also compared with those at a reference storage temperature of 30 °C.

1.2 Objective

To study the changes of physical and organoleptic properties of dried banana chips during storage at various temperatures.

1.3 Scope

- 1.3.1 Dried banana chips with the final thickness of 3- and 5-mm were prepared by LPSSD at a pressure of 10 kPa and a temperature of 90 °C.
- 1.3.2 Dried banana chips were stored for 10 weeks at 30, 40 and 50 °C in a PET/ALU/LLDPE package with or without moisture absorber. Changes of physical and organoleptic properties of the chips were monitored in term of the moisture content, water activity, hardness, crispness, lightness, redness and yellowness.

1.4 Expected Benefits

Basic information on the changes of physical and organoleptic properties of dried banana chips produced by LPSSD, which should have commercial potential as a fat-free snack product.

CHAPTER 2 BACKGROUND

This chapter reviews some information and background related to the present study. This includes information on the material viz. banana, drying and a brief review of various quality attributes that are of interest. Moreover, some information on the kinetic model for predicting the shelf life is also given.

2.1 Banana

2.1.1 General Information of Banana

Banana (*Musa Sapientum* L.) is a tropical fruit crop grown in many countries of the world. Banana may be eaten raw or as a cooked vegetable. The fruit can also be processed into a number of products. Ripe fruit can be pulped into puree for use in a variety of products including ice cream, yogurt, cake, bread, nectar, and baby food. Ripe banana can also be dried and eaten, or sliced, canned with syrup, and used in bakery products, fruit salads, and toppings. Green (unripen) banana can be sliced and fried as chips. Whole green fruits can also be dried and ground into flour. Vinegar and alcoholic beverages can be made from fermented ripe banana. Other parts of the banana plant are also widely consumed besides the fruit.

2.1.2 Nutritional Values

Banana has high contents of carbohydrates and fiber, while it is low in protein and is fat free. The nutritional values of banana are listed in Table 2.1.

Table 2.1 Nutritional values of banana

(USDA Nutrient Database for Standard Reference, 2001)

Nutrient	Value per 100 g of edible portion
Energy	92 kcal
Moisture	74.26 g
Protein	1.03 g
Total lipids (fat)	0.48 g
Fiber, total dietary	2.4 g
Ash	0.8 g
Carbohydrate	23.43 g
Potassium	396 mg
Calcium	6 mg
Iron	0.31 mg
Magnesium	29 mg
Phosphorus	20 mg
Sodium	1 mg
Ascorbic acid	9.1 mg
Thiamin	0.04 mg
Riboflavin	0.1 mg
Niacin	0.54 mg
Vitamin B-6	0.57 mg
Vitamin A	8 µg

2.2 Drying

Drying is one of the important methods for food preservation. Hot air drying is the most common mode of thermal dehydration. However, it causes much degradation, both in terms of physical and organoleptic properties of the dried products. Superheated steam drying, especially the one that operates at a reduced pressure, is an alternative method that has proven to be a good means to avoid such problems. The characteristics of superheated steam drying are reviewed briefly as follows.

2.2.1 Superheated Steam Drying (SSD)

SSD involves the use of superheated steam as the drying medium to supply heat and to carry away the evaporated moisture (Mujumdar, 1995). The major differences between SSD and hot air drying include: (1) the condensation on the surface of a product during an initial heating period of SSD; (2) the rapid elevation of surface temperature during the constant rate period of SSD and (3) the absence of oxygen in the SSD chamber. In terms of product quality the notable advantages of superheated steam drying that are of interest to food industry include: (1) the absence of oxidative reactions (e.g., enzymatic browning, lipid oxidation) hence better chance to reduce the changes of color during drying; (2) the elimination of case-hardened skin that usually occurs in rapid drying process and (3) the ability to yield a higher-porosity product and hence better texture due to an evolution of steam within the product. Since most food products melt, undergo glass transition or are damaged at the saturation temperature of superheated steam corresponding to atmospheric or higher pressures, lowering the dryer operating pressure is a feasible option.

Devahastin et al. (2004) used carrot cubes as a model heat-sensitive material to test the so-called low-pressure superheated steam drying (LPSSD) process. The experiments

were conducted to examine the drying kinetics and various quality parameters, i.e., volume, shrinkage, apparent density, color and rehydration behavior, of the carrot undergoing LPSSD. For comparison vacuum drying experiments were also performed at the same operating conditions, i.e., absolute pressures of 7, 10 and 13 kPa and temperatures of 60, 70, and 80 °C. Although LPSSD required longer dwell time to achieve the same final product moisture content than vacuum drying, some of the quality attributes of LPSSD carrot were superior to those obtained by vacuum drying.

2.2.2 Quality Changes upon Drying

Quality changes during drying can be divided into 3 categories: chemical change, physical change and nutritional change (Kilcast and David, 2000). These changes are summarized in Tables 2.2-2.3

Table 2.2 Some quality changes of food upon drying

Chemical	Physical	Nutritional
Browning reactions	Rehydration behavior	Vitamin loss
Lipid oxidation	Solubility	Protein loss
Color loss	Texture	
Aroma loss		

Table 2.3 Major changes of food upon drying

Category of change	Example and consequence
Physical	Moisture movement, causing drying and toughening of texture; hydration and softening of texture; aggregation
Chemical	Oxidation, causing oxidative rancidity; loss of color; Maillard reactions, causing discoloration and change in texture
Enzymatic	Polyphenoloxidase, causing enzymatic browning; lipoxygenase, causing oxidative rancidity; lipase, causing lipolytic rancidity; protease, causing gelation and flavor or texture changes
Microbial	Growth of spoilage organisms, causing quality deterioration; growth of toxigenic organisms, causing food poisoning; presence of infectious organisms, causing food poisoning

2.3 Quality of Dried Food Products

2.3.1 Color

Color is often regarded as an index of general quality of a food product. It strongly influences the consumer's decision to buy the products. Change of color is generally accompanied with flavor change and nutrient loss. The color perceived depends on the spectral composition of the light source, the chemical and physical characters of the object and the spectral sensitivity characteristics of eye viewing the object (Ranganna, 1986). Different methods can be used to determine the extent of color change. Color measurement by a colorimeter is simple and faster than chemical analysis (Rattanathanalerk et al., 2005). There are three widely used systems for describing color, i.e., Munsell, CIE system and Hunter *Lab* system.

The CIE system is a trichromatic system based on the mixture of the three primary values, which are amber (X), green (Y), and blue (Z). The values are known as chromatic coefficients (x , y and z) and are calculated for indicating the quantity of their primaries (X , Y , Z). However, the color space of CIE XYZ system is not uniform and improvement has occurred. The CIE L^* , a^* and b^* space, known as CIE Lab , has replaced the original system. CIE Lab system has tri-stimulus values: L^* value (whiteness/brightness or darkness), a^* value (redness or greenness) and b^* value (yellowness or blueness). The color diagram of CIE Lab system is shown in Figure 2.1.

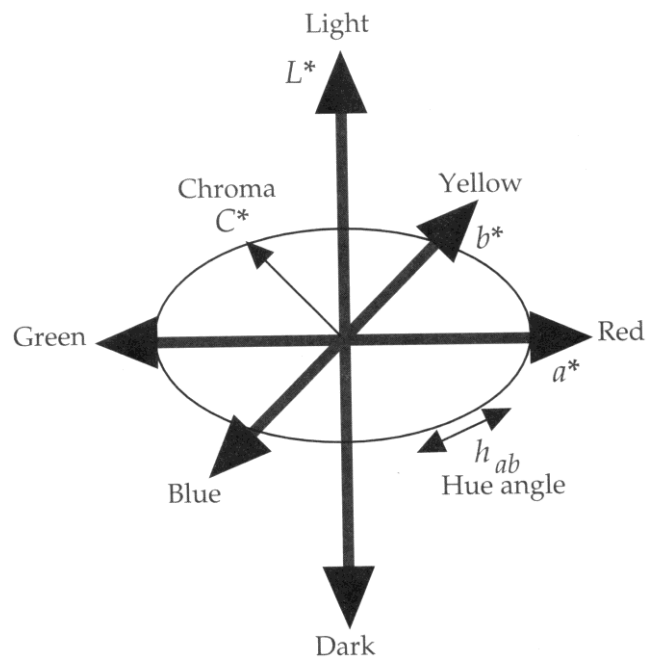


Figure 2.1 CIE Lab color system (Mahli et al., 2005)

2.3.2 Texture

Texture of food is usually related to a mechanical test, which involves the determination of the behavior of food under applied forces. Among many possible test methods compression test is one of the most common techniques that can be used to evaluate the food texture. Compression test is performed by applying a constant deformation rate to a food sample and recording the force and sample deformation (Herppich et al., 2002).

2.4 Kinetic Model of Quality Change

Changes of physical and organoleptic properties can be predicted using the kinetic model as follows (Fu and Labuza, 1997; Manuel and Sereno, 1999; Jaiswal et al., 2012):

$$\frac{dC}{dt} = kC^n \quad (2.1)$$

In this case, C is the quality factor of interest; t is time; k is the rate constant, which may depend on temperature and/or water activity; n is a power factor called the order of the reaction.

In the case of zero-order reaction, the rate is independent of the quality factor:

$$\text{Zero order } (n = 0); \quad -\frac{dC}{dt} = k \quad \text{or} \quad C = C_0 - k_0t \quad (2.2)$$

The mathematical expressions for first-order and second-order reactions are as follows:

$$\text{First order } (n = 1); \quad -\frac{dC}{dt} = kC \quad \text{or} \quad C = C_0 \exp(-k_1t) \quad (2.3)$$

$$\text{Second order } (n = 2); \quad -\frac{dC}{dt} = kC^2 \quad \text{or} \quad \frac{1}{C} = \frac{1}{C_0} + 2kt \quad (2.4)$$

The temperature dependency of the kinetic rate constant can be represented by the Arrhenius-type relationship, such as the one recommended by Niamnuy et al. (2008):

$$k = k_{\text{ref}} \exp \left[-\frac{E_a}{R} \left(\frac{1}{T} - \frac{1}{T_{\text{ref}}} \right) \right] \quad (2.5)$$

where k is the kinetic rate constant at temperature T (K), k_{ref} is the kinetic rate constant at the reference temperature T_{ref} (in the present study, T_{ref} is the average of the storage temperature, which are 293.5, 303.5 and 313.5 K), E_a is the activation energy (kJ/mol) and R is the universal gas constant of 8.314 J/mol K.

CHAPTER 3 MATERIALS AND METHODS

This chapter gives the details of the experimental set-up as well as the steps of the experiments performed in the study. The experimental design and statistical analysis as well as the procedures for product quality determination are also explained.

3.1 Materials

Gros Michel banana (*Musa sapientum* L.) or ‘Kluai Hom Thong’ in Thai was purchased from Soi Pracha Uthit 61 market in Bangkok, Thailand. Fresh banana with a ripeness level color index No. 5 (yellow body and green tip), according to Nimmol et al. (2007a) and Nimmol et al. (2007b), was selected and used in this study. The initial moisture content was in the range of 2.65-3.10 kg/kg (d.b.). Total soluble solids of banana was in the range of 17-18 °Brix. Before starting of each experiment, banana was peeled and sliced either to 3 mm or 5 mm thickness.

3.2 Preparation of Dried Banana Chips

3.2.1 Drying by LPSSD

Either three- or five-mm thickness banana slices were placed on a sample holder of the low-pressure superheated steam dryer (Devahastin et al., 2004). Drying was conducted at 90 °C and an absolute pressure of 10 kPa until the banana reached the final moisture content of 0.035 kg/kg (d.b.).

3.2.2 Storage of Dried Chips

Approximately 10 g of dried banana chips was introduced into a package with or without moisture absorber. The package was made of PET/ALU/LLDPE. The size of the package was 6 inches in width and 9 inches in length. The oxygen transmission rate of the package at 23 °C and 0% relative humidity is 0.034 cm³/m² day, while the water vapor transmission rate of the package at 38 °C and 90% relative humidity is 0.027 g/m² day. The accelerated storage temperatures were 40 and 50 °C. The storage temperature of 30 °C was used as a reference temperature.

3.3 Quality Analysis of Dried Banana Chips

The quality of dried banana chips was investigated during the storage at every two weeks.

3.3.1 Moisture Content Determination

The moisture content of banana chips was determined using a vacuum oven method (AOAC, 2005). Two g of a sample was placed in a moisture can and dried in a vacuum oven (Sanyo, model Gallenkamp/OM-09980, Loughborough, UK) at 70 °C at a vacuum pressure of 900 mbar for 24 h. The masses of the sample both before and after drying were used to determine the moisture content according to Equation (3.1). Average value of ten samples is reported.

$$\text{Moisture content (kg/kg d.b.)} = \frac{w_t - w_d}{w_d} \quad (3.1)$$

where w_t is the mass of sample (kg) at various storage time and w_d is the bone-dry mass of a sample (kg)

The change of moisture content of the chips was fitted to either the zero- or first-order kinetic model as follows:

$$m - m_0 = k_m t \quad (3.2)$$

$$\ln m/m_0 = k_m t \quad (3.3)$$

where m is the moisture content of a chip at time t , m_0 is the moisture content of the fresh chip, k_m is the kinetic rate constant of moisture content (week^{-1}) and t is the storage time (week).

3.3.2 Water Activity Determination

The water activity of a sample was analyzed using a water activity meter (LabMaster- a_w , NOVASINA, Pfäffikon, Switzerland) at 25 °C. Prior to each measurement the meter was calibrated using three standards having the water activities of 0.529, 0.328 and 0.113. After calibration 2-3 g of the sample was placed inside the measuring chamber and the head sensor was fitted to seal the chamber. The water activity values were obtained with the accuracy of ± 0.01 . The average value of five samples is reported.

The zero- or first-order kinetic model was applied to establish the relation between the change of water activity (a_w) of dried banana chips and the storage time (t) as recommended by Yan et al. (2008).

$$a_w - a_{w0} = k_a t \quad (3.4)$$

$$\ln a_w/a_{w0} = k_a t \quad (3.5)$$

where a_w is the water activity of a chip at time t , a_{w0} is the water activity of the fresh chip, k_a is the kinetic rate constant of water activity (week^{-1}) and t is the storage time (week).

3.3.3 Texture Analysis

Texture analysis was performed according to the method of Raikham et al. (2013) and Pimpaporn et al. (2007). Ten chips were used to evaluate the hardness and crispness via the use of a texture analyzer (TA.XT. Plus, Stable Micro System, Surrey, UK) equipped with a cutting probe (HDP-BSG type; Instron Ltd., High Wycombe, UK). The cutting probe was set to travel at a crosshead speed of 2 mm/s until a chip was cracked. The maximum force in the force-deformation curve was considered as the hardness of the sample. The crispness of a dried chip was determined by the number of peaks; a peak was noted with the threshold force value of 50 g force.

A general reaction rate expression for the change of hardness is as recommended by Nisha et al. (2006) and Yu et al. (2011). A linear regression model based on the assumption that the change of hardness follows either the zero- or first-order reaction is as follows:

$$H - H_0 = k_h t \quad (3.6)$$

$$\ln H/H_0 = k_h t \quad (3.7)$$

where H is the hardness of a chips at time t , H_0 is the hardness of the fresh chip, k_h is the kinetic rate constant of hardness (week^{-1}) and t is the storage time (week).

The change of crispness was also fitted to either the zero- or first-order reaction as follows:

$$C - C_0 = k_c t \quad (3.8)$$

$$\ln C/C_0 = k_c t \quad (3.9)$$

where C is the crispness of a chip at time t , C_0 is the crispness of the fresh chip, k_c is the kinetic rate constant of crispness (week^{-1}) and t is the storage time (week).

3.3.4 Color Measurement

The color measurement was performed using a colorimeter (HunterLab, model Color Quest XE, Reston, VA) in CIE system with 2 °N skylight as the light source. The color measurement was made at a minimum of five different positions on each dried chip; the color was then compared with that of the fresh sample.

The changes of color parameters were assumed to follow either the zero-order reaction kinetic model as follows:

$$(L^* - L_0^*) = k_l t \quad (3.10)$$

$$(a^* - a_0^*) = k_a t \quad (3.11)$$

$$(b^* - b_0^*) = k_b t \quad (3.12)$$

$$\ln (L^*/L_0^*) = k_l t \quad (3.13)$$

$$\ln (a^*/a_0^*) = k_a t \quad (3.14)$$

$$\ln (b^*/b_0^*) = k_b t \quad (3.15)$$

where L^* , a^* and b^* are the lightness, redness and yellowness of a chip at time t , L_0^* , a_0^* and b_0^* are the lightness, redness and yellowness of the fresh chip, k_l , k_a and k_b are the kinetic rate constants of the lightness, redness and yellowness (week^{-1}), t is the storage time (week).

3.4 Temperature-Dependent Kinetic Constants

The temperature dependency of the kinetic rate constant can be represented by the Arrhenius relation:

$$k = k_{\text{ref}} \exp \left[-\frac{E_a}{R} \left(\frac{1}{T} - \frac{1}{T_{\text{ref}}} \right) \right] \quad (3.16)$$

where k is the kinetic rate constant at temperature T (K), k_{ref} is the kinetic rate constant at the reference temperature T_{ref} (in the present study, T_{ref} is the average of the storage temperature, which are 293.5, 303.5 and 313.5 K), E_a is the activation energy (kJ/mol) and R is the universal gas constant of 8.314 J/mol K.

3.5 Statistical Analysis

The experiments were designed to be completely random. The data were analyzed using the analysis of variance (ANOVA) using SPSS statistical software (version 17.0) and are presented as mean values with standard deviations. Differences between mean values were established using Duncan's multiple range test. Mean values were considered at 95% confidence level. All experiments were performed in duplicate unless specified otherwise.

CHAPTER 4 RESULTS AND DISCUSSION

This chapter presents the results of the changes of physical and organoleptic properties of dried banana chips during accelerated storage. Drying curves of banana slices undergoing LPSSD are also given.

4.1 Drying Curves of Banana Slices

The drying curves of banana slices undergoing low-pressure superheated steam drying (LPSSD) are shown in Figure 4.1. The initial moisture content of fresh banana was in the range of 2.65-3.10 kg/kg (d.b.). The time needed for the slices of 3 and 5 mm thickness to reach the desired final moisture content of 0.0264 ± 0.0056 kg/kg d.b. and 0.0242 ± 0.0069 kg/kg d.b. was 170 ± 10 and 210 ± 10 min, respectively.

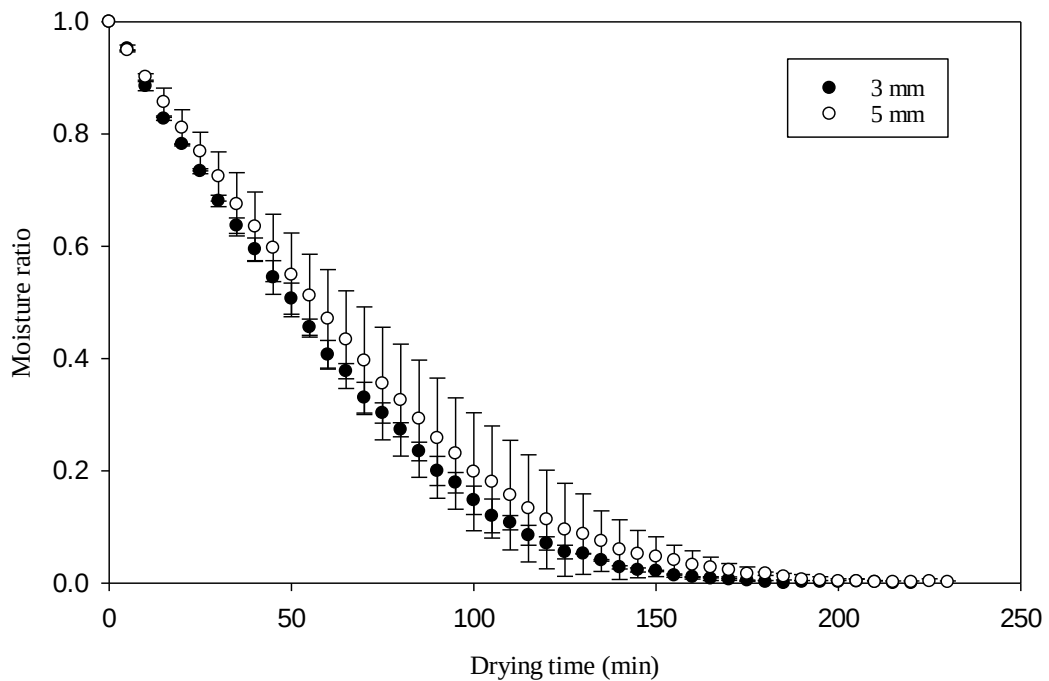


Figure 4.1 Drying curves of banana slices undergoing LPSSD

4.2 Quality Changes of Banana Chips

The quality changes of dried banana chips were investigated during accelerated storage at various temperatures. The average values of 10 samples are reported.

4.2.1 Moisture Content and Water Activity

The changes of moisture content of 3- and 5-mm dried banana chips during accelerated storage are presented in Table 4.1. Dried banana chips adsorbed the moisture from outside of package, especially at a higher storage temperature. The moisture content of the chips during storage did not significantly change because the water transmission rate of the packages is very low, only 0.027 g/m² per day at 38 °C and 90% RH and is lower than the commercial package for commercial freeze dried fruits of 0.041 g/m² per day. The moisture content change was not affected by the use of a moisture absorber.

Table 4.1 Change of moisture content of dried banana chips during accelerated storage

Thickness	Moisture absorber	Storage temperature (°C)	Moisture content (kg/100 kg dry basis)					
			Week 0	Week 2	Week 4	Week 6	Week 8	Week 10
3 mm	With	30	2.602 ± 0.492 ^{Aa}	2.063 ± 0.645 ^{Aa}	2.199 ± 1.367 ^{Aa}	1.732 ± 0.882 ^{Aa}	1.534 ± 1.200 ^{Aa}	1.470 ± 0.496 ^{Aa}
		40	2.073 ± 0.847 ^{Aa}	2.009 ± 1.866 ^{Aa}	1.864 ± 1.236 ^{Aa}	1.734 ± 0.912 ^{Aa}	1.483 ± 0.997 ^{Aa}	1.516 ± 0.715 ^{ABa}
		50	1.901 ± 0.685 ^{Aa}	1.945 ± 0.824 ^{Aa}	2.184 ± 1.109 ^{Aa}	2.246 ± 1.329 ^{Aa}	2.163 ± 1.972 ^{Aa}	2.400 ± 1.133 ^{ABCa}
	Without	30	3.296 ± 0.404 ^{Aa}	3.311 ± 0.313 ^{Aa}	3.351 ± 0.373 ^{Aa}	3.478 ± 0.219 ^{Aa}	3.517 ± 0.133 ^{Aa}	3.662 ± 0.091 ^{Aa}
		40	2.928 ± 0.112 ^{Aa}	2.961 ± 0.133 ^{Aa}	3.168 ± 0.452 ^{Aa}	2.975 ± 0.346 ^{Aa}	3.222 ± 0.168 ^{Aa}	3.427 ± 0.378 ^{ABa}
		50	3.044 ± 0.186 ^{Aa}	3.589 ± 0.272 ^{Aa}	3.521 ± 0.772 ^{Aa}	4.122 ± 0.130 ^{Aa}	3.699 ± 0.394 ^{Aa}	4.076 ± 0.764 ^{ABCa}
5 mm	With	30	3.805 ± 3.999 ^{Aa}	3.829 ± 4.048 ^{Aa}	3.183 ± 3.244 ^{Aa}	2.972 ± 3.040 ^{Aa}	2.778 ± 2.821 ^{Aa}	1.779 ± 1.997 ^{Aa}
		40	1.953 ± 1.744 ^{Aa}	1.782 ± 1.893 ^{Aa}	2.438 ± 2.406 ^{Aa}	1.603 ± 1.703 ^{Aa}	1.799 ± 1.966 ^{Aa}	1.060 ± 0.959 ^{Aa}
		50	2.266 ± 2.296 ^{Aa}	2.231 ± 2.284 ^{Aa}	2.527 ± 2.784 ^{Aa}	2.468 ± 2.400 ^{Aa}	2.084 ± 2.078 ^{Aa}	1.219 ± 1.242 ^{Aa}
	Without	30	2.325 ± 0.717 ^{Aa}	2.333 ± 0.721 ^{Aa}	2.404 ± 0.742 ^{Aa}	2.851 ± 0.246 ^{ABa}	3.102 ± 1.106 ^{Aa}	3.245 ± 0.096 ^{Ca}
		40	2.164 ± 0.897 ^{Aa}	2.219 ± 0.766 ^{Aa}	2.845 ± 1.247 ^{Aa}	3.018 ± 0.248 ^{ABa}	3.173 ± 0.462 ^{Aa}	3.563 ± 0.593 ^{BCa}
		50	2.021 ± 0.283 ^{Aa}	2.406 ± 0.741 ^{Aab}	3.032 ± 1.141 ^{Aab}	3.628 ± 0.802 ^{ABc}	2.828 ± 0.919 ^{Aab}	3.398 ± 0.200 ^{Cc}

Upper letters in the same column indicate that values are not significantly different ($p \geq 0.05$).

Lower letters in the same row indicate that values are not significantly different ($p \geq 0.05$).

The change of moisture content was fitted to the zero-order and first-order kinetic models and the rate constants were obtained and are listed in Table 4.2. In addition, k_{ref} and E_a were determined and are listed in Table 4.3. In summary, the first-order model is more fitted for describing the relationship between the moisture content and storage time.

Table 4.2 Kinetic rate constants for moisture content changes of dried banana chips

Thickness	Moisture absorber	Storage temperature (°C)	k_m (week ⁻¹)		R^2	
			Zero	First	Zero	First
3 mm	With	30	1.10E-03	5.70E-02	0.896	0.917
		40	6.00E-04	3.60E-02	0.944	0.933
		50	5.00E-03	2.16E-02	0.835	0.836
	Without	30	3.68E-04	1.06E-02	0.930	0.935
		40	4.41E-04	1.40E-02	0.715	0.716
		50	8.70E-04	2.44E-02	0.670	0.676
5 mm	With	30	1.93E-03	6.90E-02	0.900	0.839
		40	7.50E-04	4.93E-02	0.389	0.446
		50	8.19E-04	4.75E-02	0.415	0.434
	Without	30	1.05E-03	3.85E-02	0.916	0.916
		40	1.43E-03	5.18E-02	0.954	0.939
		50	1.25E-03	4.66E-02	0.602	0.635

Table 4.3 Arrhenius parameters for the kinetic modeling of change of moisture content

Moisture				
Thickness	absorber	$k_{ref,m}$	E_a (kJ/mol)	R^2
3 mm	With	0.0064	0.547	0.979
	Without	0.0978	0.595	0.912
5 mm	With	0.0243	0.257	0.938
	Without	0.0671	0.124	0.480

The water activity of dried banana chips at different storage temperatures increased with time as shown in Table 4.4. The rate constant increased with increasing storage temperature since higher temperature promoted mass transfer of water vapor from the environment into the package and hence dried banana chips. The kinetic modeling results are shown in Tables 4.5-4.6. It can be concluded that the first-order model is more suitable for describing the relationship between water activity and storage time. The effect of moisture absorber on the change of water activity was noted to be non-significant as in the case of the changes of the moisture content.

Table 4.4 Change of water activity of dried banana chips during accelerated storage

Thickness	Moisture absorber	Storage temperature (°C)	Water activity											
			Week 0		Week 2		Week 4		Week 6		Week 8		Week 10	
3 mm	With	30	0.235	± 0.003 ^{ABCa}	0.214	± 0.012 ^{ABbc}	0.227	± 0.009 ^{ABCab}	0.216	± 0.005 ^{ABCbc}	0.205	± 0.014 ^{ABc}	0.207	± 0.012 ^{ABCc}
		40	0.245	± 0.020 ^{Ca}	0.251	± 0.038 ^{Ca}	0.241	± 0.051 ^{BCa}	0.238	± 0.057 ^{Ca}	0.224	± 0.055 ^{ABCa}	0.228	± 0.053 ^{BCDEa}
		50	0.249	± 0.007 ^{Ca}	0.249	± 0.038 ^{BCa}	0.249	± 0.054 ^{Ca}	0.227	± 0.053 ^{BCa}	0.223	± 0.056 ^{ABCa}	0.235	± 0.084 ^{BCDEa}
	Without	30	0.245	± 0.007 ^{Ca}	0.248	± 0.014 ^{BCa}	0.247	± 0.011 ^{Ca}	0.237	± 0.010 ^{Ca}	0.240	± 0.014 ^{BCa}	0.239	± 0.012 ^{BCDEa}
		40	0.229	± 0.005 ^{ABab}	0.223	± 0.003 ^{ABCa}	0.241	± 0.008 ^{BCc}	0.236	± 0.011 ^{Cbc}	0.241	± 0.004 ^{BCc}	0.246	± 0.006 ^{CDEc}
		50	0.237	± 0.012 ^{ABCa}	0.247	± 0.008 ^{BCab}	0.248	± 0.014 ^{Cab}	0.279	± 0.011 ^{Dc}	0.262	± 0.020 ^{Cbc}	0.278	± 0.017 ^{Ec}
5 mm	With	30	0.241	± 0.012 ^{BCa}	0.231	± 0.031 ^{ABCa}	0.243	± 0.019 ^{BCa}	0.229	± 0.021 ^{Ca}	0.228	± 0.030 ^{ABCa}	0.225	± 0.026 ^{BCDa}
		40	0.222	± 0.008 ^{Aa}	0.209	± 0.013 ^{Ab}	0.199	± 0.002 ^{Ab}	0.183	± 0.006 ^{Ac}	0.206	± 0.011 ^{ABb}	0.175	± 0.003 ^{Ac}
		50	0.222	± 0.008 ^{Aa}	0.215	± 0.005 ^{ABab}	0.207	± 0.005 ^{ABbc}	0.191	± 0.010 ^{ABd}	0.197	± 0.005 ^{Ac d}	0.195	± 0.012 ^{ABcd}
	Without	30	0.235	± 0.004 ^{ABCa}	0.236	± 0.010 ^{ABCa}	0.236	± 0.010 ^{BCa}	0.238	± 0.001 ^{Ca}	0.236	± 0.008 ^{ABCa}	0.244	± 0.007 ^{BCDEa}
		40	0.235	± 0.007 ^{ABCa}	0.240	± 0.024 ^{ABCa}	0.245	± 0.008 ^{Ca}	0.241	± 0.012 ^{Ca}	0.247	± 0.003 ^{B^{Ca}}	0.243	± 0.008 ^{BCDEa}
		50	0.237	± 0.004 ^{ABCa}	0.251	± 0.006 ^{Cb}	0.257	± 0.016 ^{Cb}	0.254	± 0.008 ^{CDB}	0.255	± 0.007 ^{Cb}	0.259	± 0.012 ^{DEb}

Upper letters in the same column indicate that values are not significantly different ($p \geq 0.05$).

Lower letters in the same row indicate that values are not significantly different ($p \geq 0.05$).

Table 4.5 Kinetic rate constants for water activity changes of dried banana chips

Thickness	Moisture absorber	Storage temperature (°C)	k_a (week ⁻¹)		R^2	
			Zero	First	Zero	First
3 mm	With	30	2.57E-03	1.17E-02	0.675	0.678
		40	2.41E-03	1.02E-02	0.776	0.775
		50	2.41E-03	1.09E-02	0.567	0.560
	Without	30	8.86E-04	3.65E-03	0.510	0.510
		40	1.97E-03	8.39E-03	0.707	0.700
		50	3.97E-03	1.54E-02	0.733	0.744
5 mm	With	30	1.43E-03	6.14E-03	0.562	0.568
		40	3.71E-03	1.88E-02	0.633	0.628
		50	2.96E-03	1.43E-02	0.802	0.796
	Without	30	6.63E-04	2.77E-03	0.519	0.520
		40	7.75E-04	3.23E-03	0.529	0.532
		50	1.70E-03	6.85E-03	0.633	0.627

Table 4.6 Arrhenius parameters for the kinetic modeling of change of water activity

Thickness	Moisture absorber	$k_{ref,a}$	E_a (kJ/mol)	R^2
3 mm	With	0.0092	0.056	0.432
	Without	0.1478	0.943	0.999
5 mm	With	N/A	N/A	N/A
	Without	0.0367	0.722	0.839

4.2.2 Texture

4.2.2.1 Hardness

The hardness of 3- and 5-mm dried banana chips was determined at different storage temperatures and the results are listed in Table 4.7. Thickness had a significant effect on the hardness of the chips. The hardness of 3-mm dried banana chips was lower than that of the 5-mm chips at the same storage time. Moreover, the effects of moisture absorber and temperature were significant, especially in the case of 3-mm chips with no moisture absorber stored at 50 °C; the hardness (and crispness) changed abruptly at 10 weeks storage. This may be due to the glass transition of the chips (Roos, 1995).

The hardness of dried banana chips was fitted to both zero-order and first-order kinetic models as shown in Table 4.8. The first-order kinetic model provided the best fit for the change of hardness. The kinetic modeling parameters pertaining to the first-order model are given in Table 4.9.

Table 4.7 Change of hardness of dried banana chips during accelerated storage

Thickness	Moisture absorber	Storage temperature (°C)	Hardness (N)						
			Week 0	Week 2	Week 4	Week 6	Week 8	Week 10	
3 mm	With	30	23.50 ± 1.02 ^{ABCa}	23.26 ± 1.40 ^{ABa}	23.34 ± 3.23 ^{ABa}	24.26 ± 2.39 ^{ABa}	25.37 ± 3.37 ^{Aa}	26.27 ± 1.81 ^{Aa}	
		40	22.19 ± 2.29 ^{ABa}	24.00 ± 1.00 ^{ABCa}	25.84 ± 2.93 ^{ABCab}	23.32 ± 2.21 ^{ABa}	30.42 ± 0.73 ^{ABb}	26.87 ± 3.24 ^{Aab}	
		50	22.98 ± 3.41 ^{ABCa}	30.30 ± 7.12 ^{CDEa}	28.20 ± 4.71 ^{BCa}	28.36 ± 7.13 ^{ABCa}	30.16 ± 8.89 ^{ABa}	56.82 ± 28.91 ^{ABa}	
	Without	30	20.85 ± 1.38 ^{Aa}	22.97 ± 0.09 ^{ABa}	23.00 ± 0.36 ^{ABa}	21.86 ± 4.65 ^{Aa}	22.45 ± 3.18 ^{Aa}	30.14 ± 8.60 ^{Aa}	
		40	20.56 ± 1.80 ^{Aa}	19.79 ± 2.64 ^{Aa}	20.26 ± 0.46 ^{Aa}	21.32 ± 0.04 ^{Aa}	21.01 ± 0.60 ^{Aa}	26.03 ± 9.04 ^{Aa}	
		50	23.35 ± 5.74 ^{ABCa}	26.02 ± 2.09 ^{ABCDa}	24.87 ± 0.20 ^{ABCa}	28.35 ± 5.86 ^{ABCa}	47.09 ± 21.22 ^{Ba}	91.04 ± 78.33 ^{Ba}	
5 mm	With	30	27.01 ± 0.56 ^{BCDa}	27.11 ± 1.48 ^{BCDa}	28.23 ± 0.46 ^{BCa}	30.17 ± 1.66 ^{BCa}	28.67 ± 2.55 ^{Aa}	28.88 ± 3.17 ^{Aa}	
		40	31.92 ± 1.12 ^{DEFa}	31.99 ± 3.09 ^{DEa}	31.53 ± 3.12 ^{CDa}	33.74 ± 0.24 ^{Ca}	32.36 ± 4.38 ^{ABa}	34.28 ± 4.94 ^{Aa}	
		50	31.92 ± 1.12 ^{DEFa}	34.41 ± 5.06 ^{Ea}	30.70 ± 7.28 ^{CDa}	31.28 ± 3.35 ^{BCa}	27.02 ± 2.11 ^{Aa}	27.41 ± 6.10 ^{Aa}	
	Without	30	27.52 ± 1.58 ^{CDEa}	30.25 ± 0.95 ^{CDEa}	28.07 ± 1.80 ^{B^{Ca}}	28.97 ± 1.07 ^{ABCa}	33.32 ± 8.96 ^{ABa}	32.02 ± 8.10 ^{Aa}	
		40	33.39 ± 0.22 ^{Ea}	35.43 ± 2.63 ^{Ea}	37.18 ± 1.21 ^{Da}	33.27 ± 3.64 ^{Ca}	37.60 ± 8.30 ^{ABa}	40.12 ± 6.90 ^{ABa}	
		50	32.20 ± 0.30 ^{EFa}	34.71 ± 1.08 ^{Eab}	35.10 ± 1.10 ^{Dab}	35.56 ± 0.55 ^{Cab}	34.79 ± 1.12 ^{ABab}	38.66 ± 4.27 ^{ABb}	

Upper letters in the same column indicate that values are not significantly different ($p \geq 0.05$).

Lower letters in the same row indicate that values are not significantly different ($p \geq 0.05$).

Table 4.8 Kinetic rate constants for hardness changes of dried banana chips

Thickness	Moisture absorber	Storage temperature (°C)	k_h (week ⁻¹)		R^2	
			Zero	First	Zero	First
3 mm	With	30	0.302	1.22E-02	0.831	0.833
		40	0.573	2.24E-02	0.521	0.541
		50	2.414	6.46E-02	0.561	0.615
	Without	30	0.625	2.46E-02	0.494	0.503
		40	0.459	2.02E-02	0.562	0.575
		50	5.788	1.25E-01	0.671	0.767
5 mm	With	30	0.229	8.10E-03	0.518	0.533
		40	0.216	6.60E-03	0.530	0.529
		50	0.630	2.10E-02	0.702	0.712
	Without	30	0.466	1.54E-02	0.582	0.585
		40	0.518	1.41E-02	0.532	0.519
		50	0.471	1.33E-02	0.723	0.727

Table 4.9 Arrhenius parameters for the kinetic modeling of change of hardness

Thickness	Moisture absorber	$k_{ref,h}$	E_a (kJ/mol)	R^2
3 mm	With	2.2172	1.476	0.965
	Without	87.1928	2.723	0.922
5 mm	With	0.8424	1.001	0.710
	Without	0.0107	0.091	0.999

4.2.1.2 Crispness

Crispness is associated with a low-density cellular structure that is brittle and generates a high-pitched noise when fractured (Meste et al., 2002). Crispness change of dried banana chips during storage was determined and the results are shown in Table 4.10. The crispness continuously decreased throughout the storage period. Moreover, the chips upon prolonged storage exhibited rubbery viscoelastic appearance, so glass transition to transform the product to the rubbery phase might have taken place (Roos, 1995).

The change of crispness was again fitted to the zero-order and first-order kinetic models and the rate constant were obtained and are listed in Table 4.8. The first-order model provided the best fit for the change of the crispness and storage time. E_a and $k_{ref,c}$ were also determined and are listed in Table 4.9.

Table 4.10 Change of crispness of dried banana chips during accelerated storage

Thickness	Moisture absorber	Storage temperature (°C)	Number of peaks					
			Week 0	Week 2	Week 4	Week 6	Week 8	Week 10
3 mm	With	30	22 ± 0 ^{Aa}	20 ± 0 ^{Aa}	21 ± 4 ^{Aa}	21 ± 1 ^{Aa}	19 ± 5 ^{Aa}	20 ± 0 ^{Aa}
		40	21 ± 2 ^{Aa}	21 ± 9 ^{Aa}	17 ± 1 ^{Aa}	16 ± 1 ^{Aa}	17 ± 1 ^{Aa}	14 ± 2 ^{Aa}
		50	20 ± 3 ^{Aa}	19 ± 7 ^{Aa}	19 ± 6 ^{Aa}	18 ± 7 ^{Aa}	17 ± 5 ^{Aa}	14 ± 3 ^{Aa}
	Without	30	20 ± 1 ^{Aa}	19 ± 2 ^{Aa}	17 ± 4 ^{Aa}	20 ± 3 ^{Aa}	18 ± 3 ^{Aa}	18 ± 6 ^{Aa}
		40	20 ± 1 ^{Aa}	19 ± 0 ^{Aa}	18 ± 3 ^{Aa}	19 ± 0 ^{Aa}	18 ± 1 ^{Aa}	17 ± 6 ^{Aa}
		50	18 ± 3 ^{Aa}	17 ± 2 ^{Aa}	16 ± 1 ^{Aa}	12 ± 3 ^{Aa}	12 ± 4 ^{Aa}	11 ± 7 ^{Aa}
5 mm	With	30	21 ± 1 ^{Aa}	20 ± 1 ^{Aa}	19 ± 1 ^{Aa}	19 ± 1 ^{Aa}	20 ± 0 ^{Aa}	18 ± 1 ^{Aa}
		40	20 ± 2 ^{Aa}	19 ± 2 ^{Aa}	18 ± 3 ^{Aa}	22 ± 1 ^{Aa}	25 ± 2 ^{Aa}	22 ± 3 ^{Aa}
		50	20 ± 2 ^{Aa}	24 ± 4 ^{Aa}	22 ± 3 ^{Aa}	22 ± 3 ^{Aa}	22 ± 1 ^{Aa}	22 ± 4 ^{Aa}
	Without	30	24 ± 4 ^{Aa}	22 ± 3 ^{Aa}	19 ± 1 ^{Aa}	20 ± 4 ^{Aa}	18 ± 4 ^{Aa}	15 ± 1 ^{Aa}
		40	21 ± 0 ^{Aa}	16 ± 4 ^{Aa}	15 ± 0 ^{Aa}	16 ± 2 ^{Aa}	14 ± 2 ^{Aa}	15 ± 1 ^{Aa}
		50	22 ± 1 ^{Aa}	20 ± 0 ^{Aa}	17 ± 5 ^{Aa}	17 ± 3 ^{Aa}	19 ± 1 ^{Aa}	18 ± 2 ^{Aa}

Upper letters in the same column indicate that values are not significantly different ($p \geq 0.05$).

Lower letters in the same row indicate that values are not significantly different ($p \geq 0.05$).

Table 4.11 Kinetic rate constants for crispness changes of dried banana chips

Thickness	Moisture absorber	Storage temperature (°C)	k_{CR} (week ⁻¹)		R^2	
			Zero	First	Zero	First
3 mm	With	30	2.05E-01	2.57E-01	0.446	0.494
		40	6.57E-01	8.81E-02	0.787	0.801
		50	6.17E-01	9.95E-05	0.881	0.881
	Without	30	1.74E-01	9.25E-03	0.523	0.530
		40	2.24E-01	1.32E-02	0.751	0.750
		50	7.71E-01	5.42E-02	0.919	0.918
5 mm	With	30	1.77E-01	3.13E-01	0.412	0.457
		40	4.11E-01	1.08E-01	0.627	0.654
		50	3.17E-01	7.32E-02	0.912	0.917
	Without	30	7.38E-01	1.67E-03	0.918	0.918
		40	4.80E-01	3.18E-02	0.538	0.575
		50	6.68E-01	2.24E-01	0.738	0.812

Table 4.12 Arrhenius parameters for the kinetic modeling of change of crispness

Thickness	Moisture absorber	$k_{ref,c}$	E_a (kJ/mol)	R^2
3 mm	With	1.16E-03	1.349	0.961
	Without	4.71E-01	1.026	0.790
5 mm	With	5.98E-03	0.986	0.996
	Without	5.48E+02	3.243	0.999

4.2.3 Color

Changes of L^* , a^* and b^* of dried banana chips during storage were evaluated. The rate constants (k) of the changes of the color at various storage time and temperatures are reported in Tables 4.13-4.15. Lightness slowly decreased at storage temperatures of 30 °C and 40 °C but rapidly decreased at 50 °C. In contrast, redness of the chips slightly increased at 30 °C and 40 °C but rapidly increased at 50 °C. Yellowness did not significantly change at all storage temperatures, however. The color change of dried banana chips might have occurred due to non-enzymatic browning or Maillard reaction, which involves the reaction of reducing sugars and amino acids and is highly temperature-dependent (Chua et al., 2014). Thus, the chips experienced more browning, especially at 50 °C.

The changes of the lightness, redness and yellowness were fitted to the zero-order and first-order kinetic models and the results are listed in Tables 4.15-4.16. The first-order kinetic model provided the best fit for the changes of lightness, redness and yellowness. Table 4.17 lists the k_{ref} , r E_a of the changes of color of the chips.

Table 4.13 Change of lightness of dried banana chips during accelerated storage

Thickness	Moisture absorber	Storage temperature (°C)	Lightness changes (ΔL^*)										
			Week 0		Week 2		Week 4		Week 6		Week 8		Week 10
3 mm	With	30	0.00 ± 0.00	-0.90	± 0.84	-1.61	± 0.92	-1.90	± 0.84	-1.27	± 0.81	-2.28	± 1.06
		40		-1.64	± 2.00	-0.45	± 0.57	-1.64	± 0.77	-3.61	± 0.48	-5.92	± 0.94
		50		-7.46	± 1.26	-8.64	± 7.34	-14.73	± 10.84	-13.28	± 12.31	-18.25	± 10.37
	Without	30		-2.56	± 2.08	-1.52	± 0.06	-2.89	± 1.24	-3.02	± 3.29	-3.31	± 1.40
		40		-1.04	± 0.58	-1.13	± 1.20	-3.07	± 2.25	-5.83	± 1.41	-3.12	± 2.91
		50		-1.97	± 5.39	-7.97	± 8.05	-12.30	± 8.48	-20.18	± 7.35	-21.29	± 9.82
5 mm	With	30	0.00 ± 0.00	-0.75	± 0.76	-1.45	± 2.08	-1.31	± 2.05	-3.04	± 2.31	-2.67	± 1.07
		40		-1.22	± 1.75	-2.02	± 1.10	-4.44	± 0.65	-2.67	± 3.51	-4.16	± 4.96
		50		-2.43	± 6.83	-5.36	± 4.57	-10.41	± 4.40	-12.15	± 5.68	-16.15	± 3.34
	Without	30		-1.85	± 0.25	-1.76	± 2.20	-2.33	± 0.01	-2.67	± 0.53	-2.56	± 0.40
		40		-2.39	± 2.24	-2.33	± 1.81	-3.03	± 4.89	-4.95	± 4.49	-4.77	± 3.66
		50		-5.13	± 3.45	-11.43	± 6.30	-12.74	± 6.02	-17.87	± 9.91	-21.28	± 7.84

Table 4.14 Change of redness of dried banana chips during accelerated storage

Thickness	Moisture absorber	Storage temperature (°C)	Changes of redness (Δa^*)					
			Week 0	Week 2	Week 4	Week 6	Week 8	Week 10
3 mm	With	30	0.00 ± 0.00	0.55 ± 0.11	1.34 ± 1.00	0.66 ± 0.17	1.44 ± 0.01	1.45 ± 0.77
		40		0.43 ± 0.13	-0.10 ± 0.04	1.24 ± 0.62	3.70 ± 2.26	3.30 ± 0.13
		50		3.57 ± 1.50	4.31 ± 3.58	5.77 ± 1.94	6.20 ± 1.62	6.31 ± 0.06
	Without	30		0.07 ± 1.05	0.21 ± 0.60	1.46 ± 0.66	1.18 ± 2.67	1.20 ± 1.15
		40		0.90 ± 0.17	1.68 ± 0.26	2.31 ± 1.10	3.49 ± 0.89	2.22 ± 0.49
		50		3.94 ± 0.45	5.91 ± 0.50	7.37 ± 0.94	7.97 ± 2.64	8.32 ± 3.61
5 mm	With	30	0.00 ± 0.00	0.10 ± 1.40	0.01 ± 0.29	0.35 ± 0.39	1.39 ± 1.05	0.83 ± 1.03
		40		0.41 ± 1.42	1.52 ± 0.60	2.11 ± 0.09	2.94 ± 1.46	2.49 ± 1.00
		50		2.27 ± 0.86	4.23 ± 1.24	5.90 ± 0.19	7.85 ± 1.15	8.17 ± 0.30
	Without	30		0.22 ± 0.04	0.52 ± 0.69	0.69 ± 0.45	0.64 ± 0.22	0.79 ± 0.28
		40		1.48 ± 2.01	1.70 ± 2.05	2.55 ± 3.63	2.86 ± 2.72	2.42 ± 1.52
		50		3.78 ± 3.39	5.92 ± 3.88	8.16 ± 4.83	7.57 ± 3.36	8.61 ± 2.05

Table 4.15 Change of yellowness of dried banana chips during accelerated storage

Thickness	Moisture absorber	Storage temperature (°C)	Change of yellowness (Δb^*)					
			Week 0	Week 2	Week 4	Week 6	Week 8	Week 10
3 mm	With	30	0.00 ± 0.00	-0.06 ± 0.30	-0.02 ± 0.38	-0.81 ± 0.39	-0.19 ± 0.40	-1.14 ± 0.43
		40		0.05 ± 0.17	0.17 ± 2.04	0.02 ± 0.70	0.88 ± 1.12	0.79 ± 0.37
		50		0.74 ± 0.24	0.34 ± 1.06	-1.80 ± 5.98	-1.57 ± 6.57	-3.78 ± 9.96
	Without	30		-0.54 ± 0.39	-0.90 ± 1.69	-2.08 ± 0.05	-1.66 ± 2.46	-1.77 ± 1.83
		40		-1.76 ± 0.95	-2.39 ± 1.37	-2.89 ± 1.07	-2.71 ± 1.74	-3.00 ± 1.09
		50		-1.70 ± 0.01	-2.78 ± 3.07	-3.89 ± 5.57	-9.01 ± 7.15	-10.29 ± 11.53
5 mm	With	30	0.00 ± 0.00	0.22 ± 0.04	0.52 ± 0.69	0.69 ± 0.45	0.64 ± 0.22	0.79 ± 0.28
		40		1.48 ± 2.01	1.70 ± 2.05	2.55 ± 3.63	2.86 ± 2.72	2.42 ± 1.52
		50		3.78 ± 3.39	5.92 ± 3.88	8.16 ± 4.83	7.57 ± 3.36	8.61 ± 2.05
	Without	30		0.20 ± 1.11	0.04 ± 0.60	0.11 ± 0.70	-2.17 ± 0.81	-2.48 ± 1.65
		40		-1.08 ± 1.93	-0.50 ± 1.19	-1.47 ± 1.48	-1.08 ± 1.30	-2.10 ± 0.42
		50		0.35 ± 2.25	-0.02 ± 0.32	0.54 ± 1.91	-2.79 ± 5.76	-3.74 ± 6.48

Table 4.16 Kinetic rate constants for color changes of dried banana chips (zero-order model)

Thickness	Moisture absorber	Storage temperature (°C)	k_r (week ⁻¹)			R^2		
			L^*	a^*	b^*	L^*	a^*	b^*
3 mm	With	30	-0.239	0.166	-0.082	0.616	0.622	0.554
		40	-0.468	0.321	0.072	0.777	0.736	0.651
		50	-1.939	0.781	-0.265	0.859	0.692	0.642
	Without	30	-0.390	0.142	-0.219	0.511	0.729	0.761
		40	-0.468	0.330	-0.373	0.662	0.703	0.552
		50	-2.200	1.012	-0.967	0.964	0.760	0.919
5 mm	With	30	-0.301	0.099	-0.139	0.872	0.616	0.822
		40	-0.455	0.309	0.121	0.717	0.887	0.668
		50	-1.579	0.915	0.313	0.986	0.963	0.689
	Without	30	-0.326	0.089	-0.186	0.529	0.849	0.579
		40	-0.544	0.328	-0.194	0.845	0.637	0.666
		50	-2.219	1.031	-0.254	0.974	0.753	0.525

Table 4.17 Kinetic rate constants for color changes of dried banana chips (first-order model)

Thickness	Moisture absorber	Storage temperature (°C)	k_r (week ⁻¹)			R^2		
			L^*	a^*	b^*	L^*	a^*	b^*
3 mm	With	30	2.845E-03	0.0283	0.0031	0.718	0.666	0.579
		40	8.359E-03	0.0756	0.0029	0.787	0.765	0.694
		50	3.037E-02	0.0829	0.0126	0.916	0.799	0.758
	Without	30	4.524E-03	0.0266	0.0056	0.687	0.785	0.766
		40	7.972E-03	0.0361	0.0079	0.649	0.739	0.758
		50	4.744E-02	0.1089	0.0358	0.965	0.798	0.915
5 mm	With	30	4.520E-03	0.0217	0.0038	0.850	0.673	0.849
		40	6.238E-03	0.0491	0.0032	0.750	0.845	0.725
		50	2.873E-02	0.1128	0.0078	0.985	0.931	0.822
	Without	30	3.507E-03	0.0016	0.0085	0.742	0.873	0.685
		40	7.196E-03	0.0561	0.0056	0.891	0.808	0.685
		50	3.811E-02	0.1006	0.0123	0.985	0.731	0.643

Table 4.18 Arrhenius parameters for the kinetic modeling of change of color

Thickness	Moisture absorber	Parameter	$k_{ref,r}$	E_a (kJ/mol)	R^2
3 mm	With	ΔL^*	358.92	2.172	0.979
		Δa^*	14.74	1.229	0.972
		Δb^*	8.24	1.444	0.810
	Without	ΔL^*	511.12	2.268	0.943
		Δa^*	56.71	1.677	0.984
		Δb^*	19.66	1.261	0.955
5 mm	With	ΔL^*	99.39	1.728	0.948
		Δa^*	54.09	1.698	0.995
		Δb^*	1.67	0.732	0.674
	Without	ΔL^*	341.66	2.097	0.968
		Δa^*	83.08	1.826	0.968
		Δb^*	0.39	0.198	0.750

CHAPTER 5 CONCLUSIONS AND RECOMMENDATION

5.1 Conclusions

Changes of physical and organoleptic properties of dried banana chips during accelerated storage were investigated. The first-order kinetic model was noted to provide the best fit for all the changes of the chips during storage. For the changes of the moisture content and water activity, the effect of moisture absorber was not significant since the packages have low water transmission rate. In the case of the changes of hardness and crispness, both 3- and 5-mm dried banana chips stored at 50 °C had a decreasing crispness; in contrast, hardness increased with storage time because dried banana chips might have suffered glass transition into the rubbery phase. In terms of color, dried banana chips stored at 50 °C became darker and browner more rapidly due to enhanced non-enzymatic browning or Maillard reaction. On the other hand, the chips stored at 30 °C did not suffer changes of color while the chips stored at 40 °C had slight brown color after storage for 6-8 weeks.

5.2 Recommendation

Sensory tests to compare instrumental and human perceptions of the tested physical and organoleptic properties of banana chips are suggested.

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APPENDIX A

Drying Kinetics Data

A.1 Drying kinetics data for banana slices of 3- and 5-mm by LPSSD

Table A.1 Evolution of mass of banana slices of 3 mm during LPSSD (Replicate No. 1)

Time (min)	Mass (kg)	Time (min)	Mass (kg)	Time (min)	Mass (kg)
0	0.127	55	0.076	110	0.068
5	0.123	60	0.077	115	0.067
10	0.118	65	0.075	120	0.067
15	0.110	70	0.072	125	0.067
20	0.102	75	0.072	130	0.067
25	0.099	80	0.072	135	0.067
30	0.092	85	0.071	140	0.067
35	0.086	90	0.070	145	0.067
40	0.086	95	0.069	150	0.067
45	0.081	100	0.069	155	0.067
50	0.079	105	0.068	160	0.067

Table A.2 Evolution of mass of banana slices of 3 mm during LPSSD (Replicate No. 2)

Time (min)	Mass (kg)	Time (min)	Mass (kg)	Time (min)	Mass (kg)
0	0.352	60	0.199	120	0.107
4	0.340	64	0.191	124	0.104
8	0.326	68	0.183	128	0.101
12	0.317	72	0.176	132	0.099
16	0.303	76	0.168	136	0.096
20	0.294	80	0.161	140	0.093
24	0.285	84	0.153	144	0.091
28	0.276	88	0.147	148	0.092
32	0.264	92	0.142	152	0.090
36	0.256	96	0.136	156	0.089
40	0.248	100	0.130	160	0.088
44	0.238	104	0.125	164	0.088
48	0.229	108	0.120	168	0.086
52	0.218	112	0.115	172	0.087
56	0.207	116	0.111	176	0.087

Table A.3 Evolution of mass of banana slices of 5 mm during LPSSD (Replicate No. 1)

Time	Mass	Time	Mass	Time	Mass	Time	Mass
(min)	(kg)	(min)	(kg)	(min)	(kg)	(min)	(kg)
0	0.417	73	0.239	137	0.132	201	0.099
10	0.387	77	0.231	141	0.128	205	0.100
17	0.371	81	0.222	145	0.124	209	0.099
21	0.362	85	0.215	149	0.122	213	0.101
25	0.351	89	0.207	153	0.119	217	0.099
29	0.342	93	0.199	157	0.116	221	0.099
33	0.332	97	0.190	161	0.113	225	0.100
37	0.321	101	0.184	165	0.111	229	0.099
41	0.312	105	0.178	169	0.108	233	0.100
45	0.302	109	0.171	173	0.106	237	0.099
49	0.293	113	0.165	177	0.105	241	0.099
53	0.284	117	0.158	181	0.104	245	0.100
57	0.275	121	0.153	185	0.103	249	0.100
61	0.266	125	0.147	189	0.102	253	0.099
65	0.256	129	0.143	193	0.102	257	0.099
69	0.248	133	0.137	197	0.101		

Table A.4 Evolution of mass of banana slices of 5 mm during LPSSD (Replicate No. 2)

Time	Mass	Time	Mass	Time	Mass	Time	Mass
(min)	(kg)	(min)	(kg)	(min)	(kg)	(min)	(kg)
0	0.183	60	0.102	120	0.053	180	0.048
5	0.176	65	0.097	125	0.051	185	0.047
10	0.169	70	0.091	130	0.051	190	0.046
15	0.161	75	0.085	135	0.051	195	0.046
20	0.154	80	0.081	140	0.049	200	0.046
25	0.148	85	0.076	145	0.049	205	0.046
30	0.141	90	0.071	150	0.049	210	0.046
35	0.133	95	0.068	155	0.049	215	0.046
40	0.127	100	0.063	160	0.048	220	0.046
45	0.122	105	0.061	165	0.048	225	0.046
50	0.114	110	0.058	170	0.048		
55	0.109	115	0.055	175	0.047		

APPENDIX B

Statistical Analysis

B.1 Statistical analysis of the effects of chips thickness, storage temperature and moisture absorber usage to the quality change of banana chips

Table B.1 ANOVA table for the effects of chips thickness, storage temperature and moisture absorber to the changes of the moisture content

	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	week0	.000	11	4.036E-5	.921	.531
	week2	.000	11	2.213E-5	.223	.995
	week4	.001	11	5.519E-5	.471	.910
	week6	.002	11	.000	2.338	.026
	week8	.002	11	.000	1.246	.292
	week10	.002	11	.000	4.236	.000
Intercept	week0	.025	1	.025	563.286	.000
	week2	.023	1	.023	233.514	.000
	week4	.026	1	.026	220.657	.000
	week6	.025	1	.025	376.230	.000
	week8	.022	1	.022	176.307	.000
	week10	.025	1	.025	577.385	.000
Thickness	week0	8.308E-6	1	8.308E-6	.190	.666
	week2	.000	1	.000	1.101	.301
	week4	.000	1	.000	1.603	.213
	week6	.001	1	.001	8.793	.005
	week8	.001	1	.001	5.874	.020
	week10	.000	1	.000	7.028	.012

	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
MA	week0	1.337E-5	1	1.337E-5	.305	.584
	week2	1.003E-7	1	1.003E-7	.001	.975
	week4	.000	1	.000	.854	.361
	week6	.000	1	.000	5.889	.020
	week8	.000	1	.000	2.627	.113
	week10	.001	1	.001	15.098	.000
Temperature	week0	.000	2	.000	3.573	.038
	week2	3.568E-5	2	1.784E-5	.180	.836
	week4	6.543E-5	2	3.272E-5	.279	.758
	week6	.000	2	.000	1.726	.192
	week8	6.744E-5	2	3.372E-5	.265	.768
	week10	.000	2	8.821E-5	2.031	.145
Thickness * MA	week0	1.337E-5	1	1.337E-5	.305	.584
	week2	1.001E-7	1	1.001E-7	.001	.975
	week4	.000	1	.000	.854	.361
	week6	.000	1	.000	5.889	.020
	week8	.000	1	.000	2.627	.113
	week10	.001	1	.001	15.097	.000
Thickness * Temperature	week0	1.767E-5	2	8.834E-6	.202	.818
	week2	2.871E-5	2	1.435E-5	.145	.866
	week4	1.369E-5	2	6.843E-6	.058	.943
	week6	2.121E-5	2	1.060E-5	.159	.854
	week8	.000	2	.000	.976	.386
	week10	.000	2	.000	3.111	.056

	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
MA * Temperature	week0	1.800E-5	2	8.999E-6	.205	.815
	week2	1.677E-5	2	8.384E-6	.085	.919
	week4	7.476E-5	2	3.738E-5	.319	.729
	week6	6.880E-5	2	3.440E-5	.514	.602
	week8	2.417E-5	2	1.208E-5	.095	.910
	week10	7.327E-6	2	3.664E-6	.084	.919
Thickness * MA * Temperature	week0	1.800E-5	2	9.000E-6	.205	.815
	week2	1.677E-5	2	8.383E-6	.085	.919
	week4	7.475E-5	2	3.738E-5	.319	.729
	week6	6.880E-5	2	3.440E-5	.514	.602
	week8	2.417E-5	2	1.208E-5	.095	.910
	week10	7.326E-6	2	3.663E-6	.084	.919
Error	week0	.002	38	4.384E-5		
	week2	.004	38	9.915E-5		
	week4	.004	38	.000		
	week6	.003	38	6.687E-5		
	week8	.005	38	.000		
	week10	.002	38	4.344E-5		
Total	week0	.028	50			
	week2	.028	50			
	week4	.031	50			
	week6	.030	50			
	week8	.029	50			
	week10	.029	50			

Table B.2 Duncan's multiple tests for the effects of chips thickness, storage temperature and moisture absorber to the changes of the moisture content

Week 0		
Duncan		
Code	N	Subset
		1
6.00	4	.019041
3.00	4	.019042
12.00	4	.020217
8.00	4	.020619
5.00	4	.020782
2.00	4	.020782
11.00	4	.021695
9.00	4	.022779
10.00	4	.023289
1.00	4	.026037
4.00	4	.026038
7.00	6	.028047
Sig.		.110

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Week 2		
Duncan		
Code	N	Subset
		1
3.00	4	.019500
6.00	4	.019500
8.00	4	.020081
2.00	4	.020342
5.00	4	.020342
4.00	4	.020663
1.00	4	.020664
11.00	4	.022236
9.00	4	.022668
10.00	4	.023365
12.00	4	.024097
7.00	6	.026408
Sig.		.409

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

* Note m/a = moisture absorber
where

Code 1 = 3-mm chips with m/a at 30 °C

Code 2 = 3-mm chips with m/a at 40 °C

Code 3 = 3-mm chips with m/a at 50 °C

Code 4 = 3-mm chips without m/a at 30 °C

Code 5 = 3-mm chips without m/a at 40 °C

Code 6 = 3-mm chips without m/a at 50 °C

Code 7 = 5-mm chips with m/a at 30 °C

Code 8 = 5-mm chips with m/a at 40 °C

Code 9 = 5-mm chips with m/a at 50 °C

Code 10 = 5-mm chips without m/a at 30 °C

Code 11 = 5-mm chips without m/a at 40 °C

Code 12 = 5-mm chips without m/a at 50 °C

Week 4

Duncan

Code	N	Subset
		1
5.00	4	.018753
2.00	4	.018753
8.00	4	.019037
9.00	4	.021702
3.00	4	.021926
6.00	4	.021926
4.00	4	.022129
1.00	4	.022129
10.00	4	.024080
7.00	6	.025231
11.00	4	.028563
12.00	4	.030410
Sig.		.203

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Week 6

Duncan

Code	N	Subset	
		1	2
8.00	4	.016648	
1.00	4	.017379	
4.00	4	.017379	
5.00	4	.017397	
2.00	4	.017398	
9.00	4	.020780	
3.00	4	.022592	
6.00	4	.022592	
7.00	6	.023702	
10.00	4	.028514	.028514
11.00	4	.030185	.030185
12.00	4		.036321
Sig.		.051	.204

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Week 8

Duncan

Code	N	Subset
		1
2.00	4	.014900
5.00	4	.014900
4.00	4	.015441
1.00	4	.015441
8.00	4	.017643
9.00	4	.018598
6.00	4	.021913
3.00	4	.021913
7.00	6	.023744
12.00	4	.028344
10.00	4	.031108
11.00	4	.031745
Sig.		.079

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Week 10

Duncan

Code	N	Subset		
		1	2	3
1.00	4	.014718		
4.00	4	.014718		
8.00	4	.015317		
9.00	4	.017923		
7.00	6	.019967		
2.00	4	.021345	.021345	
5.00	4	.021345	.021345	
3.00	4	.024093	.024093	.024093
6.00	4	.024093	.024093	.024093
11.00	4		.030504	.030504
10.00	4			.032454
12.00	4			.033984
Sig.		.089	.082	.060

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Table B.3 ANOVA table for the effects of the storage time to the changes of the moisture content

Code		Sum of Squares	df	Mean Square	F	Sig.
1	Between Groups	.000	5	.000	.912	.495
	Within Groups	.001	18	.000		
	Total	.002	23			
2	Between Groups	.000	5	.000	.178	.967
	Within Groups	.002	18	.000		
	Total	.003	23			
3	Between Groups	.000	5	.000	.094	.992
	Within Groups	.003	18	.000		
	Total	.003	23			
4	Between Groups	.000	5	.000	.912	.495
	Within Groups	.001	18	.000		
	Total	.002	23			
5	Between Groups	.000	5	.000	.178	.967
	Within Groups	.002	18	.000		
	Total	.003	23			
6	Between Groups	.000	5	.000	.094	.992
	Within Groups	.003	18	.000		
	Total	.003	23			
7	Between Groups	.000	5	.000	.731	.606
	Within Groups	.002	30	.000		
	Total	.002	35			
8	Between Groups	.000	5	.000	.954	.471
	Within Groups	.000	18	.000		
	Total	.000	23			

Code		Sum of Squares	df	Mean Square	F	Sig.
9	Between Groups	.000	5	.000	1.020	.435
	Within Groups	.000	18	.000		
	Total	.000	23			
10	Between Groups	.000	5	.000	1.407	.269
	Within Groups	.001	18	.000		
	Total	.001	23			
11	Between Groups	.000	5	.000	1.300	.307
	Within Groups	.001	18	.000		
	Total	.001	23			
12	Between Groups	.001	5	.000	2.526	.067
	Within Groups	.001	18	.000		
	Total	.002	23			

Table B.4 Duncan's multiple tests for the effects of the storage time to the changes of the moisture content

Code 1

Duncan

Week	N	Subset for alpha = 0.05
		1
10.00	4	.014718
8.00	4	.015441
6.00	4	.017379
2.00	4	.020663
4.00	4	.022129
0.00	4	.026038
Sig.		.135

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 2

Duncan

Week	N	Subset for alpha = 0.05
		1
8.00	4	.014900
6.00	4	.017398
4.00	4	.018753
2.00	4	.020342
0.00	4	.020782
10.00	4	.021345
Sig.		.493

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 3

Duncan

Week	N	Subset for alpha = 0.05
		1
0.00	4	.019042
2.00	4	.019500
8.00	4	.021913
4.00	4	.021926
6.00	4	.022592
10.00	4	.024093
Sig.		.616

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 4

Duncan

Week	N	Subset for alpha = 0.05
		1
10.00	4	.014718
8.00	4	.015441
6.00	4	.017379
2.00	4	.020663
4.00	4	.022129
0.00	4	.026038
Sig.		.135

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 5

Duncan

Week	N	Subset for alpha = 0.05
		1
8.00	4	.014900
6.00	4	.017397
4.00	4	.018753
2.00	4	.020342
0.00	4	.020782
10.00	4	.021345
Sig.		.493

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 6

Duncan

Week	N	Subset for alpha = 0.05
		1
0.00	4	.019041
2.00	4	.019500
8.00	4	.021913
4.00	4	.021926
6.00	4	.022592
10.00	4	.024093
Sig.		.616

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 7

Duncan

Week	N	Subset for alpha = 0.05
		1
10.00	6	.019967
6.00	6	.023702
8.00	6	.023744
4.00	6	.025231
2.00	6	.026408
0.00	6	.028047
Sig.		.131

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6.000.

Code 8

Duncan

Week	N	Subset for alpha = 0.05
		1
10.00	4	.015317
6.00	4	.016648
8.00	4	.017643
4.00	4	.019037
2.00	4	.020081
0.00	4	.020619
Sig.		.130

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 9

Duncan

Week	N	Subset for alpha = 0.05
		1
10.00	4	.017923
8.00	4	.018598
6.00	4	.020780
4.00	4	.021702
2.00	4	.022668
.00	4	.022779
Sig.		.152

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 10

Duncan

Week	N	Subset for alpha = 0.05
		1
.00	4	.023289
2.00	4	.023365
4.00	4	.024080
6.00	4	.028514
8.00	4	.031108
10.00	4	.032454
Sig.		.112

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 11

Duncan

Week	N	Subset for alpha = 0.05
		1
.00	4	.021695
2.00	4	.022236
4.00	4	.028563
6.00	4	.030185
10.00	4	.030504
8.00	4	.031745
Sig.		.118

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 12

Duncan

Week	N	Subset for alpha = 0.05	
		1	2
.00	4	.020217	
2.00	4	.024097	.024097
8.00	4	.028344	.028344
4.00	4	.030410	.030410
10.00	4		.033984
6.00	4		.036321
Sig.		.097	.054

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Table B.5 ANOVA table for the effects of chips thickness, storage temperature and moisture absorber to the changes of the water activity

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	week0	.003	11	.000	3.279	.003
	week2	.011	11	.001	2.166	.038
	week4	.014	11	.001	2.223	.034
	week6	.029	11	.003	4.378	.000
	week8	.018	11	.002	2.412	.022
	week10	.035	11	.003	3.321	.003
Intercept	week0	2.748	1	2.748	31182.122	.000
	week2	2.717	1	2.717	5967.362	.000
	week4	2.761	1	2.761	4979.727	.000
	week6	2.626	1	2.626	4395.745	.000
	week8	2.617	1	2.617	3800.698	.000
	week10	2.639	1	2.639	2783.247	.000
Thickness	week0	.001	1	.001	8.685	.005
	week2	.001	1	.001	1.808	.187
	week4	.002	1	.002	2.859	.099
	week6	.003	1	.003	5.446	.025
	week8	.000	1	.000	.343	.562
	week10	.003	1	.003	3.072	.088

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
MA	week0	6.193E-6	1	6.193E-6	.070	.792
	week2	.002	1	.002	4.236	.046
	week4	.004	1	.004	7.212	.011
	week6	.014	1	.014	22.937	.000
	week8	.013	1	.013	19.472	.000
	week10	.020	1	.020	21.470	.000
Temperature	week0	.000	2	.000	1.925	.160
	week2	.001	2	.000	1.033	.366
	week4	.001	2	.000	.613	.547
	week6	.001	2	.001	1.174	.320
	week8	.000	2	.000	.295	.746
	week10	.003	2	.001	1.530	.229
Thickness * MA	week0	.001	1	.001	6.146	.018
	week2	.002	1	.002	3.482	.070
	week4	.002	1	.002	3.117	.086
	week6	.001	1	.001	1.859	.181
	week8	8.505E-5	1	8.505E-5	.124	.727
	week10	.001	1	.001	1.182	.284

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Thickness *	week0	.000	2	.000	1.641	.207
Temperature	week2	.001	2	.000	.790	.461
	week4	.001	2	.001	1.032	.366
	week6	.003	2	.002	2.903	.067
	week8	.001	2	.001	1.025	.369
	week10	.005	2	.002	2.451	.100
MA *	week0	2.665E-5	2	1.332E-5	.151	.860
Temperature	week2	.001	2	.000	.883	.422
	week4	.001	2	.000	.729	.489
	week6	.004	2	.002	3.336	.046
	week8	.002	2	.001	1.185	.317
	week10	.002	2	.001	.867	.428
Thickness *	week0	.001	2	.001	7.353	.002
MA *	week2	.004	2	.002	4.871	.013
Temperature	week4	.004	2	.002	3.685	.034
	week6	.003	2	.001	2.297	.114
	week8	.002	2	.001	1.220	.306
	week10	.002	2	.001	1.108	.341

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Error	week0	.003	38	8.814E-5		
	week2	.017	38	.000		
	week4	.021	38	.001		
	week6	.023	38	.001		
	week8	.026	38	.001		
	week10	.036	38	.001		
Total	week0	2.795	50			
	week2	2.776	50			
	week4	2.837	50			
	week6	2.710	50			
	week8	2.693	50			
	week10	2.738	50			
Corrected	week0	.007	49			
Total	week2	.028	49			
	week4	.035	49			
	week6	.051	49			
	week8	.044	49			
	week10	.071	49			

Table B.6 Duncan's multiple tests for the effects of chips thickness, storage temperature and moisture absorber to the changes of the water activity

Week 0

Duncan

Code	N	Subset		
		1	2	3
8.00	4	.222000		
9.00	4	.222000		
5.00	4	.228750	.228750	
1.00	4	.235250	.235250	.235250
10.00	4	.235250	.235250	.235250
11.00	4	.235250	.235250	.235250
12.00	4	.236500	.236500	.236500
6.00	4	.237250	.237250	.237250
7.00	6		.241000	.241000
2.00	4			.244750
4.00	4			.244750
3.00	4			.248500
Sig.		.051	.112	.092

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Week2

Duncan

Code	N	Subset		
		1	2	3
8.00	4	.209250		
1.00	4	.214250	.214250	
9.00	4	.215500	.215500	
5.00	4	.222500	.222500	.222500
7.00	6	.231000	.231000	.231000
10.00	4	.236000	.236000	.236000
11.00	4	.240000	.240000	.240000
6.00	4		.247250	.247250
4.00	4		.248000	.248000
3.00	4		.249000	.249000
2.00	4			.251000
12.00	4			.251250
Sig.		.080	.052	.107

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Week4

Duncan

Code	N	Subset		
		1	2	3
8.00	4	.198500		
9.00	4	.206750	.206750	
1.00	4	.227000	.227000	.227000
10.00	4		.235750	.235750
5.00	4		.240750	.240750
2.00	4		.241250	.241250
7.00	6		.242500	.242500
11.00	4			.244750
4.00	4			.247250
6.00	4			.247750
3.00	4			.249000
12.00	4			.256750
Sig.		.109	.061	.133

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Week6

Duncan

Code	N	Subset			
		1	2	3	4
8.00	4	.183000			
9.00	4	.191000	.191000		
1.00	4	.216250	.216250	.216250	
3.00	4		.226750	.226750	
7.00	6			.229333	
5.00	4			.236250	
4.00	4			.236750	
2.00	4			.237500	
10.00	4			.237500	
11.00	4			.240750	
12.00	4			.253500	.253500
6.00	4				.279000
Sig.		.072	.053	.069	.143

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Week8

Duncan

Code	N	Subset		
		1	2	3
9.00	4	.196500		
1.00	4	.205000	.205000	
8.00	4	.206250	.206250	
3.00	4	.223000	.223000	.223000
2.00	4	.223750	.223750	.223750
7.00	6	.228000	.228000	.228000
10.00	4	.235750	.235750	.235750
4.00	4		.240000	.240000
5.00	4		.241250	.241250
11.00	4		.246500	.246500
12.00	4			.255250
6.00	4			.261500
Sig.		.069	.059	.080

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Week10

Duncan

Code	N	Subset				
		1	2	3	4	5
8.00	4	.175000				
9.00	4	.195000	.195000			
1.00	4	.207000	.207000	.207000		
7.00	6		.225333	.225333	.225333	
2.00	4		.228000	.228000	.228000	.228000
3.00	4		.235000	.235000	.235000	.235000
4.00	4		.239250	.239250	.239250	.239250
11.00	4		.243000	.243000	.243000	.243000
10.00	4		.244250	.244250	.244250	.244250
5.00	4			.246000	.246000	.246000
12.00	4				.258500	.258500
6.00	4					.278000
Sig.		.167	.054	.127	.194	.051

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.114.

Table B.7 ANOVA table for the effects of the storage time to the changes of the water activity

Code		Sum of Squares	df	Mean Square	F	Sig.
1	Between Groups	.003	5	.001	5.452	.003
	Within Groups	.002	18	.000		
	Total	.005	23			
2	Between Groups	.002	5	.000	.186	.964
	Within Groups	.041	18	.002		
	Total	.043	23			
3	Between Groups	.003	5	.001	.196	.960
	Within Groups	.052	18	.003		
	Total	.055	23			
4	Between Groups	.000	5	.000	.637	.675
	Within Groups	.002	18	.000		
	Total	.003	23			
5	Between Groups	.002	5	.000	7.471	.001
	Within Groups	.001	18	.000		
	Total	.002	23			
6	Between Groups	.006	5	.001	5.922	.002
	Within Groups	.004	18	.000		
	Total	.010	23			
7	Between Groups	.002	5	.000	.532	.750
	Within Groups	.017	30	.001		
	Total	.019	35			
8	Between Groups	.006	5	.001	17.950	.000
	Within Groups	.001	18	.000		
	Total	.007	23			
9	Between Groups	.003	5	.001	9.408	.000
	Within Groups	.001	18	.000		
	Total	.004	23			

Code		Sum of Squares	df	Mean Square	F	Sig.
10	Between Groups	.000	5	.000	.883	.513
	Within Groups	.001	18	.000		
	Total	.001	23			
11	Between Groups	.000	5	.000	.427	.824
	Within Groups	.003	18	.000		
	Total	.003	23			
12	Between Groups	.001	5	.000	2.740	.052
	Within Groups	.002	18	.000		
	Total	.003	23			

Table B.8 Duncan's multiple tests for the effects of the storage time to the changes of the water activity

Code 1

Duncan

Week	N	Subset for alpha = 0.05		
		1	2	3
8.00	4	.205000		
10.00	4	.207000		
2.00	4	.214250	.214250	
6.00	4	.216250	.216250	
4.00	4		.227000	.227000
0.00	4			.235250
Sig.		.161	.104	.259

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 2

Duncan

Week	N	Subset for alpha = 0.05
		1
8.00	4	.223750
10.00	4	.228000
6.00	4	.237500
4.00	4	.241250
0.00	4	.244750
2.00	4	.251000
Sig.		.480

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 3

Duncan

Week	N	Subset for alpha = 0.05
		1
8.00	4	.223000
6.00	4	.226750
10.00	4	.235000
0.00	4	.248500
2.00	4	.249000
4.00	4	.249000
Sig.		.550

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 5

Duncan

Week	N	Subset for alpha = 0.05		
		1	2	3
2.00	4	.222500		
0.00	4	.228750	.228750	
6.00	4		.236250	.236250
4.00	4			.240750
8.00	4			.241250
10.00	4			.246000
Sig.		.185	.116	.063

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 4

Duncan

Week	N	Subset for alpha = 0.05
		1
6.00	4	.236750
10.00	4	.239250
8.00	4	.240000
0.00	4	.244750
4.00	4	.247250
2.00	4	.248000
Sig.		.239

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 6

Duncan

Week	N	Subset for alpha = 0.05		
		1	2	3
0.00	4	.237250		
2.00	4	.247250	.247250	
4.00	4	.247750	.247750	
8.00	4		.261500	.261500
10.00	4			.278000
6.00	4			.279000
Sig.		.337	.197	.116

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 7

Duncan

Week	N	Subset for alpha = 0.05
		1
10.00	6	.225333
8.00	6	.228000
6.00	6	.229333
2.00	6	.231000
0.00	6	.241000
4.00	6	.242500
Sig.		.286

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 6.000.

Code 8

Duncan

Week	N	Subset for alpha = 0.05		
		1	2	3
10.00	4	.175000		
6.00	4	.183000		
4.00	4		.198500	
8.00	4		.206250	
2.00	4		.209250	
0.00	4			.222000
Sig.		.186	.096	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 9

Duncan

Week	N	Subset for alpha = 0.05			
		1	2	3	4
6.00	4	.191000			
10.00	4	.195000	.195000		
8.00	4	.196500	.196500		
4.00	4		.206750	.206750	
2.00	4			.215500	.215500
0.00	4				.222000
Sig.		.375	.066	.143	.270

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 10

Duncan

Week	N	Subset for alpha = 0.05
		1
0.00	4	.235250
4.00	4	.235750
8.00	4	.235750
2.00	4	.236000
6.00	4	.237500
10.00	4	.244250
Sig.		.138

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 11

Duncan

Week	N	Subset for alpha = 0.05
		1
0.00	4	.235250
2.00	4	.240000
6.00	4	.240750
10.00	4	.243000
4.00	4	.244750
8.00	4	.246500
Sig.		.261

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Code 12

Duncan

Week	N	Subset for alpha = 0.05	
		1	2
0.00	4	.236500	
2.00	4		.251250
6.00	4		.253500
8.00	4		.255250
4.00	4		.256750
10.00	4		.258500
Sig.		1.000	.351

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4.000.

Table B.9 ANOVA table for the effects of chips thickness, storage temperature and moisture absorber to the changes of the hardness

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	week0	514.416 ^a	11	46.765	9.846	.000
	week2	605.575 ^b	11	55.052	6.304	.001
	week4	551.169 ^c	11	50.106	5.883	.002
	week6	505.193 ^d	11	45.927	4.013	.010
	week8	1105.679 ^e	11	100.516	1.769	.163
	week10	7849.300 ^f	11	713.573	1.262	.341
Intercept	week0	17267.394	1	17267.394	3635.438	.000
	week2	19845.285	1	19845.285	2272.505	.000
	week4	19391.423	1	19391.423	2276.815	.000
	week6	19873.156	1	19873.156	1736.320	.000
	week8	23502.624	1	23502.624	413.581	.000
	week10	36043.393	1	36043.393	63.721	.000
Thickness	week0	437.694	1	437.694	92.151	.000
	week2	387.981	1	387.981	44.428	.000
	week4	351.789	1	351.789	41.305	.000
	week6	355.043	1	355.043	31.020	.000
	week8	51.054	1	51.054	.898	.360
	week10	533.754	1	533.754	.944	.349
MA	week0	.459	1	.459	.097	.761
	week2	.624	1	.624	.071	.793
	week4	.073	1	.073	.009	.928
	week6	.557	1	.557	.049	.829
	week8	84.949	1	84.949	1.495	.243
	week10	566.339	1	566.339	1.001	.335
Temperature	week0	39.398	2	19.699	4.147	.040
	week2	127.256	2	63.628	7.286	.008
	week4	75.251	2	37.625	4.418	.034
	week6	89.066	2	44.533	3.891	.047
	week8	224.993	2	112.497	1.980	.178
	week10	2879.187	2	1439.593	2.545	.117

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Thickness * MA	week0	6.544	1	6.544	1.378	.262
	week2	42.092	1	42.092	4.820	.047
	week4	62.833	1	62.833	7.377	.018
	week6	8.472	1	8.472	.740	.405
	week8	29.274	1	29.274	.515	.486
	week10	49.658	1	49.658	.088	.772
Thickness * Temperature	week0	40.959	2	20.480	4.312	.037
	week2	46.957	2	23.479	2.689	.105
	week4	45.268	2	22.634	2.658	.108
	week6	41.217	2	20.609	1.801	.204
	week8	344.593	2	172.297	3.032	.083
	week10	3090.316	2	1545.158	2.732	.102
MA * Temperature	week0	2.160	2	1.080	.227	.800
	week2	12.170	2	6.085	.697	.516
	week4	.660	2	.330	.039	.962
	week6	18.537	2	9.268	.810	.466
	week8	234.043	2	117.022	2.059	.167
	week10	526.294	2	263.147	.465	.638
Thickness * MA * Temperature	week0	3.485	2	1.742	.367	.700
	week2	4.891	2	2.446	.280	.760
	week4	33.608	2	16.804	1.973	.179
	week6	2.958	2	1.479	.129	.880
	week8	149.968	2	74.984	1.320	.301
	week10	238.964	2	119.482	.211	.812
Error	week0	61.747	13	4.750		
	week2	113.526	13	8.733		
	week4	110.720	13	8.517		
	week6	148.792	13	11.446		
	week8	738.754	13	56.827		
	week10	7353.375	13	565.644		

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Total	week0	18093.055	25			
	week2	20746.615	25			
	week4	20311.760	25			
	week6	20882.277	25			
	week8	25511.855	25			
	week10	50995.455	25			

Table B.10 Duncan's multiple tests for the effects of chips thickness, storage temperature and moisture absorber to the changes of the hardness

Week0

Duncan

Code	N	Subset					
		1	2	3	4	5	6
5.00	2	20.557500					
4.00	2	20.854000					
2.00	2	22.189500	22.189500				
3.00	2	22.980000	22.980000	22.980000			
6.00	2	23.346000	23.346000	23.346000			
1.00	2	23.495500	23.495500	23.495500			
7.00	3		27.008333	27.008333	27.008333		
10.00	2			27.519000	27.519000	27.519000	
8.00	2				31.916000	31.916000	31.916000
9.00	2				31.916000	31.916000	31.916000
12.00	2					32.202500	32.202500
11.00	2						33.390000
Sig.		.239	.062	.076	.054	.064	.537

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week2

Duncan

Code	N	Subset				
		1	2	3	4	5
5.00	2	19.789000				
4.00	2	22.965500	22.965500			
1.00	2	23.263500	23.263500			
2.00	2	24.003000	24.003000	24.003000		
6.00	2	26.018000	26.018000	26.018000	26.018000	
7.00	3		27.110333	27.110333	27.110333	
10.00	2			30.251000	30.251000	30.251000
3.00	2			30.295000	30.295000	30.295000
8.00	2				31.990000	31.990000
9.00	2					34.413000
12.00	2					34.714500
11.00	2					35.428500
Sig.		.073	.218	.071	.084	.133

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week4

Duncan

Code	N	Subset			
		1	2	3	4
5.00	2	20.263500			
4.00	2	23.000000	23.000000		
1.00	2	23.339500	23.339500		
6.00	2	24.870000	24.870000	24.870000	
2.00	2	25.841000	25.841000	25.841000	
10.00	2		28.072500	28.072500	
3.00	2		28.200000	28.200000	
7.00	3		28.233667	28.233667	
9.00	2			30.698000	30.698000
8.00	2			31.526500	31.526500
12.00	2				35.105000
11.00	2				37.178500
Sig.		.101	.128	.059	.057

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week6

Duncan

Code	N	Subset		
		1	2	3
5.00	2	21.321000		
4.00	2	21.863500		
2.00	2	23.323000	23.323000	
1.00	2	24.264500	24.264500	
6.00	2	28.350000	28.350000	28.350000
3.00	2	28.363500	28.363500	28.363500
10.00	2	28.969000	28.969000	28.969000
7.00	3		30.170667	30.170667
9.00	2		31.275000	31.275000
11.00	2			33.273000
8.00	2			33.745000
12.00	2			35.562000
Sig.		.061	.053	.077

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week8

Duncan

Code	N	Subset	
		1	2
5.00	2	21.010000	
4.00	2	22.454000	
1.00	2	25.372000	
9.00	2	27.019000	
7.00	3	28.674333	
3.00	2	30.159500	30.159500
2.00	2	30.423000	30.423000
8.00	2	32.356000	32.356000
10.00	2	33.317000	33.317000
12.00	2	34.791500	34.791500
11.00	2	37.605000	37.605000
6.00	2		47.087000
Sig.		.071	.063

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week10

Duncan

Code	N	Subset	
		1	2
5.00	2	26.034000	
1.00	2	26.268500	
2.00	2	26.866500	
9.00	2	27.411000	
7.00	3	28.881667	
4.00	2	30.139000	
10.00	2	32.018500	
8.00	2	34.276500	
12.00	2	38.660000	38.660000
11.00	2	40.119500	40.119500
3.00	2	56.824000	56.824000
6.00	2		91.034500
Sig.		.259	.059

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Table B.11 ANOVA table for the effects of the storage time to the changes of the hardness

Code		Sum of Squares	df	Mean Square	F	Sig.
1	Between Groups	15.325	5	3.065	.544	.740
	Within Groups	33.824	6	5.637		
	Total	49.149	11			
2	Between Groups	88.277	5	17.655	3.443	.082
	Within Groups	30.770	6	5.128		
	Total	119.047	11			
3	Between Groups	1455.349	5	291.070	1.663	.276
	Within Groups	1050.100	6	175.017		
	Total	2505.449	11			

Code		Sum of Squares	df	Mean Square	F	Sig.
4	Between Groups	110.746	5	22.149	1.233	.397
	Within Groups	107.777	6	17.963		
	Total	218.523	11			
5	Between Groups	52.348	5	10.470	.679	.656
	Within Groups	92.581	6	15.430		
	Total	144.929	11			
6	Between Groups	6984.308	5	1396.862	1.259	.388
	Within Groups	6656.911	6	1109.485		
	Total	13641.220	11			
7	Between Groups	21.159	5	4.232	1.154	.386
	Within Groups	44.021	12	3.668		
	Total	65.180	17			
8	Between Groups	12.332	5	2.466	.230	.936
	Within Groups	64.240	6	10.707		
	Total	76.572	11			
9	Between Groups	79.208	5	15.842	.717	.634
	Within Groups	132.633	6	22.106		
	Total	211.841	11			
10	Between Groups	52.140	5	10.428	.407	.829
	Within Groups	153.618	6	25.603		
	Total	205.758	11			
11	Between Groups	70.691	5	14.138	.614	.696
	Within Groups	138.202	6	23.034		
	Total	208.893	11			
12	Between Groups	42.989	5	8.598	2.320	.167
	Within Groups	22.236	6	3.706		
	Total	65.225	11			

Table B.12 Duncan's multiple tests for the effects of the storage time to the changes of the hardness

Code 1

Duncan

Week	N	Subset for alpha = 0.05
		1
2.00	2	23.263500
4.00	2	23.339500
0.00	2	23.495500
6.00	2	24.264500
8.00	2	25.372000
10.00	2	26.268500
Sig.		.271

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 2

Duncan

Week	N	Subset for alpha = 0.05	
		1	2
0.00	2	22.189500	
6.00	2	23.323000	
2.00	2	24.003000	
4.00	2	25.841000	25.841000
10.00	2	26.866500	26.866500
8.00	2		30.423000
Sig.		.099	.099

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 3

Duncan

Week	N	Subset for alpha = 0.05
		1
0.00	2	22.980000
4.00	2	28.200000
6.00	2	28.363500
8.00	2	30.159500
2.00	2	30.295000
10.00	2	56.824000
Sig.		.053

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 4

Duncan

Week	N	Subset for alpha = 0.05
		1
0.00	2	20.854000
6.00	2	21.863500
8.00	2	22.454000
2.00	2	22.965500
4.00	2	23.000000
10.00	2	30.139000
Sig.		.085

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 5

Duncan

Week	N	Subset for alpha = 0.05
		1
2.00	2	19.789000
4.00	2	20.263500
0.00	2	20.557500
8.00	2	21.010000
6.00	2	21.321000
10.00	2	26.034000
Sig.		.181

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 6

Duncan

Week	N	Subset for alpha = 0.05
		1
0.00	2	23.346000
4.00	2	24.870000
2.00	2	26.018000
6.00	2	28.350000
8.00	2	47.087000
10.00	2	91.034500
Sig.		.103

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 7

Duncan

Week	N	Subset for alpha = 0.05
		1
0.00	3	27.008333
2.00	3	27.110333
4.00	3	28.233667
8.00	3	28.674333
10.00	3	28.881667
6.00	3	30.170667
Sig.		.093

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Code 8

Duncan

Week	N	Subset for alpha = 0.05
		1
4.00	2	31.526500
0.00	2	31.916000
2.00	2	31.990000
8.00	2	32.356000
6.00	2	33.745000
10.00	2	34.276500
Sig.		.447

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 9

Duncan

week	N	Subset for alpha = 0.05
		1
8.00	2	27.019000
10.00	2	27.411000
4.00	2	30.698000
6.00	2	31.275000
0.00	2	31.916000
2.00	2	34.413000
Sig.		.185

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 10

Duncan

week	N	Subset for alpha = 0.05
		1
0.00	2	27.519000
4.00	2	28.072500
6.00	2	28.969000
2.00	2	30.251000
10.00	2	32.018500
8.00	2	33.317000
Sig.		.313

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 11

Duncan

week	N	Subset for alpha = 0.05
		1
6.00	2	33.273000
0.00	2	33.390000
2.00	2	35.428500
4.00	2	37.178500
8.00	2	37.605000
10.00	2	40.119500
Sig.		.222

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 12

Duncan

week	N	Subset for alpha = 0.05	
		1	2
0.00	2	32.202500	
2.00	2	34.714500	34.714500
8.00	2	34.791500	34.791500
4.00	2	35.105000	35.105000
6.00	2	35.562000	35.562000
10.00	2		38.660000
Sig.		.149	.101

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Table B.13 ANOVA table for the effects of chips thickness, storage temperature and moisture absorber to the changes of the crispness

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	week0	50.440	11	4.585	.917	.552
	week2	95.840	11	8.713	.550	.836
	week4	128.860	11	11.715	.999	.494
	week6	205.073	11	18.643	2.104	.102
	week8	180.073	11	16.370	1.074	.446
	week10	242.693	11	22.063	1.588	.212
Intercept	week0	10543.543	1	10543.543	2108.709	.000
	week2	9792.171	1	9792.171	617.953	.000
	week4	8109.643	1	8109.643	691.314	.000
	week6	8461.376	1	8461.376	955.119	.000
	week8	8385.376	1	8385.376	550.092	.000
	week10	7227.733	1	7227.733	520.077	.000
Thickness	week0	10.971	1	10.971	2.194	.162
	week2	2.743	1	2.743	.173	.684
	week4	.043	1	.043	.004	.953
	week6	14.405	1	14.405	1.626	.225
	week8	29.719	1	29.719	1.950	.186
	week10	35.219	1	35.219	2.534	.135
MA	week0	.171	1	.171	.034	.856
	week2	20.743	1	20.743	1.309	.273
	week4	46.671	1	46.671	3.979	.067
	week6	39.433	1	39.433	4.451	.055
	week8	34.405	1	34.405	2.257	.157
	week10	40.305	1	40.305	2.900	.112
Temperature	week0	12.232	2	6.116	1.223	.326
	week2	12.824	2	6.412	.405	.675
	week4	30.143	2	15.072	1.285	.310
	week6	30.947	2	15.474	1.747	.213
	week8	24.947	2	12.474	.818	.463
	week10	48.359	2	24.180	1.740	.214

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Thickness * MA	week0	20.743	1	20.743	4.149	.063
	week2	2.743	1	2.743	.173	.684
	week4	3.471	1	3.471	.296	.596
	week6	11.433	1	11.433	1.291	.276
	week8	17.719	1	17.719	1.162	.301
	week10	26.076	1	26.076	1.876	.194
Thickness * Temperature	week0	3.614	2	1.807	.361	.703
	week2	42.338	2	21.169	1.336	.297
	week4	10.585	2	5.292	.451	.647
	week6	28.124	2	14.062	1.587	.242
	week8	33.447	2	16.724	1.097	.363
	week10	79.094	2	39.547	2.846	.094
MA * Temperature	week0	.085	2	.042	.008	.992
	week2	5.647	2	2.824	.178	.839
	week4	4.849	2	2.425	.207	.816
	week6	48.359	2	24.180	2.729	.102
	week8	8.418	2	4.209	.276	.763
	week10	10.624	2	5.312	.382	.690
Thickness * MA * Temperature	week0	4.232	2	2.116	.423	.664
	week2	10.926	2	5.463	.345	.715
	week4	36.614	2	18.307	1.561	.247
	week6	38.359	2	19.180	2.165	.154
	week8	29.918	2	14.959	.981	.401
	week10	10.094	2	5.047	.363	.702
Error	week0	65.000	13	5.000		
	week2	206.000	13	15.846		
	week4	152.500	13	11.731		
	week6	115.167	13	8.859		
	week8	198.167	13	15.244		
	week10	180.667	13	13.897		

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Total	week0	10807.000	25			
	week2	10222.000	25			
	week4	8526.000	25			
	week6	8895.000	25			
	week8	8953.000	25			
	week10	7785.000	25			
Corrected Total	week0	115.440	24			
	week2	301.840	24			
	week4	281.360	24			
	week6	320.240	24			
	week8	378.240	24			
	week10	423.360	24			

Table B.14 Duncan's multiple tests for the effects of chips thickness, storage temperature and moisture absorber to the changes of the crispness

Week 0			
Duncan			
code	N	Subset	
		1	2
6.00	2	18.00	
4.00	2	19.50	19.50
3.00	2	20.00	20.00
5.00	2	20.00	20.00
8.00	2	20.00	20.00
9.00	2	20.00	20.00
2.00	2	20.50	20.50
7.00	3	21.00	21.00
11.00	2	21.00	21.00
1.00	2	22.00	22.00
12.00	2	22.00	22.00
10.00	2		24.00
Sig.		.131	.094

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week 2			
Duncan			
code	N	Subset	
		1	
11.00	2	16.50	
6.00	2	17.00	
3.00	2	19.00	
4.00	2	19.00	
5.00	2	19.00	
8.00	2	19.00	
7.00	3	20.00	
12.00	2	20.50	
2.00	2	21.50	
1.00	2	22.00	
10.00	2	22.00	
9.00	2	23.50	
Sig.		.137	

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week 4

Duncan

code	N	Subset	
		1	2
11.00	2	13.00	
6.00	2	16.50	16.50
12.00	2	16.50	16.50
2.00	2	17.00	17.00
4.00	2	17.00	17.00
5.00	2	18.00	18.00
8.00	2	18.50	18.50
3.00	2	19.00	19.00
7.00	3	19.00	19.00
10.00	2	19.50	19.50
1.00	2		21.50
9.00	2		22.00
Sig.		.112	.170

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week 6

Duncan

code	N	Subset	
		1	2
6.00	2	12.00	
12.00	2	15.50	15.50
2.00	2	16.00	16.00
11.00	2	17.00	17.00
3.00	2	18.00	18.00
7.00	3	18.67	18.67
4.00	2		19.50
10.00	2		19.50
5.00	2		20.00
1.00	2		21.00
8.00	2		22.50
9.00	2		22.50
Sig.		.061	.056

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week 8

Duncan

code	N	Subset	
		1	2
6.00	2	12.00	
11.00	2	16.00	16.00
3.00	2	16.50	16.50
2.00	2	17.50	17.50
12.00	2	18.00	18.00
4.00	2	18.50	18.50
10.00	2	18.50	18.50
1.00	2	19.00	19.00
5.00	2	20.50	20.50
7.00	3	20.67	20.67
9.00	2		21.50
8.00	2		22.50
Sig.		.068	.157

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Week 10

Duncan

code	N	Subset	
		1	2
6.00	2	11.50	
3.00	2	13.50	13.50
2.00	2	14.50	14.50
12.00	2	14.50	14.50
10.00	2	15.50	15.50
5.00	2	17.00	17.00
11.00	2	18.00	18.00
7.00	3	18.33	18.33
4.00	2	18.50	18.50
1.00	2	20.50	20.50
9.00	2		21.00
8.00	2		22.50
Sig.		.050	.051

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.057.

Table B.15 ANOVA table for the effects of the storage time to the changes of the crispness

Code		Sum of Squares	df	Mean Square	F	Sig.
1	Between Groups	13.000	5	2.600	.284	.906
	Within Groups	55.000	6	9.167		
	Total	68.000	11			
2	Between Groups	71.667	5	14.333	.878	.547
	Within Groups	98.000	6	16.333		
	Total	169.667	11			
3	Between Groups	55.667	5	11.133	.395	.836
	Within Groups	169.000	6	28.167		
	Total	224.667	11			

Code		Sum of Squares	df	Mean Square	F	Sig.
4	Between Groups	8.667	5	1.733	.133	.979
	Within Groups	78.000	6	13.000		
	Total	86.667	11			
5	Between Groups	18.417	5	3.683	.406	.830
	Within Groups	54.500	6	9.083		
	Total	72.917	11			
6	Between Groups	88.000	5	17.600	1.371	.352
	Within Groups	77.000	6	12.833		
	Total	165.000	11			
7	Between Groups	18.278	5	3.656	.348	.874
	Within Groups	126.000	12	10.500		
	Total	144.278	17			
8	Between Groups	35.667	5	7.133	1.529	.308
	Within Groups	28.000	6	4.667		
	Total	63.667	11			
9	Between Groups	14.750	5	2.950	.270	.914
	Within Groups	65.500	6	10.917		
	Total	80.250	11			
10	Between Groups	85.667	5	17.133	1.977	.215
	Within Groups	52.000	6	8.667		
	Total	137.667	11			
11	Between Groups	68.417	5	13.683	1.199	.409
	Within Groups	68.500	6	11.417		
	Total	136.917	11			
12	Between Groups	85.667	5	17.133	2.235	.178
	Within Groups	46.000	6	7.667		
	Total	131.667	11			

Table B.16 Duncan's multiple tests for the effects of the storage time to the changes of the crispness

Code 1

Duncan

week	N	Subset for alpha = 0.05
		1
8.00	2	19.000000
10.00	2	20.500000
6.00	2	21.000000
4.00	2	21.500000
0.00	2	22.000000
2.00	2	22.000000
Sig.		.376

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 2

Duncan

week	N	Subset for alpha = 0.05
		1
10.00	2	14.500000
6.00	2	16.000000
4.00	2	17.000000
8.00	2	17.500000
0.00	2	20.500000
2.00	2	21.500000
Sig.		.151

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 3

Duncan

week	N	Subset for alpha = 0.05
		1
10.00	2	13.500000
8.00	2	16.500000
6.00	2	18.000000
2.00	2	19.000000
4.00	2	19.000000
0.00	2	20.000000
Sig.		.284

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 4

Duncan

week	N	Subset for alpha = 0.05
		1
4.00	2	17.000000
8.00	2	18.500000
10.00	2	18.500000
2.00	2	19.000000
0.00	2	19.500000
6.00	2	19.500000
Sig.		.526

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 5

Duncan

week	N	Subset for alpha = 0.05
		1
10.00	2	17.000000
4.00	2	18.000000
2.00	2	19.000000
0.00	2	20.000000
6.00	2	20.000000
8.00	2	20.500000
Sig.		.307

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 6

Duncan

week	N	Subset for alpha = 0.05
		1
10.00	2	11.500000
6.00	2	12.000000
8.00	2	12.000000
4.00	2	16.500000
2.00	2	17.000000
0.00	2	18.000000
Sig.		.136

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 7

Duncan

week	N	Subset for alpha = 0.05
		1
10.00	3	18.333333
6.00	3	18.666667
4.00	3	19.000000
2.00	3	20.000000
8.00	3	20.666667
0.00	3	21.000000
Sig.		.378

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Code 8

Duncan

week	N	Subset for alpha = 0.05
		1
4.00	2	18.500000
2.00	2	19.000000
0.00	2	20.000000
6.00	2	22.500000
8.00	2	22.500000
10.00	2	22.500000
Sig.		.130

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 9

Duncan

week	N	Subset for alpha = 0.05
		1
0.00	2	20.000000
10.00	2	21.000000
8.00	2	21.500000
4.00	2	22.000000
6.00	2	22.500000
2.00	2	23.500000
Sig.		.347

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 10

Duncan

week	N	Subset for alpha = 0.05	
		1	2
10.00	2	15.500000	
8.00	2	18.500000	18.500000
4.00	2	19.500000	19.500000
6.00	2	19.500000	19.500000
2.00	2	22.000000	22.000000
.00	2		24.000000
Sig.		.082	.127

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 11

Duncan

week	N	Subset for alpha = 0.05
		1
4.00	2	13.000000
8.00	2	16.000000
2.00	2	16.500000
6.00	2	17.000000
10.00	2	18.000000
.00	2	21.000000
Sig.		.068

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

Code 12

Duncan

week	N	Subset for alpha = 0.05	
		1	2
10.00	2	14.500000	
6.00	2	15.500000	15.500000
4.00	2	16.500000	16.500000
8.00	2	18.000000	18.000000
2.00	2	20.500000	20.500000
.00	2		22.000000
Sig.		.087	.069

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 2.000.

APPENDIX C
Experimental Storage Data

Table C.1 Experimental data of moisture content for 3-mm banana chips with moisture absorber during storage at 30, 40 and 50 °C

Storage time (week)	Moisture content of banana chips (kg / kg d.b.)					
	At 30 °C		At 40 °C		At 50 °C	
	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
0	0.0204	0.0289	0.0133	0.0275	0.0133	0.0214
	0.0224	0.0298	0.0132	0.0272	0.0132	0.0267
2	0.0160	0.0211	0.0042	0.0354	0.0134	0.0260
	0.0151	0.0286	0.0041	0.0351	0.0111	0.0258
4	0.0097	0.0324	0.0076	0.0280	0.0119	0.0306
	0.0107	0.0333	0.0084	0.0292	0.0125	0.0305
6	0.0088	0.0238	0.0096	0.0244	0.0108	0.0331
	0.0106	0.0250	0.0092	0.0250	0.0111	0.0329
8	0.0055	0.0240	0.0054	0.0228	0.0044	0.0372
	0.0046	0.0263	0.0071	0.0231	0.0053	0.0378
10	0.0109	0.0187	0.0153	0.0267	0.0143	0.0333
	0.0098	0.0186	0.0146	0.0269	0.0139	0.0323

Table C.2 Experimental data of moisture content for 3-mm banana chips without moisture absorber during storage at 30, 40 and 50 °C

Storage time (week)	Moisture content of banana chips (kg / kg d.b.)					
	At 30 °C		At 40 °C		At 50 °C	
	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
0	0.0342	0.0277	0.0276	0.0277	0.0305	0.0276
	0.0359	0.0299	0.0286	0.0299	0.0315	0.0286
2	0.0342	0.0287	0.0296	0.0297	0.0330	0.0357
	0.0348	0.0304	0.0270	0.0287	0.0321	0.0377
4	0.0344	0.0281	0.0346	0.0264	0.0282	0.0399
	0.0360	0.0311	0.0342	0.0277	0.0274	0.0406
6	0.0348	0.0310	0.0272	0.0314	0.0405	0.0383
	0.0456	0.0330	0.0251	0.0318	0.0408	0.0388
8	0.0329	0.0335	0.0320	0.0293	0.0328	0.0392
	0.0357	0.0338	0.0329	0.0306	0.0323	0.0385
10	0.0362	0.0347	0.0329	0.0265	0.0327	0.0458
	0.0359	0.0345	0.0334	0.0275	0.0335	0.0447

Table C.3 Experimental data of moisture content for 5-mm banana chips with moisture absorber during storage at 30, 40 and 50 °C

Storage time (week)	Moisture content of banana chips (kg / kg d.b.)						
	At 30 °C			At 40 °C		At 50 °C	
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 1	Rep 2
0	0.0207	0.0226	0.0367	0.0223	0.0192	0.0223	0.0222
	0.0213	0.0236	0.0385	0.0221	0.0171	0.0221	0.0224
2	0.0190	0.0199	0.0369	0.0220	0.0175	0.0223	0.0218
	0.0183	0.0210	0.0389	0.0207	0.0186	0.0222	0.0223
4	0.0126	0.0284	0.0309	0.0143	0.0238	0.0157	0.0246
	0.0132	0.0307	0.0314	0.0130	0.0235	0.0175	0.0271
6	0.0137	0.0240	0.0289	0.0163	0.0158	0.0161	0.0241
	0.0167	0.0260	0.0295	0.0167	0.0167	0.0177	0.0234
8	0.0124	0.0294	0.0270	0.0153	0.0177	0.0152	0.0204
	0.0141	0.0284	0.0274	0.0171	0.0193	0.0171	0.0204
10	0.0189	0.0207	0.0175	0.0163	0.0096	0.0240	0.0120
	0.0193	0.0215	0.0196	0.0248	0.0095	0.0220	0.0123

Table C.4 Experimental data of moisture content for 5-mm banana chips without moisture absorber during storage at 30, 40 and 50 °C

Storage time (week)	Moisture content of banana chips (kg / kg d.b.)					
	At 30 °C		At 40 °C		At 50 °C	
	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
0	0.0176	0.0296	0.0138	0.0296	0.0177	0.0219
	0.0162	0.0276	0.0137	0.0276	0.0172	0.0224
2	0.0176	0.0284	0.0138	0.0276	0.0177	0.0280
	0.0162	0.0291	0.0171	0.0283	0.0172	0.0310
4	0.0173	0.0293	0.0178	0.0379	0.0204	0.0379
	0.0174	0.0299	0.0171	0.0379	0.0199	0.0395
6	0.0287	0.026	0.0275	0.0322	0.0300	0.0342
	0.0305	0.0256	0.0273	0.0302	0.0301	0.0457
8	0.0215	0.0383	0.0270	0.0325	0.0199	0.0340
	0.0207	0.0399	0.0274	0.0361	0.0201	0.0360
10	0.0325	0.0305	0.0340	0.0246	0.0309	0.0346
	0.0318	0.0309	0.0348	0.0249	0.0317	0.0343

Table C.5 Experimental data of water activity for 3-mm banana chips with moisture absorber during storage at 30, 40 and 50 °C

Storage time (week)	Water activity					
	At 30 °C		At 40 °C		At 50 °C	
	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
0	0.234	0.239	0.234	0.263	0.243	0.258
	0.235	0.233	0.222	0.260	0.242	0.251
2	0.207	0.230	0.219	0.286	0.217	0.283
	0.202	0.218	0.217	0.282	0.215	0.281
4	0.232	0.228	0.192	0.285	0.210	0.295
	0.234	0.214	0.202	0.286	0.195	0.296
6	0.221	0.220	0.195	0.284	0.184	0.273
	0.213	0.211	0.181	0.290	0.178	0.272
8	0.200	0.222	0.181	0.271	0.177	0.272
	0.190	0.208	0.171	0.272	0.172	0.271
10	0.197	0.220	0.182	0.272	0.167	0.307
	0.196	0.215	0.183	0.275	0.158	0.308

Table C.6 Experimental data of water activity for 3-mm banana chips without moisture absorber during storage at 30, 40 and 50 °C

Storage time (week)	Water activity					
	At 30 °C		At 40 °C		At 50 °C	
	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
0	0.250	0.250	0.230	0.225	0.250	0.230
	0.244	0.235	0.225	0.235	0.244	0.225
2	0.243	0.265	0.226	0.222	0.242	0.253
	0.233	0.251	0.222	0.220	0.239	0.255
4	0.258	0.241	0.250	0.238	0.236	0.261
	0.255	0.235	0.243	0.232	0.235	0.259
6	0.246	0.229	0.246	0.228	0.270	0.292
	0.244	0.228	0.245	0.226	0.269	0.285
8	0.253	0.229	0.244	0.243	0.245	0.279
	0.252	0.226	0.242	0.236	0.244	0.278
10	0.252	0.233	0.250	0.246	0.265	0.292
	0.247	0.225	0.250	0.238	0.261	0.278

Table C.7 Experimental data of water activity for 5-mm banana chips with moisture absorber during storage at 30, 40 and 50 °C

Storage time (week)	Water activity						
	At 30 °C			At 40 °C		At 50 °C	
	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 1	Rep 2
0	0.237	0.263	0.235	0.231	0.215	0.231	0.215
	0.235	0.245	0.231	0.227	0.215	0.227	0.215
2	0.193	0.251	0.254	0.218	0.210	0.220	0.212
	0.190	0.248	0.250	0.218	0.191	0.220	0.210
4	0.226	0.252	0.259	0.198	0.200	0.207	0.203
	0.213	0.249	0.256	0.196	0.200	0.213	0.204
6	0.203	0.244	0.247	0.189	0.188	0.186	0.203
	0.201	0.238	0.243	0.176	0.179	0.181	0.194
8	0.194	0.248	0.246	0.200	0.215	0.197	0.204
	0.186	0.249	0.245	0.194	0.216	0.192	0.193
10	0.193	0.245	0.246	0.179	0.176	0.209	0.191
	0.190	0.236	0.242	0.173	0.172	0.200	0.180

Table C.8 Experimental data of water activity for 5-mm banana chips without moisture absorber during storage at 30, 40 and 50 °C

Storage time (week)	Water activity					
	At 30 °C		At 40 °C		At 50 °C	
	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
0	0.230	0.240	0.236	0.242	0.234	0.242
	0.236	0.235	0.226	0.237	0.233	0.237
2	0.223	0.241	0.218	0.259	0.243	0.254
	0.234	0.246	0.221	0.262	0.253	0.255
4	0.238	0.246	0.242	0.251	0.246	0.264
	0.223	0.236	0.235	0.251	0.241	0.276
6	0.239	0.236	0.226	0.253	0.257	0.258
	0.238	0.237	0.236	0.248	0.242	0.257
8	0.232	0.244	0.248	0.250	0.250	0.260
	0.227	0.240	0.246	0.242	0.248	0.263
10	0.237	0.250	0.250	0.237	0.249	0.270
	0.239	0.251	0.250	0.235	0.248	0.267

Table C.9 Experimental data of hardness for 3-mm banana chips with moisture absorber during storage at 30 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	25.93	33.72	20.09	27.50	25.03	34.87	20.73	30.69	24.02	24.70	21.07	18.08
2	32.89	25.21	30.66	25.87	26.17	26.46	19.40	18.73	18.28	17.21	20.57	13.23
3	17.62	25.19	23.48	26.24	23.56	20.30	25.92	24.79	20.85	28.05	9.29	20.15
4	31.95	21.13	28.81	31.58	40.77	19.21	28.60	18.50	19.05	12.57	22.23	30.28
5	25.97	19.79	13.35	28.28	30.72	30.75	14.93	22.93	24.52	31.40	10.03	21.91
6	18.54	25.02	28.96	23.77	25.34	21.92	27.05	17.97	29.14	21.26	23.26	29.81
7	20.67	25.90	25.51	26.37	25.40	25.77	-	22.31	23.65	27.94	9.08	49.02
8	23.96	22.19	22.82	22.36	20.63	32.73	-	-	12.92	15.37	29.82	25.78
9	17.44	20.13	24.66	20.36	28.96	31.45	-	-	19.72	23.47	12.42	12.81
10	27.23	-	29.11	29.27	34.38	25.74	-	-	29.93	18.41	22.68	36.95
11	-	-	29.94	32.02	24.37	33.82	-	-	9.53	27.93	16.80	16.87
12	-	-	22.90	17.84	-	-	-	-	-	-	21.29	-
13	-	-	32.83	-	-	-	-	-	-	-	-	-

Table C.10 Experimental data of hardness for 3-mm banana chips without moisture absorber during storage at 30 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	22.44	17.11	18.72	14.66	30.81	36.46	25.39	22.83	25.42	18.00	21.86	21.99
2	22.98	21.80	9.05	18.51	23.91	49.15	25.05	22.06	25.69	42.37	15.34	25.00
3	21.26	21.78	26.55	27.07	29.70	30.08	15.55	29.75	25.76	28.73	15.90	33.18
4	22.04	14.10	17.92	17.66	21.36	39.01	16.01	19.88	24.39	22.68	23.63	25.43
5	17.89	24.87	27.49	18.99	19.11	24.10	14.74	30.50	29.18	22.43	29.76	11.75
6	18.46	32.59	30.82	17.52	26.27	32.81	31.49	13.37	16.69	21.20	18.72	18.07
7	25.49	16.49	14.35	8.52	19.91	43.12	20.11	31.50	19.81	27.91	19.14	35.32
8	15.86	24.48	17.46	12.77	17.99	37.81	18.33	22.70	25.42	23.52	15.29	25.77
9	13.39	17.13	27.29	19.75	16.69	34.81	30.90	23.34	20.76	29.53	29.37	20.89
10	13.27	28.39	25.71	22.11	36.37	28.29	27.76	20.41	20.82	20.28	15.40	23.16
11	17.21	32.41	26.82	26.78	22.66	41.13	14.79	23.63	16.25	20.01	23.02	-
12	20.41	23.69	36.89	-	31.66	37.89	-	16.35	-	-	15.01	-
13	25.93	-	-	-	-	-	-	-	-	-	-	-
14	21.69	-	-	-	-	-	-	-	-	-	-	-

Table C.11 Experimental data of hardness for 3-mm banana chips with moisture absorber during storage at 40 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	17.49	21.13	23.65	26.02	19.72	27.97	16.88	11.32	17.17	32.94	32.13	52.54
2	21.55	24.41	15.25	13.23	23.32	29.71	24.24	33.77	29.30	35.62	29.90	32.82
3	11.76	25.48	11.76	23.93	31.61	28.87	17.01	30.02	19.88	17.07	39.13	30.03
4	20.57	25.01	30.58	15.96	28.62	29.94	24.35	33.64	39.05	18.36	24.30	28.64
5	20.02	26.18	16.21	20.62	42.12	24.70	22.52	23.85	33.13	31.69	33.45	45.50
6	17.66	23.35	16.25	20.69	42.17	35.71	18.61	23.33	27.59	21.53	37.05	36.10
7	24.16	30.64	25.33	18.94	20.52	9.36	17.89	17.03	30.28	24.25	32.49	28.04
8	33.68	19.52	25.09	26.55	36.77	14.58	31.73	-	51.30	17.90	30.35	23.28
9	24.96	19.03	18.62	32.77	15.36	16.78	16.50	-	20.65	22.86	23.26	24.67
10	20.01	23.76	15.44	14.89	43.25	22.57	20.66	-	35.61	14.04	35.77	28.98
11	22.07	37.25	11.95	23.88	25.51	8.09	33.18	-	33.49	37.50	21.48	13.55
12	15.16	13.74	15.11	24.53	-	-	33.19	-	31.39	-	25.00	21.43
13	18.33	13.36	-	20.85	-	-	32.74	-	32.31	-	37.92	35.55
14	-	-	-	-	-	-	-	-	45.60	-	-	35.12
15	-	-	-	-	-	-	-	-	46.94	-	-	-

Table C.12 Experimental data of hardness for 3-mm banana chips without moisture absorber during storage at 40 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	15.79	22.46	24.68	21.38	7.21	31.06	25.39	20.70	14.23	17.55	16.08	27.01
2	20.42	23.47	18.40	17.74	25.41	21.58	25.05	30.73	16.74	22.68	24.81	19.65
3	26.43	17.47	26.03	12.91	29.57	34.63	15.55	22.92	25.60	27.74	20.51	15.55
4	19.05	21.20	20.94	22.69	22.79	31.81	16.01	17.47	7.23	22.91	16.91	32.30
5	22.67	15.15	16.29	31.69	15.97	58.10	14.74	18.20	11.95	22.23	18.93	19.51
6	9.68	19.00	17.98	20.12	33.29	51.91	31.49	17.30	16.02	15.74	18.39	16.85
7	26.68	14.23	24.69	23.08	18.03	20.69	20.11	24.75	13.16	23.89	28.03	22.43
8	15.73	29.14	19.02	22.53	17.40	26.64	18.33	18.59	27.06	18.06	26.51	18.77
9	20.30	15.38	13.44	23.94	14.72	29.21	30.90	18.75	27.25	19.70	19.06	-
10	16.13	7.75	17.87	16.72	26.89	49.37	27.76	27.12	17.21	22.47	14.22	-
11	-	11.93	20.01	25.37	33.56	11.97	14.79	-	-	-	23.77	-
12	-	-	-	17.97	10.61	24.73	-	-	-	-	19.79	-
13	-	-	-	-	23.23	29.90	-	-	-	-	-	-

Table C.13 Experimental data of hardness for 3-mm banana chips with moisture absorber during storage at 50 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	17.49	23.16	21.57	13.48	36.16	27.47	40.02	31.71	32.89	18.97	27.15	105.31
2	21.55	20.67	24.50	29.21	24.16	16.72	30.96	34.17	29.16	18.28	34.46	43.08
3	11.76	15.48	20.00	12.73	15.01	16.06	19.64	48.97	32.88	21.46	42.16	152.40
4	20.57	40.09	20.99	27.28	23.85	21.44	23.85	44.00	23.32	31.29	50.21	230.52
5	20.02	22.64	18.81	18.80	15.39	21.38	17.99	20.34	24.95	19.15	34.85	61.50
6	17.66	21.34	20.58	18.73	18.11	25.84	30.92	34.14	41.92	24.36	31.22	51.94
7	24.16	22.00	18.72	13.48	17.79	40.62	11.65	56.01	37.40	43.51	40.31	74.70
8	33.68	16.78	14.92	20.93	22.82	21.43	44.31	31.61	48.28	27.52	42.93	45.65
9	24.96	22.55	23.44	17.10	13.62	20.43	17.32	48.04	50.42	18.08	47.46	120.62
10	20.01	20.58	30.12	23.26	13.71	26.25	22.51	29.06	22.71	56.36	64.48	92.93
11	22.07	31.74	15.87	21.41	17.96	11.00	8.59	49.89	52.65	32.42	40.44	28.20
12	15.16	22.10	-	15.44	-	14.95	32.89	25.50	31.37	27.83	37.28	161.11
13	18.33	-	-	-	-	14.39	29.42	31.82	29.55	42.91	21.92	31.49
14	-	-	-	-	-	-	-	-	39.96	-	51.40	-

Table C.14 Experimental data of hardness for 3-mm banana chips without moisture absorber during storage at 50 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	39.43	19.19	10.89	53.51	39.18	41.66	15.79	23.00	18.35	29.45	51.21	98.28
2	31.33	30.18	19.14	12.81	9.58	13.99	20.42	22.09	20.87	32.75	57.22	107.80
3	12.85	27.57	27.40	54.26	63.50	55.09	26.43	26.56	19.90	21.83	63.71	176.86
4	24.78	38.94	43.16	23.27	45.35	26.38	19.05	24.43	21.55	22.84	74.41	241.28
5	40.40	14.37	23.29	38.57	28.33	49.93	22.67	35.18	37.40	26.97	67.19	278.64
6	21.23	18.74	17.85	35.49	36.00	29.57	9.68	24.02	15.70	38.50	68.40	279.89
7	19.29	26.11	34.23	34.63	28.20	29.14	26.68	23.63	16.68	33.96	103.84	157.25
8	20.64	41.33	26.18	35.97	23.89	19.69	15.73	23.81	34.61	41.34	40.83	217.65
9	14.12	12.38	25.11	39.80	10.17	31.19	20.30	22.86	27.14	49.57	65.24	191.91
10	36.17	23.58	9.49	54.26	12.39	56.37	16.13	35.86	27.86	27.69	56.03	-
11	26.27	34.95	30.19	47.00	42.38	41.66	-	8.49	31.95	-	95.75	-
12	29.20	39.93	22.37	23.56	35.70	39.68	-	-	-	-	54.73	-
13	40.56	27.45	35.82	36.63	42.42	35.53	-	-	-	-	48.54	-
14	-	34.17	-	-	-	27.47	-	-	-	-	22.16	-
15	-	23.58	-	-	-	37.40	-	-	-	-	-	-

Table C.15 Experimental data of hardness for 5-mm banana chips with moisture absorber during storage at 30 °C

Chip No.	Hardness (N)																	
	Storage time (week) – Rep 1						Storage time (week) – Rep 2						Storage time (week) – Rep 3					
	0	2	4	6	8	10	0	2	4	6	8	10	0	2	4	6	8	10
1	30.81	23.75	23.18	37.05	22.17	12.96	23.18	23.26	25.57	42.85	41.55	31.96	30.87	20.54	19.44	59.29	23.79	30.53
2	29.68	27.52	24.76	22.27	20.97	34.52	24.76	35.66	34.30	51.09	32.80	12.05	31.09	26.47	33.07	35.82	35.19	17.91
3	15.99	25.06	28.76	30.93	33.64	25.95	28.76	24.16	20.88	31.73	39.21	29.22	24.72	23.95	34.94	40.60	40.33	45.85
4	17.98	30.09	31.53	40.92	28.94	28.50	31.53	26.53	20.69	50.57	19.78	46.24	30.90	18.62	58.76	33.96	33.15	37.73
5	30.06	26.04	27.13	27.58	15.93	23.62	27.13	39.12	19.41	31.79	17.44	30.21	22.86	21.24	21.49	26.28	26.88	38.53
6	29.53	24.21	-	24.86	25.98	41.52	-	32.67	38.53	16.38	19.40	29.73	33.19	18.70	27.47	34.76	26.49	25.88
7	30.14	26.98	-	48.32	20.79	17.75	-	22.21	34.01	27.86	61.49	30.70	22.05	20.72	20.52	30.57	22.28	15.32
8	27.14	20.86	-	20.04	31.04	21.78	-	23.08	24.97	23.19	19.35	23.25	31.84	28.27	30.40	28.38	31.01	46.68
9	-	21.44	-	23.45	33.24	29.59	-	-	49.12	38.46	22.83	15.98	33.22	31.89	30.62	48.62	18.83	44.99
10	-	32.66	-	20.35	14.10	37.72	-	-	24.19	41.78	37.59	19.63	14.60	25.62	11.76	28.80	26.48	28.09
11	-	21.54	-	20.54	34.94	24.15	-	-	22.33	29.92	29.30	-	-	24.88	15.39	41.50	35.87	26.35
12	-	-	-	21.57	29.40	28.50	-	-	-	-	-	-	-	32.17	37.56	45.69	-	-
13	-	-	-	28.94	-	-	-	-	-	-	-	-	-	34.94	-	26.47	-	-
14	-	-	-	29.85	-	-	-	-	-	-	-	-	-	46.87	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	37.99	-	-	-	-

Table C.16 Experimental data of hardness for 5-mm banana chips without moisture absorber during storage at 30 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	20.60	27.46	40.60	21.38	41.46	42.29	40.41	33.63	24.26	19.84	29.89	25.32
2	39.53	36.22	33.85	37.50	34.26	44.32	25.03	34.07	24.91	20.28	25.80	22.29
3	26.00	31.01	23.85	33.03	24.43	56.32	16.87	25.83	26.67	55.94	19.58	23.14
4	34.88	25.68	27.83	32.36	40.53	19.78	20.33	19.26	29.30	24.19	22.05	29.39
5	18.46	24.64	23.67	24.33	57.77	31.79	30.79	32.50	23.75	29.46	23.50	22.71
6	23.82	32.46	35.13	35.62	20.41	29.15	23.62	39.89	20.43	33.35	39.55	38.93
7	27.49	-	33.29	26.98	55.23	51.04	39.60	29.34	28.37	31.36	21.05	25.21
8	33.21	-	26.07	34.48	52.43	22.80	17.94	33.28	29.24	16.50	37.27	16.82
9	33.71	-	18.97	25.93	31.74	56.39	22.02	30.52	51.06	24.90	33.38	35.01
10	-	-	30.19	29.00	51.57	43.72	26.18	-	16.35	22.71	25.95	24.14
11	-	-	-	26.35	41.84	25.46	31.58	-	20.48	31.84	19.31	-
12	-	-	-	-	35.58	29.83	22.49	-	-	-	26.41	-
13	-	-	-	-	21.68	-	-	-	-	-	-	-
14	-	-	-	-	46.25	-	-	-	-	-	-	-

Table C.17 Experimental data of hardness for 5-mm banana chips with moisture absorber during storage at 40 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	32.54	19.84	54.66	17.66	22.55	14.94	32.43	29.86	26.59	23.50	21.97	23.50
2	19.16	28.78	38.00	28.69	21.13	15.43	30.15	30.53	30.82	45.79	31.99	38.04
3	38.00	46.08	22.41	30.29	19.75	27.32	36.00	30.44	42.26	32.48	37.62	22.52
4	35.59	32.13	42.35	27.26	37.07	26.85	23.61	33.11	34.07	46.95	70.68	37.40
5	41.86	28.97	21.93	46.01	33.81	22.33	25.04	26.65	26.34	47.27	27.59	47.25
6	28.42	27.80	26.82	25.12	30.01	11.29	31.12	19.91	47.82	26.12	36.15	38.70
7	28.70	17.17	16.47	22.27	23.36	19.04	32.50	28.55	27.73	29.41	25.47	21.23
8	23.59	38.58	18.09	42.64	27.02	23.13	33.76	33.57	33.60	45.98	21.59	42.91
9	28.97	21.85	39.19	24.57	31.67	28.70	33.28	-	30.12	26.47	27.51	30.73
10	27.15	28.97	21.92	29.84	46.20	19.90	37.16	-	38.01	28.54	47.84	19.83
11	38.38	23.88	21.60	-	-	40.27	30.14	-	-	20.51	31.89	43.62
12	-	43.58	30.30	-	-	22.77	-	-	-	-	45.15	-
13	-	-	27.38	-	-	-	-	-	-	-	-	-

Table C.18 Experimental data of hardness for 5-mm banana chips without moisture absorber during storage at 40 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	26.18	39.48	15.66	28.19	30.14	36.40	40.41	41.09	52.69	33.05	20.98	56.62
2	36.25	22.13	46.57	49.12	33.59	28.36	25.03	43.57	30.92	35.33	26.97	25.49
3	43.38	45.33	35.72	40.94	33.84	66.42	16.87	33.04	19.37	26.23	38.34	25.90
4	36.04	44.79	27.01	37.13	72.88	52.25	20.33	27.66	34.41	33.24	17.53	37.80
5	37.28	33.75	23.14	46.36	37.40	50.07	30.79	38.58	38.62	26.21	44.95	55.47
6	26.44	38.86	31.14	45.22	37.52	44.23	23.62	49.98	45.48	32.56	36.73	28.30
7	42.53	32.80	49.60	28.94	34.98	18.64	39.60	35.67	35.92	28.41	22.63	30.81
8	28.76	36.65	60.26	27.95	20.68	69.91	17.94	33.81	35.47	30.55	23.10	22.08
9	23.88	40.65	61.48	28.49	38.88	36.77	22.02	21.63	31.65	-	22.02	52.46
10	29.27	38.45	28.14	26.13	54.98	39.30	26.18	29.97	51.31	-	21.54	19.25
11	40.30	-	42.25	-	45.05	47.56	31.58	27.76	21.03	-	74.34	26.36
12	32.21	-	35.44	-	90.51	24.84	22.49	20.04	39.02	-	-	42.29
13	-	-	-	-	34.67	40.67	-	-	-	-	-	-
14	-	-	-	-	-	66.76	-	-	-	-	-	-
15	-	-	-	-	-	52.85	-	-	-	-	-	-

Table C.19 Experimental data of hardness for 5-mm banana chips with moisture absorber during storage at 50 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	32.54	31.19	30.76	33.19	41.22	10.73	32.43	38.08	18.15	31.41	26.41	30.51
2	19.16	33.39	23.51	22.20	22.33	15.28	30.15	48.74	40.56	32.20	16.92	30.68
3	38.00	29.52	24.16	42.32	37.05	41.62	36.00	31.97	41.49	26.61	27.74	32.46
4	35.59	28.79	26.20	23.30	32.94	24.01	23.61	37.11	33.60	35.06	29.60	35.99
5	41.86	37.75	28.81	18.91	26.32	26.32	25.04	24.43	42.48	43.88	29.85	24.62
6	28.42	28.92	24.93	28.87	16.54	19.95	31.12	35.80	26.52	31.92	34.64	36.03
7	28.70	35.75	23.38	49.05	23.00	15.99	32.50	39.74	41.29	27.23	21.20	14.82
8	23.59	21.91	27.47	33.77	21.75	19.55	33.76	44.19	42.45	46.72	23.66	32.13
9	28.97	27.43	21.36	20.21	22.19	25.06	33.28	41.85	36.08	33.17	20.18	30.48
10	27.15	33.71	24.92	24.48	37.19	19.58	37.16	-	-	36.25	29.70	43.54
11	38.38	-	-	27.00	27.70	34.18	30.14	-	-	30.27	20.92	37.66
12	-	-	-	20.71	33.87	24.93	-	-	-	28.97	-	-
13	-	-	-	31.82	-	-	-	-	-	-	-	-

Table C.20 Experimental data of hardness for 5-mm banana chips without moisture absorber during storage at 50 °C

Chip No.	Hardness (N)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	52.69	31.79	35.47	54.12	38.34	61.99	45.52	31.50	37.28	20.74	38.49	39.06
2	31.60	30.14	39.11	25.35	26.81	39.09	27.42	28.19	40.50	30.78	29.03	36.54
3	19.25	29.98	39.68	31.93	32.13	33.68	31.56	37.59	37.41	40.60	27.74	38.54
4	17.85	39.00	28.81	18.93	42.57	35.49	24.01	47.60	34.28	53.11	30.66	32.68
5	52.31	30.28	24.01	27.20	32.80	25.24	34.86	39.55	35.92	26.25	37.70	44.99
6	37.24	30.26	35.21	47.57	26.11	29.16	29.84	47.16	29.92	39.30	41.17	44.03
7	30.37	42.29	35.49	30.98	32.29	30.59	43.39	36.59	-	50.44	36.03	54.90
8	32.05	45.06	24.14	38.85	30.45	36.55	35.38	38.36	-	25.70	27.94	39.37
9	23.59	25.69	21.09	27.86	21.60	31.20	17.19	16.90	-	25.97	30.35	51.98
10	29.54	43.83	46.69	56.39	31.13	33.14	30.24	37.64	-	36.45	40.87	34.67
11	31.68	33.05	25.96	20.48	20.53	23.32	34.05	31.28	-	45.80	-	-
12	24.35	28.92	59.98	45.62	38.59	25.55	32.45	33.40	-	36.27	-	-
13	43.34	36.20	35.73	29.08	47.29	18.72	18.71	-	-	-	-	-
14	22.03	29.10	29.18	38.04	-	-	49.18	-	-	-	-	-
15	-	24.60	-	-	-	-	-	-	-	-	-	-
16	-	34.72	-	-	-	-	-	-	-	-	-	-
17	-	42.20	-	-	-	-	-	-	-	-	-	-

Table C.22 Experimental data of crispness for 3-mm banana chips without moisture absorber during storage at 30 °C

[illegible]

Table C.23 Experimental data of crispness for 3-mm banana chips with moisture absorber during storage at 40 °C

Chip No.	Crispness (Number of peaks)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	15	22	15	10	10	7	12	12	12	17	17	11
2	29	37	23	10	14	16	20	20	22	20	14	19
3	27	31	16	15	24	22	19	9	18	21	18	15
4	21	24	16	30	16	17	28	8	22	11	16	15
5	20	30	26	30	7	14	19	11	14	18	15	18
6	20	28	17	15	22	13	19	21	10	12	22	14
7	31	30	18	8	22	7	19	21	17	8	16	11
8	26	29	13	14	17	5	16	-	15	15	23	16
9	14	25	14	-	19	-	19	-	16	-	25	17
10	26	22	-	-	-	-	22	-	12	-	9	19
11	19	-	-	-	-	-	-	-	15	-	-	20
12	21	-	-	-	-	-	-	-	17	-	-	-
13	-	-	-	-	-	-	-	-	18	-	-	-

Table C.24 Experimental data of crispness for 3-mm banana chips without moisture absorber during storage at 40 °C

Chip No.	Crispness (Number of peaks)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	16	11	20	27	28	25	12	23	22	25	22	38
2	27	25	22	15	12	15	25	24	25	10	18	16
3	23	15	15	20	18	12	21	16	22	16	24	20
4	17	20	14	27	17	13	23	22	8	19	14	17
5	19	23	23	17	12	12	19	14	12	23	15	16
6	15	23	20	12	18	13	23	11	16	24	23	21
7	-	15	18	21	17	11	30	22	10	12	16	17
8	-	20	27	12	19	15	18	-	16	17	19	16
9	-	-	27	18	13	9	20	-	-	-	20	29
10	-	-	17	-	16	11	21	-	-	-	23	18
11	-	-	-	-	23	7	20	-	-	-	-	-
12	-	-	-	-	-	10	13	-	-	-	-	-
13	-	-	-	-	-	16	-	-	-	-	-	-

Table C.26 Experimental data of crispness for 3-mm banana chips without moisture absorber during storage at 50 °C

[illegible]

Table C.27 Experimental data of crispness for 5-mm banana chips with moisture absorber during storage at 30 °C

Chip No.	Crispness (Number of peaks)																	
	Storage time (week) – Rep 1						Storage time (week) – Rep 2						Storage time (week) – Rep 3					
	0	2	4	6	8	10	0	2	4	6	8	10	0	2	4	6	8	10
1	30	27	18	20	26	22	26	22	23	17	17	17	21	23	12	11	7	20
2	20	23	15	22	32	25	20	25	23	22	13	13	30	16	8	13	24	21
3	19	17	23	14	26	18	19	19	20	27	21	12	18	18	13	9	19	12
4	20	25	23	19	13	16	18	14	22	13	19	18	20	19	23	27	16	20
5	26	30	18	29	29	8	20	23	14	21	25	24	18	24	22	20	11	19
6	25	26	28	8	22	25	16	18	24	22	9	26	14	27	16	10	20	11
7	27	18	23	14	25	14	20	14	26	22	22	21	30	15	10	23	26	17
8	22	28	20	25	23	29	14	21	22	-	26	-	15	10	-	25	16	9
9	16	22	16	20	26	-	14	13	-	-	27	-	-	23	-	12	13	19
10	-	-	-	13	29	-	-	14	-	-	17	-	-	20	-	20	10	12
11	-	-	-	-	31	-	-	18	-	-	-	-	-	15	-	-	12	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-

Table C.28 Experimental data of crispness for 5-mm banana chips without moisture absorber during storage at 30 °C

Chip No.	Crispness (Number of peaks)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	17	14	9	19	16	11	16	22	24	27	24	13
2	37	13	16	14	2	21	20	27	12	20	21	22
3	35	28	13	10	18	20	14	16	20	28	14	15
4	17	38	16	28	18	11	25	15	13	22	24	12
5	27	24	25	17	13	26	21	22	29	14	18	12
6	18	29	28	17	9	28	19	23	16	-	25	13
7	23	30	21	14	20	9	29	19	21	-	19	-
8	38	18	21	-	27	15	16	27	21	-	17	-
9	-	33	-	-	8	10	19	25	-	-	27	-
10	-	15	-	-	10	13	22	14	-	-	-	-
11	-	-	-	-	18	-	23	12	-	-	-	-
12	-	-	-	-	18	-	21	-	-	-	-	-
13	-	-	-	-	26	-	23	-	-	-	-	-

Table C.29 Experimental data of crispness for 5-mm banana chips with moisture absorber during storage at 40 °C

Chip No.	Crispness (Number of peaks)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	16	25	17	28	25	23	36	23	12	16	19	28
2	19	16	6	30	21	27	26	8	22	18	17	32
3	17	16	8	28	25	20	11	14	11	26	20	23
4	18	17	20	14	22	18	28	8	19	17	31	22
5	28	10	22	28	21	17	32	26	25	21	21	26
6	27	28	20	24	23	20	12	19	21	28	23	20
7	22	27	9	23	16	28	8	25	25	28	20	20
8	21	22	15	16	31	18	12	17	21	-	22	-
9	24	-	24	19	-	13	17	21	32	-	27	-
10	23	-	-	24	-	26	16	-	25	-	-	-
11	-	-	-	16	-	22	19	-	-	-	-	-
12	-	-	-	-	-	-	11	-	-	-	-	-
13	-	-	-	-	-	-	11	-	-	-	-	-

Table C.30 Experimental data of crispness for 5-mm banana chips without moisture absorber during storage at 40 °C

Chip No.	Crispness (Number of peaks)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	17	22	5	18	8	21	16	25	10	21	7	19
2	31	22	19	15	10	21	20	17	12	16	15	21
3	16	16	20	16	10	15	14	15	10	10	10	5
4	21	6	18	19	18	20	25	17	19	22	19	11
5	28	11	9	6	14	17	21	21	13	13	12	18
6	15	6	9	20	12	16	19	14	11	20	8	7
7	13	19	26	6	17	17	29	17	10	28	21	9
8	26	21	22	18	8	19	16	19	22	11	23	19
9	-	19	17	6	12	14	19	21	20	16	17	18
10	-	8	19	24	15	12	22	25	18	14	21	21
11	-	14	7	-	8	6	23	21	-	-	-	-
12	-	13	8	-	-	10	21	-	-	-	-	-
13	-	7	-	-	-	22	23	-	-	-	-	-
14	-	8	-	-	-	-	-	-	-	-	-	-

Table C.31 Experimental data of crispness for 5-mm banana chips with moisture absorber during storage at 50 °C

Chip No.	Crispness (Number of peaks)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	16	22	22	23	22	20	36	22	14	27	25	16
2	19	22	18	28	22	29	26	28	26	22	19	28
3	17	21	12	18	18	11	11	29	19	19	17	21
4	18	19	32	25	28	16	28	30	24	23	31	31
5	28	24	33	21	12	11	32	23	16	24	19	21
6	27	20	23	19	28	22	12	17	16	27	19	25
7	22	23	17	25	17	15	8	36	23	26	29	31
8	21	24	25	19	19	15	12	-	20	29	20	-
9	24	16	32	14	23	16	17	-	25	22	-	-
10	23	15	24	13	-	16	16	-	21	-	-	-
11	-	22	29	-	-	-	19	-	-	-	-	-
12	-	27	-	-	-	-	11	-	-	-	-	-
13	-	19	-	-	-	-	11	-	-	-	-	-

Table C.32 Experimental data of crispness for 5-mm banana chips without moisture absorber during storage at 50 °C

Chip No.	Crispness (Number of peaks)											
	Storage time (week) – Rep 1						Storage time (week) – Rep 2					
	0	2	4	6	8	10	0	2	4	6	8	10
1	23	24	12	16	18	13	26	21	17	12	23	7
2	21	24	15	18	23	21	33	26	14	21	17	14
3	18	21	17	20	18	13	28	22	10	12	16	18
4	15	22	18	9	21	9	26	21	16	21	14	17
5	18	21	20	16	9	25	16	18	15	10	16	13
6	22	12	25	23	25	18	17	26	19	7	15	10
7	30	18	26	17	14	10	21	15	11	16	13	10
8	27	25	27	19	20	15	19	16	12	13	17	14
9	14	13	21	19	-	13	29	22	8	11	17	15
10	-	20	-	21	-	15	19	-	11	13	11	-
11	-	19	-	-	-	22	18	-	12	7	15	-
12	-	23	-	-	-	-	-	-	13	-	23	-
13	-	29	-	-	-	-	-	-	15	-	23	-
14	-	12	-	-	-	-	-	-	11	-	-	-

Table C.33 Experimental data of lightness for 3-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	65.94	60.69	61.24	61.13	57.92	58.88	26	74.85	54.12	52.79	62.85	59.34	56.90
2	64.52	69.63	59.27	60.03	60.76	57.21	27	65.74	49.15	64.34	65.36	56.84	56.91
3	66.72	58.57	54.26	63.40	68.87	57.10	28	59.70	62.23	65.31	65.23	54.46	56.84
4	64.39	68.89	62.37	58.46	60.31	65.89	29	74.23	49.59	53.37	58.75	59.92	54.91
5	63.82	63.72	60.20	58.54	62.51	64.02	30	70.16	59.18	63.76	64.64	64.93	62.78
6	64.51	58.10	61.47	59.90	60.73	62.08	31	75.65	61.51	66.57	61.89	59.79	65.58
7	67.58	66.46	68.60	59.73	65.65	66.20	32	70.51	51.30	58.87	59.39	58.86	66.38
8	66.15	68.55	60.51	67.11	68.28	58.51	33	67.87	65.91	63.82	49.50	60.50	62.43
9	64.50	59.00	65.89	60.60	66.90	65.22	34	62.56	65.03	67.14	53.84	64.93	61.33
10	68.07	60.22	68.25	63.58	67.57	67.29	35	74.74	57.00	66.24	67.12	61.34	71.52
11	69.30	68.73	61.80	65.62	59.73	64.95	36	61.39	66.75	71.53	57.54	66.21	73.14
12	66.13	67.99	60.60	66.67	66.08	47.42	37	46.53	53.65	68.69	62.02	64.00	74.19
13	66.19	64.46	63.83	64.35	68.45	53.45	38	62.26	57.98	69.29	67.05	66.25	58.26
14	68.96	65.90	60.06	65.85	58.51	58.92	39	56.69	70.48	66.85	57.12	63.44	69.44
15	74.36	69.60	63.75	60.78	69.27	64.81	40	61.98	60.93	63.45	61.22	68.28	78.21
16	72.63	63.59	62.08	69.39	64.07	59.77	41	63.00	57.34	58.74	54.11	74.57	67.35
17	71.89	66.15	66.83	76.00	64.65	53.54	42	64.63	67.56	58.10	52.74	61.44	71.52
18	65.98	69.84	68.27	79.05	62.03	61.49	43	57.25	54.20	57.27	58.32	77.06	67.64
19	71.62	67.89	61.33	77.70	68.33	58.73	44	63.47	70.48	56.15	53.04	64.40	62.03
20	70.16	65.70	60.23	71.35	68.35	52.55	45	71.82	61.08	64.72	55.32	69.32	62.64
21	71.76	53.65	66.54	74.47	52.86	59.87	46	70.95	71.83	62.67	62.99	61.88	57.37
22	54.87	59.90	58.03	79.08	64.87	59.71	47	62.34	70.34	65.57	65.10	59.37	66.63
23	54.94	54.00	62.69	74.79	60.48	50.44	48	67.59	69.53	57.95	59.26	52.22	63.21
24	62.37	57.15	68.54	73.78	68.33	61.14	49	68.00	72.35	61.93	57.27	61.55	59.37
25	65.03	63.87	68.38	79.30	55.70	63.41	50	71.40	70.50	64.63	60.59	63.42	67.10

Table C.33 Experimental data of lightness for 3-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	71.51	65.85	62.40	67.90	56.39	67.20	26	69.08	66.94	66.62	58.67	61.38	71.33
2	72.10	65.44	58.34	63.89	66.63	72.15	27	64.51	69.74	65.45	71.65	64.49	65.39
3	68.38	73.10	61.33	60.76	66.93	65.99	28	49.37	73.73	58.97	63.52	67.22	65.65
4	71.18	63.64	65.64	73.53	63.54	67.44	29	74.57	67.44	64.16	59.37	63.48	68.45
5	71.76	68.42	61.65	60.16	66.72	69.71	30	63.81	65.57	67.35	69.68	63.25	64.61
6	67.07	67.74	65.26	59.07	72.94	71.59	31	74.65	62.34	66.29	61.80	64.04	64.20
7	57.76	62.69	55.42	60.22	66.76	67.93	32	67.78	71.15	65.76	63.40	52.90	69.23
8	66.62	74.97	62.72	53.43	70.70	62.02	33	63.88	52.04	65.31	54.22	67.86	59.92
9	68.61	64.69	64.55	63.43	72.73	69.27	34	68.25	65.61	65.93	64.77	60.93	63.60
10	71.03	62.8	58.82	67.24	72.26	70.90	35	72.74	64.7	63.37	68.25	57.38	68.37
11	73.89	63.43	56.95	70.74	68.16	70.88	36	64.86	63.24	58.53	62.11	70.64	60.57
12	70.59	55.39	61.95	58.40	67.08	73.61	37	65.08	62.32	65.73	61.32	61.24	68.47
13	74.79	61.89	64.79	61.13	67.94	62.64	38	66.01	56.52	67.42	69.81	72.14	64.65
14	60.53	62.10	68.34	72.26	64.22	71.70	39	68.96	64.63	62.06	67.65	63.67	68.43
15	67.97	58.18	55.82	63.14	64.43	70.99	40	71.74	65.55	62.08	62.27	64.47	67.94
16	70.14	63.97	55.57	65.51	62.54	62.81	41	61.70	54.92	68.23	72.19	62.93	71.59
17	55.08	58.36	67.93	64.00	61.77	67.45	42	60.98	64.28	55.83	65.42	61.66	71.78
18	58.62	53.39	56.33	66.12	64.38	59.71	43	61.38	59.10	60.31	62.19	53.45	73.47
19	55.41	67.36	56.29	66.32	60.19	61.06	44	60.53	50.95	70.69	71.39	60.94	68.34
20	61.63	66.93	57.56	68.79	65.68	73.48	45	59.86	66.47	55.61	62.67	61.67	69.63
21	69.22	68.20	61.33	62.78	66.95	63.22	46	62.94	64.55	58.97	67.37	69.25	63.33
22	61.32	72.31	70.31	59.08	59.47	71.10	47	60.93	64.13	61.32	67.75	69.67	66.40
23	60.31	68.48	67.99	63.89	67.61	62.51	48	73.90	59.72	65.31	66.66	72.00	60.67
24	69.12	70.76	69.39	58.12	63.05	65.46	49	64.97	63.05	57.18	68.52	73.35	67.01
25	62.65	72.47	73.20	63.46	62.40	72.07	50	59.38	62.89	62.96	67.93	72.75	67.03

Table C.34 Experimental data of redness for 3-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	4.22	4.77	8.40	6.88	8.87	7.16	26	2.54	10.65	7.98	5.91	11.71	6.33
2	5.89	6.39	9.34	6.31	6.95	6.11	27	7.26	12.19	4.95	4.68	10.45	6.50
3	5.22	5.45	7.44	3.46	6.70	8.51	28	5.61	8.50	4.84	6.14	12.02	5.67
4	4.18	6.01	8.29	7.02	8.37	5.28	29	2.63	12.06	8.46	6.60	11.93	7.55
5	4.87	5.68	8.45	6.50	6.67	5.79	30	6.12	10.41	6.05	4.05	9.02	5.78
6	5.36	7.36	6.05	6.55	4.59	5.90	31	4.68	8.04	4.49	7.51	7.54	7.00
7	6.45	4.66	5.64	5.11	4.19	2.99	32	5.47	9.74	8.01	4.46	11.21	6.13
8	4.76	4.17	7.79	3.44	6.74	6.80	33	4.15	7.28	6.11	5.42	7.71	7.96
9	7.32	5.26	6.18	6.34	4.84	5.36	34	4.63	6.90	2.20	7.83	6.31	7.22
10	6.59	5.66	5.96	5.07	4.20	3.65	35	4.71	9.04	4.30	4.39	10.20	5.81
11	4.89	4.33	4.41	5.28	6.95	7.22	36	7.44	1.65	2.74	6.95	8.60	3.11
12	4.01	4.84	4.93	5.49	5.84	10.02	37	4.06	7.40	4.40	9.27	6.05	1.78
13	2.97	6.07	4.09	3.64	3.75	7.72	38	3.51	6.40	2.94	6.68	8.27	3.99
14	4.07	5.95	4.73	6.35	7.02	9.60	39	4.86	2.25	4.60	7.40	8.06	3.27
15	2.89	5.07	4.18	4.64	5.57	6.93	40	6.73	4.56	5.63	7.33	8.37	2.46
16	2.49	5.55	6.32	2.92	6.71	6.96	41	4.02	9.25	5.78	6.31	4.04	2.86
17	3.68	5.93	5.21	2.13	6.27	7.06	42	4.68	6.76	6.21	10.36	6.55	3.84
18	4.01	4.12	4.89	2.87	9.64	7.00	43	5.09	8.52	7.52	7.26	2.41	4.29
19	2.39	3.89	5.00	2.91	6.09	6.84	44	4.77	6.61	7.77	6.13	7.01	3.61
20	2.49	5.14	5.26	2.94	6.34	4.89	45	4.92	5.63	5.91	9.05	6.51	5.52
21	7.61	7.92	2.78	2.43	9.51	7.43	46	3.58	6.38	5.89	6.46	6.65	5.77
22	8.56	6.69	4.90	2.33	7.32	6.33	47	4.88	4.00	5.48	5.81	7.55	3.57
23	9.25	7.21	2.75	3.28	7.57	8.42	48	6.33	6.97	5.09	7.34	10.91	7.80
24	7.29	7.04	5.20	2.36	4.86	7.59	49	5.69	4.35	6.39	7.69	7.96	4.08
25	5.22	7.34	3.18	2.30	11.34	5.89	50	3.70	4.32	5.28	6.35	6.56	4.24

Table C.34 Experimental data of redness for 3-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	3.62	2.93	5.00	2.64	8.40	2.54	26	3.20	2.04	4.60	5.67	6.83	3.64
2	2.74	4.17	4.36	3.61	3.81	2.46	27	2.33	2.59	6.07	3.53	2.88	6.83
3	3.17	2.34	4.85	3.70	4.63	3.49	28	6.46	1.85	4.58	6.04	6.23	1.30
4	4.00	2.65	3.60	1.62	5.11	3.29	29	2.90	3.12	4.39	4.70	6.21	4.18
5	3.14	3.85	4.52	4.93	5.33	3.14	30	2.52	3.11	5.54	3.59	4.50	5.90
6	2.61	3.03	6.06	4.18	2.60	2.30	31	2.75	6.34	3.90	6.27	5.19	3.78
7	1.83	3.88	9.90	3.85	4.91	2.33	32	1.99	5.14	2.27	4.04	9.91	3.84
8	3.24	1.81	6.10	9.24	1.99	7.20	33	2.67	3.41	4.83	8.64	4.49	2.84
9	3.78	2.97	7.00	4.84	2.63	2.82	34	1.72	4.96	4.60	4.23	6.11	4.56
10	2.31	2.2	8.21	3.75	2.64	2.56	35	3.00	6.39	4.89	2.92	8.81	4.28
11	2.90	7.33	8.50	3.52	3.65	3.06	36	0.81	2.65	8.74	2.24	2.39	6.12
12	2.70	5.72	5.13	7.76	2.39	2.16	37	0.85	5.32	5.02	3.85	2.91	3.22
13	2.96	5.94	2.55	7.33	3.87	4.52	38	1.15	3.69	4.72	1.90	3.02	5.99
14	2.55	5.5	5.03	2.86	2.82	2.35	39	1.67	3.4	4.59	2.31	3.09	3.97
15	3.52	7.24	8.79	3.85	5.10	2.89	40	0.62	4.17	6.92	3.13	3.92	3.38
16	4.17	3.91	8.39	3.55	4.39	3.92	41	5.99	6.92	3.90	3.07	7.85	2.72
17	7.36	5.56	4.42	4.00	6.22	2.61	42	3.30	6.28	5.76	6.35	7.98	1.65
18	8.06	5.99	8.22	3.15	5.03	5.12	43	3.11	7.62	7.56	3.67	9.61	0.83
19	3.90	2.78	3.23	3.44	7.40	2.03	44	4.07	6.53	3.67	3.21	5.84	3.02
20	3.73	3.96	7.71	2.39	4.64	1.59	45	7.61	6.18	7.45	6.41	7.15	1.72
21	4.45	3.31	6.07	5.49	3.55	2.46	46	2.42	7.33	6.93	2.28	3.40	3.62
22	6.11	2.87	3.16	7.74	6.92	1.49	47	2.58	6.78	5.36	2.59	2.94	4.90
23	6.24	2.82	2.82	5.21	3.75	3.95	48	2.59	7.01	5.21	3.22	3.49	5.63
24	4.55	3.22	3.36	6.12	4.49	2.60	49	2.72	7.59	7.90	2.23	2.31	3.97
25	6.24	3.03	2.12	3.92	8.08	1.65	50	2.42	6.92	4.87	1.76	2.21	4.56

Table C.35 Experimental data of yellowness for 3-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	33.81	31.78	34.54	34.39	30.46	31.55	26	29.43	33.40	31.85	31.96	34.90	29.35
2	33.00	36.42	33.10	30.24	32.54	29.12	27	35.26	33.67	28.97	32.84	33.32	29.56
3	30.58	31.65	27.49	26.46	35.66	34.48	28	31.12	33.81	32.64	34.11	32.04	28.45
4	30.93	35.98	34.71	32.22	30.99	32.76	29	29.65	34.64	30.90	31.18	35.40	30.32
5	33.65	31.73	34.61	30.02	33.71	32.10	30	34.73	36.03	32.72	32.33	36.44	32.49
6	31.93	31.51	31.65	35.55	25.11	28.78	31	34.27	34.09	31.02	34.23	31.39	35.12
7	35.58	33.00	32.34	25.53	26.63	24.59	32	36.65	32.79	32.04	29.47	35.08	34.64
8	32.61	32.17	34.41	30.36	33.25	31.79	33	32.94	35.98	32.71	23.67	30.80	37.00
9	35.45	30.18	34.11	34.08	26.64	29.46	34	33.11	31.79	29.31	30.13	32.50	33.79
10	36.58	30.80	32.73	29.23	27.57	26.60	35	34.68	33.18	33.24	32.81	34.44	36.04
11	34.50	32.00	28.09	31.58	32.18	34.24	36	35.05	24.72	32.57	31.59	36.50	30.30
12	31.54	31.59	29.62	34.49	34.48	29.45	37	24.88	30.79	31.04	35.10	31.67	25.57
13	29.74	35.23	29.90	28.93	29.71	29.36	38	27.34	31.27	31.79	33.80	33.65	26.97
14	32.98	32.82	27.56	34.76	32.07	34.08	39	27.73	27.01	31.00	30.70	33.80	29.57
15	33.55	34.17	30.07	32.98	33.65	33.79	40	34.45	32.24	31.37	31.75	37.60	28.28
16	29.70	31.92	32.10	25.39	30.93	33.27	41	26.15	33.61	30.29	27.85	31.53	26.20
17	31.00	32.73	34.02	26.18	31.15	29.00	42	29.80	35.87	29.80	33.41	32.43	29.49
18	30.39	31.13	32.45	29.76	36.69	33.50	43	25.63	32.47	31.85	30.93	28.07	31.70
19	29.23	30.83	31.76	27.22	32.06	31.94	44	29.53	37.62	31.49	29.18	33.08	26.84
20	28.65	32.48	31.65	26.30	33.14	27.16	45	33.71	31.75	33.05	32.72	35.11	29.25
21	36.86	31.06	28.75	27.21	31.99	30.35	46	30.50	32.24	33.24	34.37	29.59	26.68
22	31.59	33.65	27.21	28.92	34.78	29.61	47	30.53	29.81	33.51	32.45	31.88	28.39
23	31.13	32.41	28.73	30.19	35.15	28.85	48	32.03	35.31	30.56	31.75	31.54	33.62
24	34.64	32.44	33.88	26.76	29.56	31.11	49	33.20	31.23	34.13	32.26	33.33	23.62
25	30.67	34.89	29.41	29.27	33.00	31.06	50	30.30	29.57	32.56	30.28	30.18	29.78

Table C.35 Experimental data of yellowness for 3-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	35.41	33.06	32.13	32.24	34.65	29.97	26	35.06	31.20	34.73	30.17	34.71	34.68
2	35.00	33.02	31.09	32.39	32.72	31.20	27	31.81	32.99	33.42	34.96	30.03	36.44
3	34.28	33.06	31.69	29.92	33.42	30.27	28	30.60	30.93	32.41	31.52	35.61	22.44
4	35.79	31.54	32.56	32.63	32.39	32.01	29	34.67	33.51	33.64	30.70	35.05	32.47
5	34.41	34.47	32.83	32.63	37.00	30.88	30	31.82	33.14	34.94	34.29	30.30	37.65
6	31.61	34.60	33.08	29.74	34.23	30.45	31	33.43	35.37	33.50	36.05	32.09	30.60
7	28.19	30.86	34.77	29.80	31.78	30.37	32	33.62	36.08	30.79	31.34	33.25	33.96
8	31.58	33.19	32.45	31.90	32.34	34.12	33	31.03	29.48	34.83	32.13	35.02	29.30
9	34.19	32.90	34.69	32.27	32.47	30.60	34	32.16	35.75	33.84	30.61	32.17	30.80
10	32.73	29.79	36.19	32.00	31.99	30.55	35	33.16	34.16	34.70	31.53	34.74	34.05
11	32.66	36.01	33.38	32.98	32.89	32.07	36	28.18	31.74	35.83	29.96	32.30	30.61
12	31.48	29.44	30.74	33.97	32.94	31.91	37	29.21	33.51	34.62	31.79	30.86	32.67
13	33.27	30.39	27.35	35.32	31.67	31.87	38	29.17	32.79	33.59	30.47	32.53	34.54
14	28.11	33.93	34.35	32.45	32.34	31.29	39	32.50	33.04	31.67	33.03	31.42	33.18
15	33.76	31.60	33.35	32.27	32.65	32.18	40	30.99	33.20	36.56	33.33	34.42	32.79
16	34.68	31.43	32.60	29.68	31.33	34.49	41	33.08	33.56	34.92	33.48	35.91	33.85
17	34.78	31.32	32.01	32.53	31.68	30.39	42	32.37	35.31	29.51	35.57	36.65	32.57
18	36.42	26.45	32.54	30.11	32.02	34.16	43	30.05	33.87	33.79	32.78	32.14	26.39
19	28.93	31.42	28.64	30.39	32.93	31.47	44	32.46	31.91	35.26	33.98	28.30	33.35
20	31.37	32.71	33.41	31.77	32.17	31.17	45	36.42	35.52	33.10	34.95	33.83	31.31
21	34.67	34.96	30.35	32.12	33.56	31.08	46	32.11	33.05	34.42	31.31	32.73	32.87
22	34.49	35.35	29.85	34.46	34.97	29.71	47	34.12	33.17	33.29	32.43	29.05	34.47
23	33.78	33.22	32.99	32.96	33.94	31.75	48	35.74	32.55	34.32	32.59	34.28	31.33
24	34.33	35.63	31.58	31.48	32.71	31.85	49	33.33	32.81	33.68	30.62	30.24	34.01
25	32.94	35.18	31.37	32.23	35.75	29.41	50	32.26	31.98	33.21	31.76	28.48	35.07

Table C.36 Experimental data of lightness for 3-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	57.31	57.86	49.01	47.25	55.20	63.26	26	61.54	62.11	55.98	60.20	66.97	72.11
2	59.58	65.05	58.76	61.34	63.02	48.09	27	58.40	58.33	61.31	54.81	65.31	54.79
3	58.25	60.61	47.04	53.18	52.63	57.84	28	59.07	64.32	52.84	53.28	60.87	50.82
4	63.28	62.42	62.50	56.92	57.29	57.19	29	63.87	60.73	66.15	52.25	65.19	71.09
5	59.99	60.41	55.45	56.92	60.62	55.31	30	65.86	52.79	60.89	59.43	61.75	56.21
6	66.31	65.20	58.15	57.03	63.39	56.99	31	57.51	64.97	66.90	59.15	58.67	49.38
7	68.26	58.84	62.11	57.94	60.23	60.38	32	58.15	63.92	67.29	60.57	50.21	60.46
8	61.82	49.82	56.90	51.03	60.10	59.63	33	60.08	58.98	71.21	58.70	55.06	57.36
9	68.62	62.12	65.82	59.16	58.74	62.23	34	64.95	64.73	69.46	53.97	55.10	58.85
10	59.05	68.73	60.70	54.31	62.43	63.55	35	58.66	54.78	54.98	61.77	51.13	52.62
11	56.67	62.21	39.59	59.92	57.41	55.55	36	61.03	58.22	62.86	62.22	62.76	52.16
12	58.65	57.95	67.74	56.89	63.98	65.88	37	67.11	63.32	60.07	54.07	52.55	46.08
13	62.32	62.52	63.95	60.40	63.37	53.44	38	60.60	52.44	50.29	56.42	55.60	49.94
14	50.56	57.30	68.34	50.98	53.36	57.61	39	58.78	63.48	61.85	53.39	62.99	47.10
15	44.60	51.29	48.76	64.14	58.05	67.15	40	51.03	67.66	61.80	64.61	59.47	55.86
16	56.71	51.64	59.80	59.44	65.00	65.85	41	55.80	68.17	55.11	54.75	60.89	64.82
17	58.22	64.20	56.16	53.45	63.33	52.32	42	65.19	60.25	55.41	54.31	58.90	57.63
18	60.24	62.89	64.99	48.50	61.32	56.43	43	58.16	64.78	57.81	57.06	60.02	63.04
19	64.76	60.93	62.74	58.73	68.69	57.89	44	61.51	67.20	59.41	59.68	58.42	58.82
20	68.97	62.61	62.09	64.62	70.90	53.29	45	73.06	68.50	63.07	64.68	49.75	62.26
21	62.12	56.20	64.02	52.54	63.07	59.91	46	53.57	64.57	49.75	52.11	65.10	68.20
22	63.02	54.37	68.24	61.30	61.60	62.02	47	41.69	67.42	51.61	57.93	69.19	58.87
23	67.13	63.92	59.24	59.45	56.08	60.73	48	57.74	63.18	54.27	60.03	61.37	65.81
24	63.29	60.49	62.04	53.46	65.45	59.30	49	47.29	62.13	52.41	52.78	58.27	58.80
25	55.51	65.53	65.48	59.50	66.06	66.30	50	60.38	48.68	60.42	53.80	59.22	63.75

Table C.36 Experimental data of lightness for 3-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	66.24	61.69	56.92	54.51	58.86	64.09	26	35.37	63.10	65.18	56.28	61.15	64.02
2	67.02	65.43	59.55	56.22	54.39	59.77	27	65.81	65.02	64.92	56.23	59.84	60.34
3	62.51	55.55	71.00	56.66	54.81	62.65	28	58.40	67.21	63.46	58.23	56.91	55.52
4	63.79	58.22	59.09	54.05	55.35	49.30	29	61.06	64.46	68.62	55.85	57.55	63.74
5	65.18	67.18	58.46	57.33	61.09	58.03	30	47.76	65.89	65.87	65.18	66.58	60.96
6	54.73	60.79	55.07	48.66	62.75	61.43	31	51.39	60.19	63.12	68.33	51.65	61.90
7	66.81	63.27	62.99	59.60	61.63	55.54	32	57.87	59.87	57.48	63.29	61.13	64.33
8	61.85	63.82	57.45	53.11	63.02	62.64	33	55.41	62.24	57.34	64.01	63.07	62.65
9	64.63	63.01	64.94	62.21	68.43	54.79	34	54.31	65.85	66.78	62.66	57.51	57.65
10	59.19	62.02	59.62	49.37	65.31	56.78	35	58.36	62.34	69.69	64.92	60.04	68.14
11	69.47	58.22	63.91	45.45	59.02	43.53	36	52.50	63.81	61.10	52.06	54.10	63.00
12	56.79	71.94	56.02	60.26	54.33	55.67	37	52.70	69.86	66.17	53.68	67.30	67.21
13	60.84	71.77	68.53	47.99	67.03	51.30	38	55.79	55.66	59.42	52.37	58.92	55.69
14	63.81	61.92	65.02	42.74	61.05	59.41	39	50.76	70.00	63.71	53.97	51.89	62.40
15	70.14	68.33	63.33	60.27	49.95	58.45	40	64.88	64.31	67.01	53.52	58.64	61.06
16	63.68	67.95	57.10	57.05	59.63	56.38	41	55.51	64.19	56.80	60.72	56.70	68.09
17	59.84	57.22	57.63	52.87	57.55	58.27	42	60.41	63.15	54.74	51.20	51.67	59.37
18	55.04	66.08	62.45	47.71	51.14	49.19	43	64.16	59.26	62.23	51.28	56.35	65.23
19	67.71	67.05	53.67	54.14	59.04	62.45	44	58.35	58.14	53.17	63.56	54.81	70.16
20	53.98	59.71	61.34	51.28	61.14	53.66	45	58.17	66.22	52.50	65.91	48.46	65.72
21	56.62	63.26	65.46	50.47	48.97	65.62	46	64.47	64.63	68.61	59.98	55.92	57.55
22	60.69	59.76	63.08	52.89	59.09	63.58	47	64.93	61.73	65.50	64.90	65.86	63.17
23	59.38	69.97	61.51	56.74	49.82	64.60	48	57.45	66.92	66.20	57.04	55.17	66.83
24	46.51	60.70	63.36	53.52	52.40	59.62	49	63.74	60.37	63.21	62.27	57.68	55.94
25	59.05	67.71	61.09	62.83	59.16	51.02	50	65.64	55.05	67.02	68.47	60.82	68.46

Table C.37 Experimental data of redness for 3-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	7.62	6.89	7.35	10.98	6.69	6.87	26	7.24	6.47	8.99	9.00	4.98	2.55
2	7.38	5.12	5.88	8.22	4.11	10.72	27	5.38	7.49	6.56	9.15	6.72	8.55
3	8.32	4.46	11.17	8.80	8.14	7.79	28	6.64	5.67	7.30	10.21	6.20	11.66
4	8.46	3.80	7.11	8.61	7.44	7.44	29	6.51	6.55	6.67	11.26	6.18	2.65
5	7.96	6.46	6.75	9.72	6.55	9.00	30	5.61	7.20	6.47	8.26	6.50	6.82
6	7.52	4.84	6.72	8.43	4.46	8.53	31	7.55	4.97	4.63	8.23	7.55	11.43
7	6.10	8.83	7.77	9.32	5.35	7.51	32	4.96	5.82	4.23	6.68	8.26	6.37
8	7.18	5.58	6.25	11.37	6.75	8.73	33	7.28	3.93	2.96	8.18	10.28	9.12
9	6.06	6.14	5.77	8.20	5.84	6.90	34	5.71	3.19	3.30	7.28	8.69	7.30
10	5.65	4.91	9.99	9.28	7.60	6.78	35	7.49	4.27	9.23	6.98	8.74	8.33
11	7.38	6.42	2.32	7.16	6.72	4.88	36	6.75	4.53	5.72	7.63	3.40	8.31
12	8.02	8.37	3.63	7.27	5.10	5.19	37	5.11	4.96	8.44	4.81	8.33	8.24
13	8.83	7.47	3.22	6.14	5.71	6.20	38	5.46	7.95	8.56	7.81	8.25	14.00
14	6.45	7.78	2.99	9.58	6.50	4.75	39	4.40	4.56	6.04	6.88	2.50	12.48
15	6.15	6.98	5.15	6.02	7.08	5.46	40	3.86	3.25	8.16	5.64	6.42	5.74
16	9.75	7.41	3.87	7.57	3.87	7.33	41	8.49	5.07	11.18	7.56	4.90	5.91
17	7.08	8.35	6.44	7.65	4.85	7.82	42	5.41	8.08	8.13	6.63	5.32	6.62
18	9.20	5.74	3.53	8.74	5.98	8.86	43	5.88	4.13	8.01	4.91	5.94	6.84
19	8.06	7.65	5.43	7.71	4.05	10.02	44	10.19	7.07	8.35	5.25	4.74	6.37
20	5.70	8.32	5.21	5.50	2.97	6.87	45	6.44	4.48	6.25	3.98	2.75	3.80
21	4.51	5.81	3.66	8.61	6.71	4.83	46	6.79	5.57	9.57	7.63	5.20	4.58
22	6.26	5.78	3.05	5.05	6.76	5.61	47	5.82	4.51	11.74	8.23	3.75	9.23
23	6.21	7.23	4.54	7.41	7.10	3.82	48	8.15	6.03	9.04	6.92	5.07	5.91
24	6.08	6.08	4.64	8.50	6.42	5.45	49	6.86	5.77	10.28	6.83	4.38	5.44
25	3.89	5.66	4.62	5.50	6.56	4.11	50	6.84	9.31	9.09	9.19	6.95	6.59

Table C.37 Experimental data of redness for 3-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	2.05	4.14	6.51	9.31	10.00	7.36	26	1.81	3.83	4.21	6.16	8.55	7.65
2	1.76	3.95	6.89	7.56	10.51	6.96	27	4.13	4.07	3.14	6.46	7.62	8.61
3	3.67	5.67	2.94	7.52	10.79	7.14	28	4.37	3.48	3.88	7.39	9.51	8.02
4	1.96	3.70	6.36	7.52	11.92	11.26	29	6.14	7.97	3.42	6.60	7.97	7.49
5	2.32	4.47	5.39	6.95	9.78	7.13	30	6.77	3.78	3.21	3.00	6.54	9.37
6	5.59	3.12	9.61	10.24	6.63	6.45	31	8.72	8.03	5.10	2.58	9.53	4.58
7	4.79	5.83	5.78	6.87	6.48	9.14	32	8.95	5.74	6.10	3.78	8.00	3.36
8	4.14	5.42	4.37	8.34	5.89	6.74	33	5.51	6.15	6.41	4.53	7.15	2.60
9	6.00	3.27	5.32	5.85	3.45	8.13	34	6.75	7.57	4.57	5.54	8.45	4.74
10	5.08	6.62	8.83	7.59	5.25	8.46	35	7.52	5.34	2.59	3.63	8.22	3.15
11	4.44	4.04	4.65	7.91	7.48	9.84	36	6.87	3.91	6.27	6.09	7.68	6.37
12	4.88	2.05	7.82	6.62	6.49	8.11	37	7.40	4.65	6.84	7.40	5.39	5.30
13	4.64	2.77	3.24	7.71	4.49	9.81	38	9.10	3.94	7.43	7.21	8.03	7.08
14	5.20	5.08	4.89	7.99	6.91	8.33	39	8.24	4.25	5.88	7.52	8.23	6.46
15	4.60	1.83	5.14	6.52	9.63	8.64	40	6.68	4.02	6.48	6.07	6.77	6.54
16	5.67	3.20	6.33	7.67	6.93	7.90	41	9.25	7.18	7.54	7.14	7.45	6.12
17	7.06	3.67	9.16	9.19	7.36	10.04	42	8.21	5.31	5.84	5.52	9.66	8.83
18	6.87	3.65	6.35	9.01	9.03	9.26	43	6.95	8.97	5.97	8.59	7.00	7.03
19	4.95	3.35	8.17	7.65	7.95	8.90	44	5.39	7.82	6.99	6.11	8.36	4.33
20	6.08	4.50	7.59	9.60	6.90	9.65	45	5.68	6.03	5.60	4.25	9.15	5.26
21	7.63	1.98	4.63	10.06	9.87	4.26	46	3.02	5.35	1.99	5.41	7.72	4.25
22	9.42	4.39	4.83	8.80	7.82	4.19	47	2.46	7.86	3.09	4.99	6.13	5.20
23	8.10	2.60	7.89	6.68	9.08	5.18	48	2.69	4.59	3.70	6.36	8.84	5.14
24	7.36	5.01	4.51	9.16	9.29	6.38	49	3.42	6.80	3.08	3.91	8.44	4.53
25	9.44	2.58	4.89	5.76	9.30	7.42	50	2.52	7.86	2.03	3.48	5.14	3.45

Table C.38 Experimental data of yellowness for 3-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	33.29	35.50	28.62	30.61	26.86	32.21	26	33.68	34.97	30.51	35.17	32.85	31.61
2	37.39	36.15	29.64	34.85	30.60	30.43	27	33.45	35.58	35.50	32.67	34.11	32.94
3	34.49	34.38	27.75	33.03	27.09	31.68	28	35.06	33.94	30.08	29.59	31.19	32.48
4	39.82	33.64	32.61	35.44	30.54	29.61	29	34.26	34.86	32.44	32.96	33.71	31.42
5	38.05	32.98	30.45	34.22	33.50	34.92	30	36.17	33.23	34.97	34.26	32.65	32.77
6	39.50	32.16	32.79	35.43	33.21	30.85	31	35.78	33.36	34.31	33.65	28.71	32.51
7	35.24	34.29	35.50	32.88	31.72	33.16	32	33.19	38.32	36.27	36.48	32.94	28.24
8	35.82	29.74	33.32	32.51	33.78	34.88	33	34.57	31.62	33.87	34.67	30.69	34.17
9	35.16	33.82	34.58	32.60	31.87	32.79	34	35.88	33.34	33.99	31.84	30.91	32.25
10	35.01	33.48	38.37	33.45	33.76	33.69	35	37.11	28.99	31.47	35.03	34.72	28.03
11	35.80	35.56	24.49	35.51	34.00	28.34	36	38.90	30.94	32.14	31.40	31.74	33.41
12	36.62	35.21	35.06	32.43	30.81	33.99	37	35.89	32.35	34.62	31.59	30.32	28.10
13	38.30	38.11	32.21	34.64	31.42	32.10	38	36.04	31.33	32.49	29.53	32.44	32.58
14	32.35	33.66	35.77	31.63	30.49	28.75	39	34.93	32.63	31.44	30.79	31.20	29.45
15	30.29	31.26	29.98	35.84	33.03	36.02	40	29.57	31.84	35.66	30.77	32.34	30.15
16	34.70	31.12	30.58	34.06	31.49	34.28	41	32.74	37.01	33.91	32.52	32.51	31.82
17	35.10	39.71	34.24	30.07	29.58	29.70	42	34.64	35.51	32.44	28.55	32.61	32.51
18	36.85	33.85	30.97	32.66	30.82	32.93	43	33.00	29.77	31.62	31.11	32.60	32.07
19	38.65	34.37	33.27	33.31	30.99	33.86	44	37.61	36.66	34.29	33.56	32.40	29.79
20	36.57	39.00	37.00	35.03	29.73	31.45	45	32.18	37.12	30.86	34.58	24.93	33.05
21	32.40	32.78	37.13	32.48	32.94	33.03	46	33.59	36.91	31.50	32.22	32.39	30.45
22	34.41	33.76	31.30	30.09	33.83	31.79	47	29.73	36.30	33.29	35.90	32.55	33.25
23	39.82	37.04	36.49	37.06	30.70	29.28	48	37.04	34.41	29.56	33.44	29.77	35.49
24	36.10	34.62	32.03	32.88	33.75	33.38	49	32.26	34.04	31.95	32.54	27.13	30.64
25	29.48	38.93	36.65	29.99	35.19	31.74	50	34.60	32.35	38.27	33.36	34.21	35.97

Table C.38 Experimental data of yellowness for 3-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	30.58	33.45	32.57	31.64	34.20	36.22	26	23.42	30.47	31.61	31.50	36.77	35.05
2	30.54	34.85	34.48	34.06	35.00	33.92	27	34.25	33.82	33.42	29.90	32.09	32.60
3	33.55	34.15	34.15	31.21	33.73	34.37	28	32.49	32.00	30.89	32.30	33.12	31.55
4	30.47	32.87	34.67	32.64	35.65	32.02	29	34.15	34.84	33.11	31.59	35.06	33.58
5	30.14	36.17	33.68	30.91	35.48	34.38	30	29.53	33.99	34.47	30.04	35.10	33.65
6	30.16	31.12	36.13	28.63	33.76	29.88	31	33.47	36.18	33.73	29.26	31.88	33.56
7	35.10	33.73	35.23	32.67	33.19	33.46	32	35.80	30.26	30.46	32.39	36.71	30.00
8	32.96	32.68	32.92	29.52	34.06	31.04	33	31.78	34.10	33.58	29.81	33.12	32.44
9	36.75	32.16	36.11	33.61	31.53	33.68	34	33.43	38.79	33.57	32.32	34.26	31.68
10	32.50	31.20	40.46	27.64	34.23	33.51	35	31.15	30.86	32.73	31.90	36.04	30.43
11	34.42	29.40	31.15	26.56	34.76	27.86	36	32.50	33.55	34.33	31.87	32.45	35.94
12	31.94	33.31	32.26	31.22	29.13	33.23	37	32.14	35.73	35.99	33.03	32.54	33.49
13	32.01	34.30	31.20	27.55	33.42	31.37	38	33.95	28.33	32.54	32.67	35.17	32.49
14	34.52	32.04	31.67	25.15	35.45	34.95	39	31.66	35.77	35.69	33.64	31.87	35.33
15	34.98	31.98	34.92	31.25	29.50	34.31	40	36.00	33.78	35.74	32.78	32.46	32.37
16	33.22	28.92	31.87	34.40	32.11	32.93	41	35.16	36.62	33.31	34.24	35.33	32.45
17	36.13	31.88	36.34	32.37	31.56	35.06	42	37.04	31.34	33.70	31.45	34.11	35.15
18	33.08	33.72	33.09	26.58	29.66	31.67	43	37.88	35.17	34.92	30.62	31.09	32.50
19	35.52	30.71	33.22	32.94	31.37	37.36	44	34.76	32.29	34.31	32.43	34.71	33.09
20	33.53	33.22	37.19	31.81	33.67	32.85	45	33.73	34.83	33.49	34.31	32.79	34.14
21	34.48	28.67	33.16	29.21	30.59	33.86	46	31.14	32.35	30.25	32.09	30.85	29.45
22	36.59	32.93	33.26	30.20	31.98	32.16	47	33.24	35.29	33.04	31.50	37.22	29.96
23	35.79	32.93	35.29	28.28	31.42	32.44	48	32.31	31.19	30.78	32.33	30.56	34.35
24	30.86	33.73	31.97	29.78	33.60	32.21	49	31.49	32.51	32.32	32.55	36.42	29.23
25	36.57	32.87	32.15	29.96	33.92	29.22	50	33.83	32.45	30.08	30.98	31.99	30.42

Table C.39 Experimental data of lightness for 3-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	67.18	63.54	66.85	69.96	69.96	62.25	26	63.33	62.09	60.12	69.55	55.88	70.23
2	70.81	59.66	66.05	74.07	74.07	53.01	27	68.18	58.18	74.96	62.96	56.69	64.20
3	70.77	68.99	67.08	69.03	69.03	60.56	28	75.86	69.31	66.02	69.32	54.93	55.88
4	71.98	46.78	68.10	68.17	68.17	63.81	29	60.72	66.73	64.47	62.97	67.23	57.20
5	69.38	63.89	71.66	72.71	72.71	59.43	30	71.80	56.39	72.77	70.49	61.62	69.30
6	58.29	68.19	64.04	72.21	72.21	69.41	31	56.55	69.49	71.03	59.30	68.15	68.38
7	73.49	45.50	66.07	71.74	71.74	67.05	32	66.40	69.78	73.91	49.49	56.21	68.46
8	66.51	65.02	71.96	56.92	56.92	61.59	33	75.58	73.41	73.50	47.97	61.63	61.93
9	67.11	67.71	59.70	71.03	71.03	69.24	34	65.06	72.31	67.57	50.57	62.14	71.22
10	67.08	63.73	71.60	68.54	68.54	69.55	35	62.89	74.34	64.74	57.97	61.75	61.62
11	62.84	73.83	63.25	58.49	58.49	56.65	36	66.74	61.60	64.89	57.91	67.77	69.16
12	67.50	64.57	63.90	57.35	57.35	65.49	37	70.05	73.00	61.69	71.20	62.59	59.74
13	70.96	69.72	63.78	58.94	58.94	64.14	38	73.36	68.46	54.93	69.71	63.28	61.26
14	62.09	64.75	59.90	65.40	65.40	63.97	39	71.67	58.78	71.15	76.32	73.86	53.17
15	75.36	69.74	62.76	77.16	77.16	71.35	40	75.10	71.85	52.49	67.68	67.00	61.61
16	73.24	61.51	70.69	56.83	56.83	50.46	41	67.73	59.73	65.23	68.62	66.53	60.11
17	68.00	69.16	63.22	60.86	60.86	61.03	42	66.11	64.51	70.97	72.81	69.75	66.15
18	61.43	57.62	54.89	56.26	56.26	58.56	43	63.27	70.76	72.14	69.52	71.71	64.08
19	54.51	68.39	68.46	63.68	63.68	57.57	44	69.49	67.97	57.63	68.42	61.65	61.40
20	68.67	69.54	68.36	66.50	66.50	63.20	45	64.47	70.32	64.01	71.06	70.87	64.05
21	71.00	59.60	63.91	49.62	49.62	59.26	46	56.67	67.58	69.61	70.09	52.32	52.86
22	66.25	57.63	66.44	54.11	54.11	59.59	47	66.89	57.26	63.80	61.97	57.88	57.50
23	71.59	58.00	67.60	62.17	62.17	62.93	48	67.86	68.66	73.70	70.38	62.46	56.67
24	72.04	57.59	69.12	61.84	61.84	65.75	49	69.73	62.73	69.74	65.00	57.24	59.61
25	69.48	51.93	69.59	63.59	63.59	58.09	50	67.32	65.74	65.69	61.01	64.29	67.73

Table C.39 Experimental data of lightness for 3-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	62.42	72.15	61.39	60.11	60.11	65.62	26	69.39	57.27	68.36	56.86	63.77	56.85
2	66.21	65.05	60.71	64.38	64.38	56.59	27	57.26	55.45	59.35	60.09	62.25	55.90
3	64.94	63.42	63.80	60.19	60.19	61.57	28	67.14	60.06	59.13	69.67	64.39	45.52
4	60.22	65.86	60.98	60.38	60.38	70.16	29	73.03	62.99	53.39	66.33	66.86	64.84
5	60.12	68.35	60.88	58.18	58.18	58.97	30	68.68	52.93	68.49	72.22	63.59	57.54
6	66.77	64.03	66.06	52.29	52.29	55.30	31	67.28	71.60	66.46	66.84	50.39	50.61
7	67.87	70.45	49.21	61.42	61.42	53.14	32	59.35	60.20	62.79	57.38	57.31	61.21
8	62.18	61.19	69.00	67.01	67.01	57.78	33	56.84	59.07	60.83	62.58	54.24	51.34
9	62.55	69.83	64.75	56.39	56.39	55.09	34	57.26	67.29	61.70	71.60	45.47	59.91
10	58.02	64.83	48.53	66.32	66.32	57.23	35	65.89	73.53	58.10	59.54	55.21	65.90
11	69.68	59.15	69.67	56.89	56.89	57.86	36	67.40	77.14	60.29	59.10	68.06	53.96
12	69.44	61.48	65.24	68.27	68.27	56.33	37	63.77	62.64	71.48	67.36	65.30	47.76
13	69.42	52.94	68.82	58.53	58.53	55.98	38	68.66	74.06	64.03	65.52	62.02	51.90
14	62.18	55.96	65.21	53.79	53.79	57.07	39	67.48	65.28	79.39	61.65	68.29	60.88
15	69.70	62.61	68.46	65.01	65.01	56.54	40	63.23	57.37	72.02	70.45	61.83	59.76
16	59.61	73.14	54.85	63.89	63.89	59.09	41	66.16	56.14	65.73	63.25	53.24	59.24
17	60.96	64.71	66.71	63.96	63.96	61.06	42	61.91	72.60	55.65	68.08	54.69	70.05
18	66.66	71.06	63.93	62.89	62.89	55.73	43	71.69	61.45	64.97	62.89	63.83	59.39
19	60.14	61.88	51.49	64.74	64.74	65.07	44	59.64	60.63	64.06	59.99	64.22	69.94
20	55.19	71.14	66.96	64.78	64.78	59.67	45	58.49	65.41	64.85	65.37	60.54	66.44
21	66.84	68.74	63.78	65.69	65.69	58.74	46	67.20	57.81	58.46	62.86	48.65	43.55
22	60.92	62.57	65.23	55.93	55.93	50.59	47	70.55	67.62	63.37	58.38	69.34	52.53
23	66.25	63.69	64.89	62.05	62.05	63.75	48	60.78	61.13	55.91	60.83	60.56	46.47
24	63.69	57.04	53.87	62.08	62.08	57.33	49	64.47	55.07	54.93	63.77	65.38	53.01
25	62.32	70.72	69.11	65.86	65.86	61.22	50	66.81	66.85	66.23	64.01	60.63	53.47

Table C.40 Experimental data of redness for 3-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	3.32	4.84	1.53	4.12	4.12	4.80	26	5.52	4.32	3.10	1.24	9.60	5.80
2	2.60	5.93	1.82	5.92	5.92	7.03	27	2.29	4.21	2.68	3.70	9.36	5.87
3	2.63	3.91	2.31	8.22	8.22	6.58	28	3.85	2.12	1.51	1.41	9.25	9.34
4	2.27	6.47	2.68	5.44	5.44	4.98	29	2.63	5.31	2.75	4.70	6.40	8.15
5	2.20	6.12	1.07	4.30	4.30	4.88	30	3.96	3.21	2.51	3.61	7.77	6.49
6	2.82	1.95	3.00	3.85	3.85	4.69	31	2.69	4.28	3.42	6.45	7.84	4.27
7	3.35	5.91	7.11	5.70	5.70	6.51	32	3.25	3.77	2.07	10.47	10.19	2.86
8	4.37	2.90	5.30	7.86	7.86	9.20	33	1.35	3.37	1.56	10.21	10.34	6.68
9	2.01	1.65	7.75	4.20	4.20	5.09	34	2.99	3.08	5.14	9.87	9.52	3.82
10	2.79	0.99	3.36	5.60	5.60	5.66	35	1.16	1.94	3.08	5.44	10.26	7.38
11	3.96	1.62	3.94	11.64	11.64	7.29	36	6.38	4.77	3.93	6.26	7.29	5.79
12	3.23	5.17	2.89	10.07	10.07	3.17	37	4.13	3.18	2.46	1.89	5.45	4.84
13	1.98	2.16	2.68	9.27	9.27	3.58	38	3.87	4.76	2.95	2.61	7.34	7.61
14	4.95	3.31	4.72	7.26	7.26	5.49	39	4.69	2.86	2.37	1.91	6.18	5.33
15	1.66	1.42	4.23	5.60	5.60	2.18	40	2.93	2.02	1.87	1.71	5.43	6.73
16	3.38	5.20	3.10	10.26	10.26	10.85	41	5.04	6.70	3.35	2.32	7.16	9.39
17	5.30	4.10	6.29	8.24	8.24	5.20	42	2.53	6.16	5.34	3.22	8.63	6.82
18	2.60	2.38	8.43	11.59	11.59	5.91	43	3.17	3.03	3.13	2.40	7.69	8.58
19	3.60	2.62	2.63	9.74	9.74	9.07	44	3.98	2.89	2.03	1.97	9.25	9.38
20	3.54	4.02	2.52	8.26	8.26	5.75	45	2.11	3.34	5.33	2.40	8.48	7.63
21	2.92	4.70	3.20	12.87	12.87	7.90	46	5.42	1.76	2.84	6.37	11.21	9.89
22	2.79	6.82	2.66	13.08	13.08	6.99	47	1.30	2.79	4.39	2.63	10.69	6.01
23	1.67	4.05	3.16	13.89	13.89	5.63	48	1.96	2.56	0.96	3.70	6.62	11.18
24	1.95	3.66	2.58	12.70	12.70	6.53	49	4.28	2.83	2.84	4.30	9.68	7.25
25	1.85	4.43	2.15	13.09	13.09	7.72	50	1.55	1.47	3.15	4.76	7.31	6.78

Table C.40 Experimental data of redness for 3-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	6.15	3.72	6.81	8.79	8.79	4.27	26	3.14	7.31	4.20	5.50	5.82	7.85
2	5.42	5.56	5.81	8.10	8.10	6.25	27	5.80	4.05	6.00	5.80	7.94	10.37
3	4.82	3.99	8.69	8.78	8.78	5.90	28	4.22	7.31	6.43	4.50	6.33	10.32
4	7.44	4.30	6.54	7.08	7.08	3.64	29	2.97	5.34	6.47	4.32	6.00	8.30
5	6.29	3.94	8.48	8.80	8.80	6.64	30	4.61	4.50	4.19	4.48	5.54	8.49
6	3.53	5.50	4.39	8.30	8.30	8.47	31	3.76	4.05	5.39	3.35	7.35	9.41
7	4.95	3.95	8.87	6.40	6.40	6.47	32	3.89	4.95	6.17	6.97	9.37	7.36
8	6.61	5.53	5.89	6.14	6.14	5.83	33	5.38	6.88	6.30	6.10	7.44	9.55
9	3.59	3.69	3.63	7.33	7.33	8.63	34	3.99	5.42	6.81	4.14	9.00	6.68
10	7.91	5.53	9.83	8.31	8.31	7.16	35	5.12	3.45	6.06	6.31	10.25	5.32
11	2.17	8.92	5.65	6.24	6.24	10.43	36	4.23	2.68	4.37	3.98	4.85	7.79
12	3.84	5.73	6.86	6.02	6.02	7.87	37	6.23	4.42	2.10	5.26	4.39	8.28
13	3.16	12.21	5.44	7.33	7.33	10.22	38	4.19	3.67	2.66	7.11	5.54	7.92
14	5.00	8.55	6.49	6.51	6.51	10.60	39	4.45	3.64	-0.31	4.34	5.88	6.10
15	3.02	5.98	5.54	5.93	5.93	7.20	40	4.42	6.78	2.88	3.98	6.18	5.40
16	3.94	3.76	8.15	5.26	5.26	8.07	41	4.66	3.38	6.17	6.06	6.18	7.62
17	7.60	3.18	5.43	6.46	6.46	8.55	42	6.69	3.71	8.45	6.76	8.03	4.47
18	5.09	3.74	4.78	6.72	6.72	8.37	43	4.10	4.92	4.25	8.31	4.43	6.81
19	4.80	3.31	8.22	5.30	5.30	8.08	44	7.42	4.73	6.18	5.30	6.06	4.08
20	5.58	4.47	6.06	5.45	5.45	10.19	45	5.71	4.55	8.17	6.71	5.54	5.31
21	5.05	4.98	3.85	7.38	7.38	6.23	46	2.29	5.73	5.09	11.20	7.72	12.05
22	3.57	6.54	5.75	8.54	8.54	9.19	47	2.33	3.23	5.90	8.83	4.44	11.18
23	7.10	4.39	3.60	8.09	8.09	6.71	48	7.89	6.58	5.99	11.34	5.20	10.07
24	5.46	6.36	9.06	8.71	8.71	9.52	49	1.65	5.26	7.21	10.49	5.65	12.41
25	3.73	5.26	6.79	8.07	8.07	7.78	50	1.16	3.43	5.75	8.39	6.35	11.21

Table C.41 Experimental data of yellowness for 3-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	30.66	29.65	26.29	27.01	27.01	28.26	26	31.37	29.85	28.35	22.55	32.29	30.54
2	31.68	30.78	25.54	33.92	33.92	29.92	27	27.97	30.12	32.21	26.42	30.71	29.97
3	31.82	30.63	27.85	37.45	37.45	32.95	28	32.63	28.31	26.72	22.60	31.96	31.29
4	30.84	27.32	28.43	31.52	31.52	28.74	29	25.70	32.47	30.02	29.72	33.50	27.86
5	28.92	32.59	28.07	28.45	28.45	30.22	30	32.88	26.98	30.70	29.66	30.49	31.93
6	27.89	26.94	31.66	29.94	29.94	32.98	31	27.09	34.01	32.15	28.38	33.55	31.37
7	33.24	27.68	33.16	33.08	33.08	30.83	32	28.54	34.00	30.81	29.68	33.37	25.44
8	34.05	28.50	35.13	29.49	29.49	36.96	33	28.26	32.67	29.31	29.77	36.03	32.52
9	28.86	26.69	30.74	29.53	29.53	33.19	34	27.46	32.84	32.47	30.16	33.10	31.20
10	30.86	25.57	32.53	31.88	31.88	31.61	35	25.06	32.15	28.63	28.74	35.05	33.52
11	29.48	27.07	31.44	33.49	33.49	30.61	36	33.97	32.17	27.94	31.24	33.03	31.74
12	31.51	32.10	28.81	32.47	32.47	24.90	37	32.77	32.17	26.28	28.51	28.28	26.25
13	30.84	26.80	25.66	32.96	32.96	28.74	38	34.52	34.02	28.27	29.02	30.95	31.69
14	31.82	28.79	31.02	34.26	34.26	31.63	39	33.85	28.27	30.80	30.85	34.93	28.07
15	30.73	25.51	31.08	31.18	31.18	24.68	40	33.19	30.39	23.12	28.29	29.76	30.24
16	32.53	33.18	30.98	33.08	33.08	32.70	41	33.32	33.27	27.13	28.24	36.02	34.30
17	34.53	34.11	35.26	31.07	31.07	30.45	42	28.41	33.77	32.07	32.53	37.93	33.28
18	25.53	27.11	32.56	33.30	33.30	29.07	43	30.01	32.36	29.05	28.96	37.55	34.55
19	27.10	32.03	29.23	35.63	35.63	35.42	44	31.69	30.78	23.76	28.46	37.06	36.36
20	31.18	34.06	30.03	33.12	33.12	32.26	45	28.21	31.69	30.48	29.79	37.79	33.87
21	28.70	29.71	29.28	30.61	30.61	31.97	46	28.09	27.96	29.06	38.15	29.66	31.09
22	29.64	29.63	28.32	33.40	33.40	31.10	47	27.43	27.50	31.04	28.17	34.29	30.69
23	29.25	29.16	30.11	35.11	35.11	29.88	48	29.07	29.33	26.61	34.89	31.08	36.02
24	29.01	28.62	28.33	32.63	32.63	33.07	49	33.04	29.10	29.31	30.59	32.00	31.38
25	27.53	29.15	27.40	38.53	38.53	31.11	50	28.37	27.93	29.70	33.18	31.20	35.08

Table C.41 Experimental data of yellowness for 3-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	32.35	29.24	30.18	33.91	33.91	26.06	26	27.41	30.42	34.08	26.24	31.03	32.60
2	32.07	28.45	29.29	33.45	33.45	26.71	27	27.95	25.71	30.69	28.73	31.06	34.78
3	31.27	27.30	31.34	34.15	34.15	29.69	28	27.86	31.27	32.66	28.33	31.61	28.60
4	33.00	30.03	30.06	30.56	30.56	26.21	29	27.76	29.19	28.29	26.01	30.10	36.65
5	32.18	31.40	32.28	32.15	32.15	28.07	30	29.03	26.76	34.26	28.94	30.58	34.44
6	26.26	28.10	29.88	28.96	28.96	29.83	31	28.78	28.60	33.78	25.19	29.37	30.72
7	27.75	26.71	30.56	29.94	29.94	23.84	32	29.42	28.57	31.91	29.91	32.10	31.95
8	28.25	27.52	32.66	31.00	31.00	26.65	33	29.94	29.31	32.71	28.59	28.22	30.04
9	25.41	26.07	27.77	28.62	28.62	29.12	34	28.61	30.48	32.25	27.82	27.65	31.32
10	31.76	28.32	30.21	34.67	34.67	26.49	35	33.09	26.85	31.81	30.19	30.98	31.33
11	26.11	35.28	32.34	26.76	26.76	34.64	36	30.04	25.55	29.23	25.64	27.79	26.94
12	31.91	30.61	32.22	31.31	31.31	31.42	37	32.67	28.42	29.91	28.86	27.61	26.39
13	30.58	32.59	31.63	29.07	29.07	32.93	38	33.06	27.28	30.52	31.22	28.07	26.16
14	30.41	33.41	30.35	26.12	26.12	34.78	39	31.18	27.77	28.69	26.73	30.28	28.04
15	28.88	31.10	30.46	30.01	30.01	30.39	40	30.47	27.78	33.01	26.19	27.87	26.98
16	29.53	29.78	30.73	27.31	27.31	31.07	41	28.61	24.98	34.20	32.00	27.48	29.64
17	35.18	26.46	29.26	28.67	28.67	34.26	42	28.97	33.02	35.12	34.62	29.63	27.29
18	32.83	29.41	26.71	27.45	27.45	29.34	43	28.34	28.39	30.13	33.92	26.07	28.07
19	29.32	26.45	29.60	28.14	28.14	34.58	44	29.34	27.69	33.03	28.22	27.85	28.01
20	28.73	31.06	29.64	28.15	28.15	35.01	45	28.73	30.74	38.89	32.21	28.81	28.02
21	32.99	30.49	27.92	32.41	32.41	29.30	46	27.49	30.51	32.26	38.30	26.17	29.80
22	28.10	31.68	30.81	32.66	32.66	29.95	47	29.43	29.36	34.40	33.51	27.60	34.35
23	33.40	28.56	27.55	34.71	34.71	32.21	48	34.44	27.71	31.47	36.14	26.55	29.40
24	32.13	29.47	32.72	35.64	35.64	33.39	49	26.79	25.48	32.68	38.03	30.01	35.74
25	29.27	32.14	34.04	34.66	34.66	33.01	50	25.49	29.53	35.99	34.89	28.97	34.90

Table C.42 Experimental data of lightness for 3-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	63.85	51.04	43.45	56.75	50.79	41.52	26	59.10	54.99	66.91	69.19	49.37	60.65
2	62.99	62.56	59.82	46.76	51.33	48.57	27	59.66	53.15	68.43	55.53	48.55	56.60
3	59.84	54.13	66.64	48.96	56.83	52.92	28	59.14	59.35	54.67	63.48	52.91	66.94
4	64.93	61.21	59.14	63.78	52.84	49.17	29	48.07	58.03	66.80	63.22	60.65	61.45
5	62.49	59.76	57.51	55.16	51.53	53.24	30	58.86	54.49	65.12	64.23	57.64	57.99
6	60.89	53.96	49.74	66.99	54.19	55.52	31	60.80	64.87	58.48	55.39	55.50	61.59
7	60.60	52.91	55.09	63.27	45.22	54.47	32	60.41	57.38	54.62	59.06	55.02	61.33
8	58.76	50.78	59.91	61.36	46.41	51.24	33	61.76	65.41	71.66	51.41	58.04	58.62
9	63.18	52.53	55.33	65.62	53.26	50.09	34	58.77	49.55	61.02	57.66	60.51	63.45
10	58.99	57.83	54.84	66.44	54.71	62.84	35	60.45	58.71	65.84	53.06	63.77	60.44
11	48.53	59.70	59.92	52.42	55.17	61.65	36	62.38	60.41	56.16	62.24	45.68	46.03
12	62.17	66.34	61.32	58.67	46.46	51.74	37	59.55	56.03	48.63	57.19	47.67	44.87
13	61.62	61.62	62.43	62.81	54.06	53.11	38	55.62	63.67	61.05	63.82	50.00	48.65
14	54.38	61.85	62.24	59.59	52.24	63.93	39	65.06	62.26	61.99	59.75	43.43	43.46
15	61.33	50.57	62.92	61.26	49.30	60.19	40	58.02	59.23	63.84	69.83	48.29	47.35
16	57.94	55.53	50.48	55.61	59.23	45.11	41	56.62	57.11	51.52	67.27	61.21	49.66
17	59.04	59.54	56.41	55.27	54.24	52.13	42	64.93	52.59	54.29	63.49	53.10	51.99
18	47.56	57.91	54.00	44.24	52.44	45.72	43	63.71	59.54	52.27	56.18	50.26	49.42
19	58.06	63.23	56.80	46.28	59.20	48.55	44	61.70	58.22	52.36	60.79	58.09	46.07
20	58.26	61.40	60.82	52.38	59.54	42.71	45	60.96	56.86	53.70	69.74	62.51	53.67
21	60.81	63.76	57.00	48.10	43.15	61.07	46	60.45	57.87	47.55	59.17	44.61	58.84
22	55.97	62.11	50.50	45.67	51.82	58.08	47	59.27	63.47	56.37	64.36	55.92	62.04
23	62.11	58.31	52.90	50.43	46.80	61.93	48	63.13	70.89	60.90	55.00	53.93	58.43
24	58.18	60.25	55.73	54.49	54.24	61.90	49	66.48	59.06	52.35	62.71	49.49	59.69
25	62.38	58.36	55.21	44.60	54.81	58.76	50	59.92	46.50	64.22	65.32	52.01	55.54

Table C.42 Experimental data of lightness for 3-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	66.24	56.30	66.80	60.68	48.48	53.73	26	35.37	58.78	58.84	52.39	49.87	60.86
2	67.02	53.08	51.72	55.49	56.28	52.72	27	65.81	47.62	56.94	51.84	54.32	58.51
3	62.51	55.57	53.15	50.58	58.15	59.01	28	58.40	56.63	59.16	52.64	49.58	60.04
4	63.79	54.92	62.97	59.11	49.65	60.51	29	61.06	49.82	48.69	58.57	53.36	63.42
5	65.18	59.73	55.20	60.30	61.53	54.04	30	47.76	50.16	64.99	59.86	53.56	63.14
6	54.73	64.97	49.10	52.99	53.34	55.36	31	51.39	55.33	62.61	57.80	48.37	56.54
7	66.81	61.54	62.69	59.33	57.57	58.05	32	57.87	54.77	67.15	61.68	55.66	61.91
8	61.85	62.94	66.18	53.36	50.66	57.73	33	55.41	66.13	50.84	58.96	53.24	60.77
9	64.63	65.92	58.26	52.58	56.27	48.46	34	54.31	64.42	63.40	59.90	53.93	57.78
10	59.19	57.71	67.02	50.81	61.48	59.54	35	58.36	51.35	68.30	61.17	52.01	65.59
11	69.47	56.82	62.76	44.46	55.80	57.78	36	52.50	62.44	61.55	55.60	51.06	62.27
12	56.79	66.72	59.34	51.48	49.38	55.97	37	52.70	52.14	62.05	45.91	52.60	58.71
13	60.84	58.84	62.87	60.93	52.99	53.84	38	55.79	69.64	59.54	50.22	56.80	57.28
14	63.81	54.06	56.35	61.08	48.04	48.96	39	50.76	60.99	60.54	46.37	51.35	58.17
15	70.14	66.23	60.37	57.49	57.08	52.76	40	64.88	53.48	55.70	59.09	54.12	64.03
16	63.68	63.09	60.45	53.71	44.82	55.47	41	55.51	60.87	55.97	61.07	62.51	68.51
17	59.84	48.89	63.72	51.06	59.01	62.65	42	60.41	64.08	55.44	58.58	59.87	58.82
18	55.04	42.94	57.34	37.63	54.23	55.70	43	64.16	61.30	56.58	47.20	55.12	56.78
19	67.71	51.99	55.03	47.30	56.95	56.48	44	58.35	61.32	52.98	57.78	59.41	61.84
20	53.98	53.40	66.26	56.70	49.89	61.39	45	58.17	65.50	60.88	52.91	59.72	64.45
21	56.62	59.02	52.76	63.12	57.67	63.41	46	64.47	57.62	60.84	51.74	54.55	50.74
22	60.69	65.56	46.41	64.35	54.56	60.04	47	64.93	60.52	60.42	47.68	54.73	59.62
23	59.38	59.00	56.33	55.65	60.65	51.86	48	57.45	60.01	60.83	49.80	55.75	58.10
24	46.51	61.25	56.63	62.03	61.55	64.17	49	63.74	65.66	62.14	45.16	49.21	47.62
25	59.05	67.15	56.77	66.77	56.14	60.18	50	65.64	60.95	63.68	44.95	56.06	62.14

Table C.43 Experimental data of redness for 3-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	7.52	8.51	12.81	8.83	12.35	13.16	26	6.02	8.61	3.94	7.23	7.08	9.83
2	6.91	7.01	8.12	11.27	9.19	8.54	27	6.59	8.00	5.16	11.03	11.74	9.53
3	7.61	6.49	8.65	12.33	10.84	11.58	28	5.56	7.88	8.98	8.12	7.38	8.48
4	7.80	7.69	9.36	8.69	11.47	12.10	29	5.35	8.23	3.88	8.51	9.06	7.15
5	6.70	9.37	8.40	11.32	8.18	10.15	30	8.63	10.36	5.95	9.14	8.63	7.41
6	6.45	8.29	10.53	5.33	12.00	7.94	31	7.44	8.08	9.14	9.67	9.47	8.45
7	5.99	8.65	9.44	5.18	11.42	10.16	32	8.00	6.10	6.80	11.18	6.19	7.18
8	6.86	10.39	8.16	5.92	12.37	10.49	33	6.12	7.70	4.72	11.12	8.38	7.43
9	6.00	9.29	9.09	5.01	12.07	9.53	34	8.77	8.94	8.33	9.05	7.10	7.56
10	5.40	7.49	10.31	5.74	10.95	8.12	35	9.11	5.33	6.86	10.13	7.17	7.25
11	11.21	7.70	6.65	10.15	11.09	9.37	36	8.17	6.27	8.89	7.67	12.78	12.17
12	6.84	6.87	8.47	8.55	13.20	9.52	37	7.24	8.15	11.57	8.37	11.08	11.78
13	6.85	8.14	6.08	7.32	11.76	9.36	38	6.21	4.62	9.45	6.85	9.80	11.51
14	9.31	8.38	6.79	8.97	10.46	8.51	39	7.72	5.49	7.97	6.45	12.71	11.86
15	6.55	5.60	8.62	7.91	12.60	7.26	40	8.61	6.16	8.73	4.98	9.68	12.14
16	8.43	8.40	12.07	8.27	6.96	11.88	41	7.40	8.85	7.76	7.85	8.06	10.01
17	11.18	9.52	10.78	9.51	9.48	11.01	42	6.77	11.37	9.85	7.36	9.08	9.94
18	6.64	9.78	10.58	12.51	9.48	12.15	43	6.17	10.61	7.13	7.60	7.86	10.08
19	10.44	10.22	11.07	11.78	7.31	11.60	44	7.15	9.98	8.13	7.66	8.81	13.64
20	8.40	7.74	9.27	9.68	8.46	12.73	45	5.27	9.19	9.94	6.23	6.74	9.63
21	8.16	7.64	8.25	11.19	13.67	8.78	46	3.97	6.09	7.91	7.77	12.22	7.57
22	6.50	9.64	11.40	10.66	10.57	10.70	47	4.94	6.80	10.48	6.84	9.01	6.50
23	5.72	7.05	10.04	9.67	10.33	8.17	48	4.75	6.01	6.69	9.81	8.73	9.31
24	7.47	10.06	8.20	9.30	12.07	9.52	49	4.94	6.59	7.37	6.94	10.40	8.09
25	7.57	10.30	10.34	11.15	9.64	9.66	50	3.45	8.05	8.34	5.74	8.99	4.74

Table C.43 Experimental data of redness for 3-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	2.05	9.42	4.12	8.15	12.01	10.37	26	1.81	5.75	8.65	9.32	10.69	6.06
2	1.76	10.30	7.00	8.72	10.07	9.56	27	4.13	7.01	9.93	10.44	8.73	8.19
3	3.67	10.86	8.26	8.72	9.62	9.82	28	4.37	7.42	9.90	9.40	11.73	6.63
4	1.96	8.78	4.69	8.30	12.36	9.28	29	6.14	7.42	8.97	10.22	10.60	4.89
5	2.32	8.83	7.71	7.35	8.27	9.34	30	6.77	4.69	7.54	7.10	8.82	6.94
6	5.59	5.01	11.00	9.46	10.80	8.35	31	8.72	10.34	6.20	8.29	11.58	5.43
7	4.79	6.79	7.07	7.82	8.03	8.05	32	8.95	9.25	5.22	6.45	10.21	6.81
8	4.14	5.75	6.64	9.34	11.07	9.90	33	5.51	5.81	5.01	6.49	8.54	6.77
9	6.00	4.66	9.79	9.58	10.26	9.81	34	6.75	5.92	5.31	7.83	10.51	5.49
10	5.08	6.04	4.85	9.15	7.20	7.92	35	7.52	5.21	4.64	5.73	10.43	3.83
11	4.44	6.07	5.71	11.69	8.16	9.47	36	6.87	4.55	6.50	11.38	8.36	5.46
12	4.88	5.56	8.49	6.43	11.78	11.09	37	7.40	6.40	6.64	12.61	10.34	7.22
13	4.64	6.04	6.74	6.96	11.28	11.02	38	9.10	3.87	9.21	10.84	8.96	8.01
14	5.20	6.89	6.83	8.21	12.40	10.59	39	8.24	4.67	9.60	12.36	8.48	7.96
15	4.60	6.24	8.50	5.12	8.02	9.93	40	6.68	4.08	6.64	11.48	9.98	5.15
16	5.67	7.79	7.09	8.78	12.25	6.70	41	9.25	3.51	7.10	8.69	7.63	4.54
17	7.06	8.57	5.24	10.69	8.60	4.52	42	8.21	5.48	7.80	7.48	8.68	7.08
18	6.87	9.92	7.60	12.96	9.84	7.24	43	6.95	5.53	6.54	10.67	9.74	6.17
19	4.95	6.13	5.76	9.75	9.60	7.00	44	5.39	5.37	10.23	8.58	9.10	6.10
20	6.08	6.78	4.12	8.25	11.98	4.27	45	5.68	5.30	6.85	8.62	8.33	5.35
21	7.63	8.20	11.69	5.23	7.29	5.38	46	3.02	7.22	6.20	10.66	9.80	9.81
22	9.42	5.38	13.09	4.12	9.85	6.50	47	2.46	4.94	7.24	9.55	9.87	7.86
23	8.10	6.80	11.05	7.42	7.98	8.00	48	2.69	3.99	6.27	11.44	9.62	10.14
24	7.36	6.60	11.42	5.16	9.27	5.24	49	3.42	4.99	6.09	10.10	10.17	10.86
25	9.44	5.27	9.98	4.53	9.24	6.25	50	2.52	3.85	6.53	9.05	9.98	7.42

Table C.44 Experimental data of yellowness for 3-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	36.56	30.84	30.16	31.86	32.90	26.70	26	33.69	32.19	33.24	37.35	29.98	35.61
2	37.59	36.18	31.57	29.41	29.98	27.51	27	37.24	32.09	32.52	32.01	29.23	32.94
3	39.35	30.49	35.96	33.57	34.13	32.89	28	33.81	34.50	31.94	33.92	30.80	37.98
4	37.94	36.44	37.38	34.19	35.11	33.14	29	31.45	34.90	32.45	34.72	36.25	33.24
5	36.24	35.73	32.06	36.22	32.28	33.21	30	38.19	33.71	31.84	36.56	31.02	33.79
6	36.47	33.48	30.00	31.78	34.19	34.42	31	37.91	36.16	32.89	33.54	34.79	34.85
7	36.37	31.13	34.17	27.88	30.04	34.56	32	37.32	27.18	29.41	37.41	31.20	32.09
8	38.90	32.75	35.04	31.72	29.75	30.89	33	36.00	36.11	31.05	34.23	33.60	34.01
9	37.29	31.77	35.29	29.19	34.58	31.56	34	36.88	32.39	32.64	34.31	33.44	34.52
10	34.84	32.13	35.16	31.43	35.20	37.25	35	38.07	27.97	34.03	32.13	29.03	32.27
11	32.13	33.49	30.32	30.24	36.38	33.95	36	37.25	30.17	34.19	32.79	30.60	28.16
12	37.48	36.87	33.28	33.50	30.24	30.92	37	34.76	33.59	32.32	31.61	31.05	30.47
13	35.02	34.52	33.15	32.16	36.48	31.28	38	32.10	30.27	33.94	33.74	31.39	30.25
14	35.66	34.55	31.02	35.02	31.34	34.27	39	39.05	30.35	35.52	32.09	28.98	27.80
15	36.31	31.05	35.83	35.87	32.27	33.46	40	35.69	35.49	34.96	33.83	32.09	29.43
16	39.23	31.60	30.07	29.86	35.57	28.11	41	33.07	32.89	29.72	35.75	30.71	29.32
17	38.59	35.19	33.85	33.53	32.15	32.23	42	37.09	31.35	31.15	32.39	31.10	31.73
18	31.56	35.49	34.56	28.95	32.03	29.78	43	35.23	37.42	31.17	30.67	27.91	28.95
19	38.03	37.64	33.94	31.09	35.72	29.75	44	35.30	38.15	30.08	30.61	29.49	30.06
20	38.80	34.66	34.57	29.47	34.62	27.44	45	34.48	33.19	32.55	33.95	33.79	33.21
21	37.22	36.61	31.11	32.03	28.42	37.63	46	33.50	32.15	30.33	32.66	29.00	33.17
22	34.62	36.48	32.31	28.55	33.80	35.55	47	31.97	35.55	32.50	31.36	31.92	31.26
23	36.68	33.12	30.41	30.10	29.71	32.87	48	34.37	34.30	29.90	32.31	30.47	35.92
24	36.56	36.56	32.51	33.49	34.91	36.76	49	38.59	32.88	33.25	29.97	31.41	33.49
25	39.07	36.77	34.52	29.67	35.78	34.55	50	31.49	31.12	32.97	29.81	29.34	29.12

Table C.44 Experimental data of yellowness for 3-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	30.58	34.45	31.02	33.74	30.17	32.17	26	23.42	33.08	35.54	32.92	30.16	27.93
2	30.54	34.59	30.68	29.88	31.41	31.42	27	34.25	30.79	33.00	30.09	31.80	33.29
3	33.55	32.46	33.28	32.35	32.69	35.97	28	32.49	33.81	34.31	30.05	31.75	29.97
4	30.47	33.74	29.16	32.09	30.78	35.04	29	34.15	31.74	29.84	35.77	33.21	28.28
5	30.14	35.79	33.69	32.55	34.84	32.29	30	29.53	29.46	36.55	32.86	32.52	34.80
6	30.16	33.90	29.11	27.83	34.58	31.25	31	33.47	32.05	32.67	32.03	33.80	27.81
7	35.10	33.34	32.04	32.03	31.15	34.26	32	35.80	29.90	31.85	34.08	37.04	31.74
8	32.96	34.01	32.82	30.61	31.17	34.33	33	31.78	33.55	30.10	32.28	32.54	29.83
9	36.75	29.72	34.10	32.16	36.03	30.76	34	33.43	34.08	32.50	32.72	35.78	30.51
10	32.50	31.93	31.54	26.98	33.54	34.81	35	31.15	25.75	32.73	34.49	34.24	30.59
11	34.42	32.38	29.53	27.02	30.56	35.07	36	32.50	33.34	32.10	33.44	30.98	28.90
12	31.94	33.49	33.50	24.01	32.51	34.06	37	32.14	31.72	32.22	30.67	33.73	33.25
13	32.01	32.30	31.36	35.06	34.38	33.19	38	33.95	29.37	32.85	31.77	32.86	32.20
14	34.52	32.12	28.21	33.70	31.39	29.97	39	31.66	33.24	33.55	31.24	31.50	33.12
15	34.98	32.97	35.26	26.77	31.67	32.48	40	36.00	30.29	31.29	35.46	34.23	30.40
16	33.22	32.30	31.81	32.12	29.16	30.53	41	35.16	30.98	29.96	35.16	35.15	31.86
17	36.13	31.87	29.23	30.46	31.56	29.06	42	37.04	34.05	30.14	30.99	34.54	31.93
18	33.08	31.74	31.33	22.84	31.10	30.49	43	37.88	33.07	29.77	29.37	30.77	28.55
19	35.52	28.38	30.33	29.05	31.61	32.04	44	34.76	33.05	32.66	34.03	33.41	29.39
20	33.53	32.62	28.40	33.10	33.92	28.43	45	33.73	34.82	32.77	30.89	33.85	32.40
21	34.48	32.06	30.90	31.50	31.56	31.38	46	31.14	31.47	30.64	32.70	32.76	30.80
22	36.59	30.10	30.55	27.72	31.76	32.57	47	33.24	29.16	30.63	30.38	32.49	31.21
23	35.79	34.97	32.77	30.36	34.01	30.15	48	32.31	29.46	30.47	31.63	33.57	34.40
24	30.86	32.03	36.63	27.74	38.31	32.84	49	31.49	33.42	30.73	27.86	30.17	28.94
25	36.57	32.29	33.62	32.38	32.00	32.56	50	33.83	30.98	31.83	29.12	34.31	31.85

Table C.45 Experimental data of lightness for 3-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	67.18	61.91	61.63	64.05	66.73	61.46	26	63.33	53.79	66.23	61.29	62.03	59.70
2	70.81	61.46	58.47	56.27	69.10	49.63	27	68.18	53.13	62.24	60.67	65.31	52.73
3	70.77	59.88	65.55	63.70	61.83	57.02	28	75.86	63.91	64.99	60.62	54.57	54.16
4	71.98	64.17	65.45	59.66	68.41	49.78	29	60.72	60.21	62.35	61.48	67.00	52.21
5	69.38	60.51	60.86	57.35	66.02	54.42	30	71.80	57.46	60.97	59.41	69.15	50.96
6	58.29	67.49	65.07	57.91	62.13	55.11	31	56.55	46.96	68.80	56.52	53.48	60.23
7	73.49	63.67	65.06	62.83	61.88	65.10	32	66.40	56.69	59.51	55.62	67.35	56.19
8	66.51	67.02	66.12	61.78	58.02	54.97	33	75.58	56.99	70.24	57.57	65.61	54.41
9	67.11	58.46	61.63	49.47	61.95	51.13	34	65.06	55.54	65.57	60.54	56.88	66.87
10	67.08	54.70	61.43	56.30	62.13	66.67	35	62.89	57.03	72.03	62.22	60.17	55.35
11	62.84	68.34	67.14	63.07	65.16	47.34	36	66.74	64.16	65.36	62.85	68.18	49.05
12	67.50	69.15	63.80	62.44	60.69	64.00	37	70.05	58.41	62.32	59.79	56.88	52.93
13	70.96	61.69	61.23	62.51	53.11	55.72	38	73.36	66.25	65.48	64.56	57.95	57.23
14	62.09	69.95	63.13	58.56	71.37	49.88	39	71.67	62.69	68.70	58.88	68.91	42.02
15	75.36	65.16	67.98	64.33	64.12	58.20	40	75.10	60.11	62.02	59.68	65.06	51.94
16	73.24	65.27	64.31	64.98	55.46	62.29	41	67.73	64.13	65.58	65.30	68.06	59.65
17	68.00	59.77	61.66	71.61	64.24	61.65	42	66.11	57.20	59.75	50.14	65.51	52.97
18	61.43	68.76	63.49	60.94	65.35	58.26	43	63.27	63.20	58.67	60.12	61.09	55.42
19	54.51	67.44	65.31	64.23	64.53	55.33	44	69.49	62.71	67.50	63.69	62.87	53.82
20	68.67	61.15	67.54	62.05	63.43	63.06	45	64.47	59.64	59.83	52.81	68.74	65.82
21	71.00	67.76	55.43	60.10	57.47	59.08	46	56.67	60.28	68.76	55.08	59.44	59.62
22	66.25	51.63	63.48	58.55	60.54	63.70	47	66.89	63.42	68.29	67.31	70.28	55.12
23	71.59	60.25	61.52	64.06	58.34	61.94	48	67.86	58.91	64.34	56.91	63.53	51.36
24	72.04	60.21	61.07	59.52	57.84	63.26	49	69.73	61.58	72.63	68.99	64.03	59.79
25	69.48	60.84	59.27	61.56	60.84	54.15	50	67.32	50.91	67.92	57.15	68.53	62.04

Table C.45 Experimental data of lightness for 3-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	67.09	54.44	46.22	37.38	38.51	32.66	26	66.72	53.31	53.21	36.95	38.84	35.93
2	59.11	48.49	43.98	42.52	43.20	34.79	27	64.30	55.88	59.40	42.44	32.94	40.11
3	61.37	57.33	44.67	35.95	42.71	31.78	28	57.26	53.07	57.22	38.43	39.89	28.97
4	61.18	56.37	46.84	44.62	37.20	35.29	29	71.21	51.31	52.44	35.15	32.89	37.67
5	62.09	57.92	51.70	44.16	40.08	36.08	30	59.97	50.72	51.38	43.71	38.39	41.55
6	56.46	59.22	58.44	36.92	46.44	38.60	31	60.06	51.30	52.68	40.76	27.84	33.13
7	63.52	54.79	54.73	34.45	42.45	39.80	32	73.91	51.77	45.58	36.61	36.94	31.24
8	66.83	49.62	52.72	39.58	44.13	35.44	33	67.76	57.72	46.13	40.55	32.72	33.17
9	56.01	60.65	53.01	37.82	42.54	33.48	34	64.09	60.80	51.37	38.38	31.00	33.09
10	63.72	56.32	57.27	52.37	42.15	36.73	35	73.75	52.10	46.26	37.79	41.91	36.48
11	59.41	52.10	48.82	44.73	39.52	43.52	36	55.76	50.97	41.81	39.24	37.80	32.07
12	66.06	57.09	51.28	43.23	39.62	44.02	37	58.91	53.32	43.13	37.72	37.05	34.06
13	68.96	54.52	43.08	50.08	36.69	34.79	38	60.15	47.71	46.00	34.90	37.72	36.49
14	65.22	52.02	46.77	39.45	38.88	44.72	39	60.70	53.79	37.03	39.86	34.37	29.93
15	69.95	54.22	45.71	41.57	39.15	52.22	40	61.28	56.32	46.06	44.38	38.92	36.03
16	60.01	60.75	43.95	38.05	39.57	32.27	41	60.38	45.60	39.61	41.03	46.35	37.22
17	70.00	61.43	51.37	46.69	34.88	38.41	42	55.35	57.98	47.96	37.40	44.47	38.77
18	61.04	57.85	53.09	38.86	39.94	34.66	43	70.87	58.72	45.80	39.83	47.02	46.42
19	64.54	64.32	49.01	43.39	40.24	34.53	44	67.19	53.99	45.88	44.76	48.77	42.11
20	69.98	62.46	44.91	30.58	35.88	36.98	45	62.84	60.87	48.36	37.23	42.54	43.20
21	56.54	46.06	58.43	39.64	44.02	35.94	46	64.75	53.37	51.50	36.97	46.62	37.76
22	57.78	51.25	54.23	39.95	55.56	35.88	47	57.17	58.77	39.04	39.65	47.16	33.99
23	64.93	56.24	56.54	46.34	51.71	42.17	48	60.05	46.04	43.64	36.80	37.86	33.45
24	55.58	46.30	52.61	43.88	42.70	42.67	49	56.05	52.95	45.41	38.31	45.43	38.97
25	60.19	57.64	48.12	45.57	49.04	41.02	50	61.55	44.15	53.45	43.31	48.02	40.42

Table C.46 Experimental data of redness for 3-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	3.32	3.74	5.59	7.70	8.33	8.30	26	5.52	7.60	6.57	6.70	7.15	9.45
2	2.60	6.66	3.35	10.11	6.02	12.53	27	2.29	9.84	6.14	9.49	8.29	10.13
3	2.63	5.79	4.50	6.47	9.49	8.93	28	3.85	4.87	6.74	8.66	8.80	10.07
4	2.27	2.92	6.99	10.67	6.02	11.73	29	2.63	5.37	4.37	6.82	7.21	10.35
5	2.20	5.31	1.45	9.30	7.65	12.55	30	3.96	6.63	5.55	9.30	7.97	13.10
6	2.82	6.33	5.32	4.99	6.95	10.98	31	2.69	8.60	3.81	7.87	12.46	7.34
7	3.35	3.13	5.97	5.36	10.21	8.43	32	3.25	7.14	6.20	9.19	8.01	10.32
8	4.37	6.03	5.11	5.13	8.47	8.05	33	1.35	10.11	3.55	6.94	6.93	8.55
9	2.01	4.78	4.29	6.77	10.13	11.79	34	2.99	11.17	2.69	8.31	9.86	8.01
10	2.79	3.37	3.70	6.83	9.70	8.46	35	1.16	10.99	3.19	7.39	9.35	7.74
11	3.96	2.35	4.45	6.67	7.11	11.82	36	6.38	7.21	5.33	7.83	6.28	10.38
12	3.23	3.84	4.01	8.08	10.28	6.36	37	4.13	7.14	6.13	9.35	9.13	11.08
13	1.98	2.92	7.52	4.86	7.06	12.09	38	3.87	5.68	4.57	7.00	9.58	11.81
14	4.95	3.89	4.70	7.48	3.96	11.36	39	4.69	5.11	5.96	11.33	7.10	10.55
15	1.66	3.69	4.40	7.84	9.73	5.94	40	2.93	5.73	6.52	7.50	6.36	10.91
16	3.38	5.29	3.99	6.95	5.04	9.01	41	5.04	7.74	6.23	3.22	6.72	8.09
17	5.30	4.11	5.95	5.31	9.31	8.24	42	2.53	5.22	5.01	8.65	5.73	9.54
18	2.60	4.61	5.40	7.48	7.44	10.86	43	3.17	6.04	6.58	3.18	9.78	9.23
19	3.60	4.69	5.28	9.19	10.38	8.32	44	3.98	5.60	6.22	6.36	6.18	7.60
20	3.54	4.63	3.70	7.16	8.23	8.62	45	2.11	4.73	4.62	9.90	6.51	6.52
21	2.92	4.01	3.41	8.07	7.47	5.74	46	5.42	4.73	5.11	11.00	10.70	9.23
22	2.79	4.42	3.64	7.48	9.16	7.56	47	1.30	10.28	5.65	6.55	6.20	8.00
23	1.67	2.75	6.83	4.91	10.70	8.94	48	1.96	7.25	3.55	9.05	8.81	10.31
24	1.95	3.54	3.66	8.63	8.58	9.19	49	4.28	4.75	4.26	6.89	9.68	10.39
25	1.85	3.37	3.44	5.23	10.13	11.29	50	1.55	6.61	4.72	9.39	7.30	8.72

Table C.46 Experimental data of redness for 3-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	6.12	7.73	12.72	11.66	12.02	9.91	26	4.80	12.07	9.84	13.19	13.72	12.16
2	6.68	11.12	13.30	12.83	15.26	12.31	27	5.06	12.77	12.16	14.94	12.45	13.60
3	6.47	7.96	13.71	13.10	13.30	9.50	28	7.27	11.79	9.91	13.64	16.08	9.76
4	6.08	8.25	13.09	12.73	11.75	12.32	29	4.56	11.65	13.78	12.61	12.81	13.41
5	7.87	10.25	13.16	14.21	14.27	13.02	30	5.93	12.17	10.80	15.46	13.61	14.85
6	9.39	11.07	10.95	11.50	13.48	11.51	31	6.80	10.53	12.02	14.40	10.17	13.39
7	6.53	10.18	11.38	11.79	11.75	11.46	32	3.31	11.14	12.79	13.09	13.88	10.61
8	7.09	10.65	12.29	11.45	13.11	12.59	33	4.14	9.90	11.38	12.77	11.87	12.06
9	7.70	10.00	12.55	13.66	12.78	10.59	34	3.86	9.14	12.25	13.98	11.05	12.88
10	6.02	10.21	11.07	14.21	12.32	11.33	35	3.42	10.83	13.11	13.69	14.79	12.43
11	4.82	11.69	12.82	12.83	12.72	11.97	36	6.73	11.81	12.47	14.14	12.10	11.83
12	5.42	11.27	13.73	13.13	14.46	8.27	37	5.32	10.65	13.45	12.28	13.34	12.74
13	3.67	10.91	13.34	12.26	13.90	12.31	38	7.91	9.94	12.65	12.61	12.08	14.01
14	3.61	11.61	12.97	11.55	12.30	12.19	39	6.59	11.44	11.93	13.13	13.50	11.03
15	5.15	11.25	13.40	12.78	14.12	9.87	40	4.28	12.18	12.45	14.29	10.95	13.22
16	6.23	9.54	13.13	12.93	13.75	12.09	41	4.24	11.21	12.56	13.17	14.47	11.04
17	4.12	9.09	14.33	12.90	12.83	14.48	42	1.93	9.22	13.57	12.92	15.75	11.61
18	7.67	11.11	13.15	13.29	13.37	13.42	43	2.54	8.76	12.53	13.93	12.93	10.31
19	4.59	9.26	14.50	12.80	14.12	13.33	44	3.31	9.58	13.59	13.97	14.38	11.81
20	4.75	8.19	13.45	11.60	13.97	14.20	45	7.05	8.59	14.48	12.99	14.34	12.81
21	6.69	10.55	11.87	11.56	12.84	12.73	46	6.19	10.78	13.40	13.42	13.02	12.37
22	7.49	10.88	11.98	11.98	11.98	11.17	47	9.05	10.69	13.82	13.06	13.78	10.93
23	5.11	10.32	11.80	12.39	12.59	13.24	48	7.31	11.31	12.03	12.87	12.86	11.68
24	6.50	11.75	12.52	9.66	12.76	14.42	49	7.39	10.17	14.03	12.80	12.79	11.61
25	8.53	10.31	11.97	12.61	12.24	11.58	50	8.35	10.07	13.41	13.74	14.18	13.26

Table C.47 Experimental data of yellowness for 3-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	30.66	27.17	31.24	36.25	34.84	33.96	26	31.37	30.20	33.35	31.44	28.83	34.56
2	31.68	33.41	27.91	34.74	32.61	33.33	27	27.97	32.28	33.22	34.03	34.48	32.28
3	31.82	30.90	30.59	30.81	36.49	33.08	28	32.63	32.70	33.81	33.28	29.60	32.12
4	30.84	27.21	33.75	35.89	32.76	33.13	29	25.70	30.58	29.96	32.28	32.11	32.81
5	28.92	31.94	25.48	32.41	33.98	36.42	30	32.88	32.55	32.45	35.92	35.86	34.22
6	27.89	32.69	32.04	28.27	31.26	34.23	31	27.09	29.29	29.11	32.09	34.71	33.24
7	33.24	26.42	34.47	31.75	33.99	35.29	32	28.54	31.60	31.82	33.89	35.39	34.68
8	34.05	33.87	32.19	30.48	31.89	30.35	33	28.26	32.85	30.31	31.33	31.83	31.94
9	28.86	28.07	32.18	29.62	34.24	32.10	34	27.46	34.18	27.15	35.92	34.32	36.18
10	30.86	27.79	29.25	31.72	35.97	35.79	35	25.06	33.20	30.48	33.75	31.49	31.42
11	29.48	28.66	31.51	34.73	33.80	31.33	36	33.97	33.58	32.49	31.79	32.14	32.36
12	31.51	32.45	29.87	31.93	34.86	32.15	37	32.77	31.48	33.66	32.15	30.61	33.79
13	30.84	27.23	34.88	29.73	30.28	35.91	38	34.52	31.84	32.35	31.12	30.60	35.02
14	31.82	30.97	30.84	33.33	30.52	32.79	39	33.85	28.13	34.26	32.36	31.97	31.49
15	30.73	28.06	31.01	36.39	36.15	31.19	40	33.19	30.94	32.71	30.57	30.45	33.67
16	32.53	33.62	31.17	34.66	25.94	36.72	41	33.32	36.56	33.86	28.13	32.05	32.17
17	34.53	28.87	30.34	32.99	36.34	34.37	42	28.41	29.62	29.46	29.65	31.48	31.68
18	25.53	32.73	32.54	32.46	32.17	36.85	43	30.01	32.24	32.07	27.49	35.28	30.74
19	27.10	32.61	31.11	33.57	38.14	32.79	44	31.69	33.30	34.31	31.27	30.45	31.74
20	31.18	30.71	30.95	33.46	34.61	35.31	45	28.21	30.68	29.43	33.65	33.75	31.51
21	28.70	30.23	27.11	31.88	31.96	28.74	46	28.09	29.57	32.00	35.05	35.32	35.42
22	29.64	27.77	30.87	32.68	34.91	35.25	47	27.43	37.32	32.50	34.20	33.28	29.56
23	29.25	27.33	32.66	31.65	34.24	35.30	48	29.07	33.27	27.62	32.86	35.22	33.38
24	29.01	26.87	30.60	33.20	32.49	36.28	49	33.04	29.47	33.46	35.17	37.59	37.16
25	27.53	28.22	28.15	31.17	36.57	33.26	50	28.37	26.11	31.10	37.32	34.89	35.43

Table C.47 Experimental data of yellowness for 3-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	34.80	25.58	27.08	22.54	24.58	14.16	26	31.25	34.89	31.23	24.29	26.18	17.92
2	31.49	28.99	24.94	24.83	29.94	17.91	27	31.15	37.13	37.07	29.90	19.43	25.33
3	33.53	27.38	26.57	20.45	28.02	13.75	28	29.32	35.20	34.41	27.42	26.71	12.47
4	32.14	29.72	28.58	30.42	22.26	18.41	29	33.47	33.71	36.26	22.10	19.70	21.05
5	34.34	34.12	31.98	29.72	26.67	19.94	30	30.07	35.63	33.71	31.47	26.21	28.79
6	34.06	35.38	36.56	19.13	31.13	22.18	31	34.46	29.83	33.76	26.92	13.63	19.22
7	33.91	31.27	33.88	16.81	26.40	24.20	32	32.03	32.28	27.83	23.12	23.01	14.08
8	36.17	30.83	33.45	22.18	28.50	19.98	33	31.57	32.62	29.11	27.46	18.98	16.65
9	33.97	35.41	32.75	25.29	26.65	17.52	34	30.16	34.75	33.93	24.74	15.69	18.09
10	33.13	32.19	36.62	35.89	28.62	19.97	35	32.97	32.67	31.85	26.51	28.47	21.63
11	28.04	32.73	33.69	28.80	24.99	25.67	36	29.26	33.00	25.08	26.11	20.80	20.10
12	32.26	35.90	33.00	30.03	26.82	21.31	37	30.29	34.10	30.87	23.47	22.21	18.31
13	30.67	33.58	26.30	30.09	24.47	16.80	38	34.46	29.89	27.66	20.36	21.00	24.79
14	29.87	32.87	29.53	24.98	24.31	27.24	39	31.02	34.49	26.97	28.19	18.08	16.16
15	33.93	33.50	34.82	26.35	26.10	28.44	40	30.01	36.36	31.82	31.05	20.89	20.71
16	29.86	34.02	28.23	25.88	25.55	15.49	41	30.15	28.54	25.87	25.52	30.63	18.46
17	32.93	33.74	33.12	31.01	21.48	23.63	42	25.26	32.68	33.83	21.19	30.06	21.75
18	32.05	36.06	34.52	28.41	25.50	21.42	43	27.21	32.05	31.05	25.04	30.38	27.53
19	31.66	37.17	30.93	27.71	26.61	19.12	44	30.65	29.94	31.78	30.25	32.96	24.08
20	33.34	34.60	29.42	27.11	23.94	22.66	45	34.80	34.91	34.67	22.67	29.71	27.60
21	31.91	31.08	36.92	24.57	26.79	22.10	46	33.03	34.67	35.05	20.67	30.00	23.73
22	33.30	31.39	34.91	24.85	35.21	21.28	47	33.84	36.91	24.38	24.47	30.88	18.84
23	35.42	35.52	35.75	29.78	33.38	28.37	48	33.98	33.88	30.59	20.42	23.00	19.41
24	31.20	30.50	34.33	25.71	25.82	30.79	49	30.83	33.46	31.13	27.04	28.82	23.67
25	34.48	35.87	31.84	30.10	31.38	25.50	50	36.02	28.03	36.01	30.91	32.19	26.49

Table C.48 Experimental data of lightness for 3-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	65.66	65.36	55.18	59.47	47.65	40.13	26	58.01	64.64	63.07	52.97	54.60	53.38
2	63.03	68.36	58.98	58.86	49.82	37.07	27	70.05	69.29	55.71	53.52	56.31	50.98
3	56.05	56.08	59.23	57.54	50.69	39.74	28	69.20	65.24	66.47	60.89	48.83	45.99
4	61.65	46.69	58.93	58.52	41.54	49.14	29	69.35	68.78	56.81	59.43	50.46	54.10
5	68.85	67.22	59.50	60.85	49.33	42.62	30	74.19	64.44	60.92	54.53	52.15	47.45
6	59.89	65.60	68.13	49.61	50.51	49.67	31	71.48	67.52	67.46	60.93	50.38	52.44
7	58.13	66.34	58.84	56.30	44.28	46.97	32	59.59	60.87	68.89	56.81	43.35	53.89
8	61.72	67.64	72.11	52.96	54.02	46.60	33	62.38	61.92	70.87	49.56	53.72	49.50
9	62.81	69.70	65.39	49.15	38.40	50.10	34	63.15	61.05	68.80	55.79	52.61	51.59
10	64.96	58.24	58.46	45.48	43.50	47.50	35	69.39	62.01	68.46	61.02	50.55	47.77
11	61.38	68.75	58.62	59.61	54.69	55.78	36	59.61	65.45	59.92	63.58	51.13	56.70
12	65.93	64.76	56.23	60.78	40.33	49.83	37	64.43	63.73	64.16	57.19	48.75	54.90
13	64.99	72.37	65.03	53.74	44.32	48.82	38	63.41	69.68	59.55	58.39	42.30	56.23
14	62.43	63.05	57.39	61.48	41.49	49.56	39	58.58	65.30	63.87	65.10	49.85	56.34
15	58.43	69.47	58.37	53.99	50.66	56.10	40	55.52	69.60	61.56	59.98	52.87	55.39
16	73.41	60.07	58.93	58.63	49.41	53.93	41	65.05	56.86	59.73	60.57	51.70	41.41
17	68.28	60.29	58.05	61.78	54.50	44.21	42	66.62	72.49	59.83	57.68	51.29	51.96
18	71.27	70.10	54.03	55.98	36.63	53.94	43	62.81	59.89	55.24	53.28	43.48	45.88
19	69.62	71.59	61.66	57.79	47.70	53.65	44	60.12	55.47	56.99	65.39	51.29	49.33
20	55.25	70.71	62.76	63.50	51.93	45.40	45	60.48	70.62	59.12	61.50	51.60	53.99
21	65.02	67.00	60.28	49.46	52.12	43.86	46	65.65	67.04	62.51	63.19	42.98	46.42
22	60.59	69.03	59.68	57.99	45.02	45.31	47	60.63	66.07	60.74	57.31	49.20	42.62
23	58.63	65.77	66.56	53.72	48.51	50.42	48	63.82	69.36	55.87	59.35	45.74	51.98
24	69.33	70.07	59.08	53.40	55.83	56.18	49	68.81	68.48	64.76	61.31	45.46	45.64
25	51.66	67.42	67.51	55.18	47.66	43.67	50	63.11	69.15	60.32	53.85	54.21	50.81

Table C.48 Experimental data of lightness for 3-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	57.31	50.67	35.14	42.68	29.59	34.35	26	61.54	52.94	52.37	33.44	32.87	31.49
2	59.58	65.15	50.39	45.31	33.84	30.52	27	58.40	48.73	46.92	41.12	35.05	25.14
3	58.25	57.08	42.94	45.36	29.65	29.11	28	59.07	49.85	51.35	41.64	34.45	32.45
4	63.28	54.29	43.06	42.28	37.09	35.71	29	63.87	54.40	42.74	43.77	39.64	28.63
5	59.99	60.35	47.28	42.26	31.99	29.37	30	65.86	59.27	54.97	37.45	39.29	25.84
6	66.31	44.74	47.57	39.61	19.23	28.18	31	57.51	54.67	37.02	37.95	31.87	30.76
7	68.26	55.81	42.83	36.00	34.89	35.32	32	58.15	62.04	48.38	46.20	48.25	38.05
8	61.82	50.72	41.44	34.17	33.53	28.69	33	60.08	51.05	54.60	45.95	35.93	33.98
9	68.62	57.29	47.34	41.01	29.16	29.40	34	64.95	48.61	52.94	40.60	33.95	32.46
10	59.05	52.73	44.65	47.92	34.66	31.27	35	58.66	51.04	52.13	34.94	46.59	32.71
11	56.67	49.33	45.99	36.14	28.20	31.84	36	61.03	48.99	52.41	42.88	36.98	28.76
12	58.65	45.12	41.29	42.23	36.87	37.49	37	67.11	53.25	37.70	39.43	36.81	34.31
13	62.32	51.82	41.75	38.67	28.69	30.72	38	60.60	45.38	51.54	44.26	38.26	31.83
14	50.56	53.02	43.86	46.39	31.54	37.56	39	58.78	53.50	41.08	45.15	33.16	30.06
15	44.60	45.35	46.93	44.84	42.24	36.03	40	51.03	58.36	56.49	39.94	34.47	37.25
16	56.71	70.93	41.15	45.14	34.35	22.34	41	55.80	53.67	58.96	38.33	29.14	30.96
17	58.22	58.08	38.01	47.31	31.24	27.43	42	65.19	57.47	39.77	44.41	33.77	29.43
18	60.24	48.41	33.64	43.49	36.36	35.50	43	58.16	53.56	50.09	39.83	31.70	37.37
19	64.76	58.37	46.44	39.74	36.16	22.69	44	61.51	59.15	61.48	45.14	37.64	30.38
20	68.97	62.38	37.85	47.73	33.34	28.01	45	73.06	49.37	49.97	47.39	31.96	31.19
21	62.12	54.43	45.25	43.31	33.57	36.36	46	53.57	53.48	47.33	34.11	36.22	28.78
22	63.02	53.82	59.06	38.24	34.50	33.09	47	41.69	49.82	43.24	41.92	35.59	34.24
23	67.13	55.98	52.23	43.77	35.19	33.19	48	57.74	56.13	44.07	37.16	32.49	37.70
24	63.29	56.36	35.97	33.66	37.45	26.54	49	47.29	59.45	41.95	45.75	32.00	28.96
25	55.51	48.35	52.22	44.46	40.90	35.21	50	60.38	62.36	39.69	40.93	34.98	35.65

Table C.49 Experimental data of redness for 3-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	1.24	9.27	8.96	12.40	11.96	14.73	26	3.41	6.56	9.29	11.16	10.77	13.25
2	1.24	7.22	10.36	11.82	11.15	13.74	27	3.32	6.93	11.39	10.27	11.65	14.39
3	3.86	7.55	8.21	12.74	11.89	14.47	28	2.42	7.78	9.15	9.88	11.94	14.76
4	1.52	7.26	9.34	12.09	10.89	13.68	29	1.15	6.67	10.45	10.56	13.51	13.24
5	1.41	8.41	10.12	10.66	12.13	14.95	30	1.80	5.30	9.40	9.85	11.65	13.09
6	3.77	5.49	8.56	11.80	11.70	13.15	31	1.77	8.60	8.36	8.60	13.83	14.30
7	5.04	6.40	9.41	10.79	13.55	13.71	32	1.88	9.69	7.10	11.58	14.02	13.36
8	5.33	5.04	7.13	11.71	10.83	13.03	33	2.12	6.87	7.74	12.48	14.09	14.04
9	4.69	6.72	9.80	12.26	10.82	14.10	34	2.11	7.60	7.42	9.78	14.06	12.94
10	3.58	5.54	7.96	10.66	13.40	13.89	35	1.74	10.12	7.59	10.47	13.19	14.94
11	3.69	7.33	10.46	10.95	12.51	12.86	36	4.85	8.41	8.90	8.72	13.09	13.24
12	2.20	9.81	6.76	10.48	14.84	13.26	37	3.11	9.01	9.34	9.63	12.30	11.64
13	3.44	6.75	8.76	10.93	14.44	12.07	38	4.38	7.59	11.58	11.41	12.92	12.65
14	2.64	6.19	10.41	10.34	14.07	13.30	39	3.28	6.43	10.12	8.89	12.97	12.17
15	1.79	5.05	7.24	12.90	12.76	13.13	40	2.48	7.51	10.74	9.77	13.03	11.16
16	1.69	5.83	7.93	9.84	12.56	14.92	41	2.04	6.35	10.94	10.08	13.45	13.80
17	1.36	7.99	10.87	10.75	12.39	15.91	42	2.56	6.34	9.05	11.61	11.67	13.77
18	2.07	5.71	10.27	12.38	12.75	15.08	43	2.84	6.54	9.92	10.93	14.17	14.29
19	1.85	5.97	9.49	9.73	12.79	14.71	44	3.64	6.30	9.23	8.03	12.76	13.85
20	3.34	6.67	7.66	10.22	12.89	16.06	45	3.20	6.24	9.33	10.76	12.90	13.45
21	3.32	5.96	6.85	11.95	13.56	12.27	46	3.11	6.63	10.12	10.86	12.18	14.15
22	2.36	5.48	10.10	10.36	12.99	14.76	47	2.51	9.34	7.51	11.91	12.30	13.68
23	3.82	6.45	7.65	12.37	11.75	13.35	48	1.87	8.88	10.56	10.37	12.03	13.61
24	3.31	4.60	8.56	10.88	12.53	12.25	49	2.93	7.09	7.64	10.88	12.35	13.35
25	3.56	5.96	6.02	10.56	11.57	12.44	50	2.20	8.29	10.32	10.42	11.31	13.38

Table C.49 Experimental data of redness for 3-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	7.62	10.63	11.27	14.81	10.94	12.49	26	7.24	10.08	12.10	11.00	12.51	13.62
2	7.38	7.97	13.93	12.34	11.10	14.40	27	5.38	10.01	12.03	13.77	12.46	9.03
3	8.32	8.40	13.78	13.87	10.29	12.56	28	6.64	11.18	11.77	12.83	12.41	13.70
4	8.46	10.37	13.83	14.66	15.53	13.19	29	6.51	9.99	11.58	14.06	14.56	10.57
5	7.96	9.14	11.70	12.59	12.66	13.32	30	5.61	9.66	12.59	13.94	13.59	9.34
6	7.52	12.20	12.24	13.77	13.35	12.16	31	7.55	11.74	11.79	13.33	11.16	10.93
7	6.10	11.15	14.46	12.20	12.99	14.16	32	4.96	9.10	14.26	16.10	14.57	14.34
8	7.18	12.74	11.75	12.61	12.28	11.82	33	7.28	11.47	10.12	14.27	12.26	13.01
9	6.06	10.70	11.96	13.04	9.75	13.05	34	5.71	10.17	11.02	15.08	11.81	12.29
10	5.65	11.32	11.63	14.44	14.54	12.13	35	7.49	12.44	13.41	13.30	13.87	11.98
11	7.38	10.71	14.59	12.83	12.22	12.93	36	6.75	13.24	12.40	15.86	13.34	10.71
12	8.02	10.36	12.32	12.32	12.70	13.95	37	5.11	11.92	11.81	10.97	13.10	13.89
13	8.83	11.29	13.54	15.61	12.66	13.81	38	5.46	10.74	12.93	13.24	13.15	11.65
14	6.45	11.21	13.17	11.94	12.54	14.00	39	4.40	11.79	12.68	11.94	12.93	12.46
15	6.15	11.35	13.64	13.87	14.13	15.57	40	3.86	10.64	12.51	15.02	13.20	16.49
16	9.75	5.65	14.09	12.98	12.37	9.07	41	8.49	8.82	9.38	11.90	11.86	12.15
17	7.08	8.43	12.66	14.90	13.34	9.58	42	5.41	8.33	11.22	12.72	13.42	12.27
18	9.20	12.89	10.67	11.36	11.89	14.08	43	5.88	11.01	12.07	11.84	12.43	15.35
19	8.06	8.79	14.35	13.80	14.09	10.21	44	10.19	10.07	9.57	12.36	14.57	9.97
20	5.70	5.91	13.07	14.16	13.11	12.35	45	6.44	9.69	11.28	13.47	11.45	10.62
21	4.51	9.80	11.11	13.44	12.37	15.06	46	6.79	11.36	13.39	13.25	12.86	11.42
22	6.26	10.43	10.08	13.69	13.01	12.68	47	5.82	10.15	14.49	14.66	15.05	12.49
23	6.21	10.58	10.51	13.58	12.66	11.63	48	8.15	11.27	10.89	12.76	11.86	13.98
24	6.08	10.18	12.93	12.13	12.85	8.58	49	6.86	11.52	12.65	14.97	11.15	11.04
25	3.89	8.87	9.94	13.76	14.23	14.60	50	6.84	10.15	13.51	14.21	14.94	14.41

Table C.50 Experimental data of yellowness for 3-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	20.51	37.44	30.54	38.24	30.07	28.48	26	19.34	33.87	35.02	33.13	32.44	35.64
2	20.18	34.12	36.17	35.00	33.11	24.63	27	22.77	34.83	34.64	34.07	34.03	34.94
3	22.59	32.28	33.48	37.25	32.67	27.31	28	22.12	36.11	37.15	36.17	29.37	30.60
4	20.18	29.83	32.50	37.69	27.34	33.96	29	21.01	34.03	34.13	37.36	33.07	36.29
5	21.90	35.10	36.33	36.60	33.20	31.51	30	22.63	32.09	35.72	35.89	32.17	30.53
6	20.90	31.38	34.79	32.53	33.30	35.18	31	21.97	36.15	36.31	34.71	31.14	34.92
7	22.89	34.59	34.24	34.17	30.04	32.14	32	19.58	35.42	33.06	36.18	26.39	35.66
8	23.55	30.97	35.49	34.63	34.31	32.37	33	17.99	32.04	36.59	31.05	34.82	33.15
9	24.08	33.62	36.41	33.02	23.76	35.56	34	20.29	33.13	35.55	34.01	34.48	34.16
10	21.94	31.37	31.13	33.29	28.68	33.31	35	21.29	36.46	36.43	37.09	31.94	32.22
11	21.92	35.58	37.35	35.53	35.54	35.36	36	21.85	34.85	34.36	34.92	34.45	38.13
12	21.33	36.10	30.85	37.16	25.41	35.34	37	22.00	34.71	36.42	34.80	33.16	33.68
13	23.91	35.31	35.65	33.65	29.90	32.55	38	22.82	34.51	37.72	37.87	26.97	37.23
14	21.40	30.74	36.91	35.98	25.76	34.62	39	20.86	32.08	37.26	35.88	33.83	34.40
15	18.94	31.19	31.72	34.64	35.42	35.67	40	18.51	34.50	36.65	36.64	36.41	35.21
16	22.24	30.70	33.60	35.62	31.80	36.75	41	21.66	30.11	37.95	36.03	36.56	27.08
17	20.36	34.06	35.68	38.06	35.90	29.74	42	22.22	35.09	34.74	36.30	33.55	34.88
18	22.23	33.44	33.70	37.40	21.48	36.79	43	21.20	32.74	35.38	32.11	31.37	31.86
19	22.23	33.42	34.97	35.06	30.56	35.75	44	22.46	29.77	34.43	35.54	35.85	34.92
20	19.06	35.41	34.95	38.00	34.69	31.47	45	20.61	34.18	34.59	37.63	34.98	37.15
21	23.07	34.41	31.06	30.39	32.54	30.84	46	23.52	32.67	36.71	39.14	26.30	31.90
22	20.39	33.29	35.10	34.01	26.86	32.27	47	20.89	37.03	32.62	37.34	32.57	26.93
23	19.90	33.51	34.33	35.19	29.36	34.05	48	20.81	38.23	34.97	35.74	30.78	35.75
24	24.65	31.88	34.79	32.47	34.24	35.87	49	24.36	34.04	33.33	38.73	28.14	32.39
25	18.67	32.78	33.07	35.16	29.05	30.91	50	21.25	37.01	35.88	36.61	35.80	34.13

Table C.50 Experimental data of yellowness for 3-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	33.29	32.77	16.91	29.04	14.38	17.70	26	33.68	31.92	33.53	15.77	19.17	18.88
2	37.39	35.65	35.42	30.53	16.05	16.44	27	33.45	28.90	31.23	27.07	19.12	8.98
3	34.49	30.00	28.84	30.61	13.10	18.45	28	35.06	33.06	35.46	23.69	18.11	20.30
4	39.82	34.88	27.86	27.75	25.10	19.59	29	34.26	32.85	26.91	28.36	27.62	11.63
5	38.05	34.17	29.51	27.93	17.21	14.84	30	36.17	34.86	37.30	23.87	23.88	9.33
6	39.50	28.21	31.18	30.39	19.75	12.97	31	35.78	36.89	19.39	25.75	16.37	12.63
7	35.24	35.54	30.81	19.77	23.26	21.02	32	33.19	33.99	29.61	32.85	32.57	22.40
8	35.82	34.31	27.08	21.67	19.14	12.41	33	34.57	33.93	32.43	29.73	20.21	19.37
9	35.16	34.47	30.26	24.75	14.06	14.15	34	35.88	30.87	32.15	27.63	16.45	18.03
10	35.01	33.79	30.85	35.10	20.99	15.28	35	37.11	34.79	31.62	26.59	30.12	14.72
11	35.80	33.00	31.15	21.32	16.42	16.75	36	38.90	30.79	34.53	31.93	25.00	12.24
12	36.62	31.21	31.21	24.68	22.12	23.30	37	35.89	33.12	25.93	24.98	25.41	17.71
13	38.30	35.34	28.62	26.87	19.21	20.08	38	36.04	27.77	35.77	29.93	26.27	16.62
14	32.35	35.30	31.20	29.34	20.86	23.63	39	34.93	34.57	28.76	29.39	21.20	15.60
15	30.29	31.20	35.76	31.68	30.77	24.92	40	29.57	35.36	40.44	27.33	24.90	23.94
16	34.70	31.98	26.33	29.86	24.03	9.02	41	32.74	34.67	33.05	22.50	13.46	15.97
17	35.10	33.04	23.98	31.25	18.52	11.92	42	34.64	30.40	26.26	29.90	19.58	15.25
18	36.85	33.82	18.86	24.60	21.36	21.71	43	33.00	32.18	35.65	25.18	17.92	23.62
19	38.65	34.28	31.49	22.88	23.67	11.38	44	37.61	36.02	35.68	28.55	26.29	13.76
20	36.57	31.32	28.41	34.32	17.57	15.15	45	32.18	32.33	32.95	34.18	15.36	13.08
21	32.40	33.47	28.07	28.06	17.56	19.73	46	33.59	35.48	31.45	20.60	21.11	13.47
22	34.41	33.81	35.46	25.44	22.82	14.41	47	29.73	33.60	30.61	25.99	22.07	19.09
23	39.82	35.32	31.04	29.02	19.51	17.01	48	37.04	35.57	31.05	22.04	17.73	20.90
24	36.10	34.55	22.86	20.29	22.22	8.80	49	32.26	38.64	26.78	32.94	17.59	11.93
25	29.48	28.02	30.09	29.79	29.81	18.41	50	34.60	35.62	23.90	27.99	22.99	22.35

Table C.51 Experimental data of lightness for 5-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	63.35	69.02	62.15	60.78	60.67	52.88	26	49.02	57.56	67.15	50.49	60.94	59.91
2	52.16	58.35	59.82	51.08	50.90	55.38	27	57.24	71.10	67.69	63.10	62.46	59.04
3	59.61	69.85	63.88	55.01	56.29	66.26	28	58.35	66.24	70.28	66.59	53.84	52.59
4	49.00	63.59	60.33	60.66	57.18	54.72	29	65.08	68.02	71.40	44.03	63.15	61.76
5	63.41	68.33	65.12	57.47	56.13	58.44	30	61.98	63.55	68.74	47.54	65.68	62.26
6	63.24	65.27	70.08	63.34	64.26	56.44	31	64.17	59.18	62.54	64.97	66.99	61.10
7	56.07	56.03	68.72	63.94	63.50	58.69	32	68.93	63.98	64.97	64.84	52.95	62.68
8	64.05	53.35	71.51	65.54	65.84	64.15	33	72.02	58.18	65.10	68.31	61.34	59.86
9	64.46	56.51	67.97	69.80	60.98	60.41	34	72.42	58.96	66.09	60.22	65.50	53.67
10	70.76	65.50	63.02	66.11	66.23	62.18	35	69.07	59.33	66.18	66.43	68.41	61.29
11	62.09	59.68	65.33	62.76	61.66	64.87	36	60.25	56.90	54.77	64.30	56.22	55.28
12	58.59	69.10	70.22	61.61	63.44	66.79	37	59.16	63.60	63.26	69.37	57.31	65.88
13	65.89	65.28	71.15	52.61	70.70	62.79	38	60.26	62.40	64.94	60.77	57.22	64.99
14	68.80	68.20	64.69	65.43	59.17	65.11	39	67.00	63.81	60.39	72.75	61.28	69.25
15	59.11	68.31	71.22	67.54	65.79	66.37	40	58.39	64.86	74.40	67.33	60.97	62.99
16	61.53	64.03	70.50	62.08	58.08	65.62	41	69.23	52.21	58.14	49.55	62.98	55.70
17	76.54	65.25	66.60	58.49	59.82	61.90	42	61.43	57.02	59.17	64.21	64.19	63.28
18	72.59	62.21	63.88	59.09	64.83	51.36	43	66.69	55.54	60.82	57.70	70.24	60.78
19	71.56	56.27	59.05	62.11	61.46	64.03	44	61.70	52.18	66.42	63.27	65.95	58.53
20	51.30	52.78	57.77	63.42	76.08	64.41	45	66.90	63.75	57.01	63.91	67.31	67.12
21	55.26	50.30	60.20	59.26	65.31	63.38	46	67.08	53.98	52.93	65.35	64.02	53.26
22	59.20	70.39	59.64	66.59	67.90	55.62	47	69.53	63.63	63.38	60.73	55.54	56.34
23	57.71	66.68	65.80	64.84	75.47	62.01	48	64.07	60.90	56.48	66.48	65.95	57.96
24	54.43	61.64	65.70	65.22	68.28	62.62	49	66.79	66.78	54.03	67.90	69.51	53.38
25	66.90	61.70	46.90	63.92	54.49	53.44	50	64.44	68.93	58.60	67.21	49.87	58.30

Table C.51 Experimental data of lightness for 5-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	63.77	50.46	65.87	62.22	42.87	61.82	26	51.26	45.55	46.44	60.43	53.53	64.77
2	53.97	65.15	59.01	53.76	53.44	66.74	27	55.99	45.42	52.02	57.44	57.99	67.00
3	52.47	50.91	65.50	57.09	56.27	45.61	28	52.68	53.43	55.37	53.87	48.16	69.54
4	58.79	51.84	66.95	52.30	41.94	58.85	29	56.17	60.75	53.47	53.70	63.48	66.20
5	63.34	65.18	60.85	58.83	57.99	56.48	30	57.63	59.76	48.64	58.02	52.24	68.69
6	58.30	59.42	52.92	58.51	57.59	44.13	31	59.70	53.09	53.94	68.21	55.06	41.06
7	58.19	66.83	68.66	57.11	45.69	52.19	32	45.83	56.03	52.12	60.80	53.88	50.53
8	60.06	45.83	52.49	53.93	46.13	48.20	33	40.67	49.88	56.00	66.84	51.55	56.39
9	65.04	59.21	65.35	56.79	51.25	43.68	34	65.84	54.49	58.67	56.04	46.01	43.62
10	59.25	59.32	46.78	65.53	50.37	46.58	35	50.78	42.14	55.75	63.40	54.76	56.95
11	55.32	65.58	55.71	51.05	48.51	60.07	36	51.35	49.37	49.43	64.73	50.70	63.14
12	62.19	61.09	48.63	58.21	54.48	49.55	37	66.66	54.90	46.01	68.34	56.01	49.57
13	56.18	64.61	54.88	53.87	46.09	55.82	38	54.18	59.77	66.96	61.77	55.76	55.12
14	63.21	64.31	46.32	65.85	49.65	62.04	39	58.06	47.58	53.21	67.48	56.89	54.81
15	60.90	64.32	42.50	66.45	46.97	58.57	40	70.06	62.16	50.85	64.17	55.49	56.48
16	65.41	46.34	64.74	52.15	51.65	45.91	41	55.29	46.96	54.64	65.40	60.35	69.18
17	64.52	57.83	65.60	56.83	52.90	55.77	42	59.34	57.51	50.65	61.84	52.23	61.52
18	63.41	53.87	53.45	51.41	65.18	65.00	43	53.38	42.55	47.30	59.93	63.24	58.75
19	68.86	57.66	60.62	48.46	65.95	56.14	44	55.18	44.33	57.71	66.20	59.01	57.89
20	62.22	53.38	62.74	56.61	69.32	48.10	45	52.51	41.65	49.23	59.57	60.77	64.10
21	67.72	53.35	58.22	53.24	50.89	56.60	46	62.35	52.17	61.63	62.75	57.15	66.48
22	62.76	52.56	56.87	51.41	67.82	55.66	47	59.13	52.26	46.71	64.15	51.67	61.42
23	61.00	54.48	52.75	57.26	63.11	61.96	48	62.16	44.28	54.18	68.82	57.35	59.59
24	62.24	55.80	60.10	54.30	62.15	62.48	49	57.49	57.08	49.21	65.21	58.64	66.69
25	58.67	50.69	57.80	51.40	67.86	52.53	50	60.48	48.43	57.27	61.88	62.46	61.20

Table C.51 Experimental data of lightness for 5-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 3)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	67.50	63.63	67.80	61.99	64.18	64.38	26	64.04	62.92	67.33	68.89	56.53	64.38
2	65.67	63.30	61.30	57.84	65.06	67.13	27	66.15	60.49	73.43	76.17	63.17	61.28
3	67.62	67.28	71.64	60.82	66.98	58.20	28	68.70	63.35	62.92	61.89	71.29	58.23
4	66.96	58.83	66.86	60.77	60.68	65.68	29	68.19	71.21	61.31	67.56	55.85	61.80
5	67.48	69.00	66.90	66.64	54.71	74.35	30	74.88	59.69	72.57	74.56	61.31	64.81
6	70.47	64.25	72.29	62.82	63.56	58.12	31	62.41	71.86	61.35	55.66	53.40	57.62
7	73.58	71.12	72.89	72.85	54.06	59.86	32	76.71	67.73	67.18	57.19	58.87	66.52
8	70.33	57.35	67.95	67.36	58.35	67.61	33	72.72	75.00	64.30	62.57	59.41	66.66
9	65.12	63.08	69.48	68.40	57.00	63.46	34	66.81	64.86	65.28	66.76	57.75	64.65
10	69.57	67.06	71.88	68.06	57.89	74.05	35	65.94	64.81	67.76	56.41	52.35	62.29
11	70.52	57.29	63.48	51.92	63.11	65.81	36	63.86	72.69	60.80	61.18	65.78	65.14
12	66.46	71.45	72.32	51.90	68.20	60.81	37	67.79	59.33	66.20	64.34	60.20	55.43
13	68.10	63.47	64.82	65.78	79.40	59.87	38	69.42	74.28	68.57	67.33	69.20	61.11
14	64.27	60.87	62.70	61.10	64.41	63.32	39	67.51	69.37	66.54	62.36	65.18	57.50
15	69.29	58.42	71.71	57.72	70.01	72.47	40	51.94	62.73	68.03	65.66	64.29	59.49
16	67.06	70.61	64.65	64.11	61.68	61.83	41	63.45	56.79	64.54	71.25	73.88	68.26
17	66.55	60.13	60.75	66.47	52.18	68.19	42	69.41	55.78	60.41	67.29	69.08	68.51
18	67.08	69.29	61.85	63.44	56.58	65.78	43	68.84	63.49	60.14	60.62	71.27	61.22
19	68.52	67.97	64.22	69.11	60.72	56.69	44	69.12	61.34	56.02	63.23	65.72	69.19
20	67.85	66.69	70.74	65.17	62.57	66.56	45	68.10	44.86	69.20	70.04	66.53	67.45
21	74.69	69.83	55.13	66.31	52.11	64.50	46	63.35	56.97	70.87	65.59	72.93	64.13
22	73.56	57.88	63.90	69.28	67.50	70.85	47	66.06	65.31	70.76	66.61	67.74	61.55
23	65.32	66.94	66.70	58.16	54.64	71.03	48	73.52	58.81	72.93	64.79	70.96	62.07
24	71.26	70.63	64.49	66.56	53.93	67.67	49	72.03	54.55	66.22	69.26	73.33	66.67
25	64.55	56.73	68.58	65.71	67.86	67.18	50	74.96	66.31	69.99	70.23	71.77	66.23

Table C.52 Experimental data of redness for 5-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	10.39	5.93	10.04	8.22	9.94	9.38	26	10.68	5.93	5.46	8.61	10.51	9.88
2	9.16	3.31	7.94	11.35	10.12	7.96	27	7.12	3.95	5.01	7.17	10.30	8.00
3	12.31	5.58	9.86	9.57	11.39	6.91	28	5.22	4.91	5.22	9.82	9.67	10.60
4	9.16	5.72	10.28	8.81	7.77	6.44	29	8.90	5.58	5.30	10.91	9.97	8.09
5	8.26	6.95	8.39	9.68	9.32	8.43	30	7.78	5.07	4.96	9.94	9.04	9.48
6	6.92	9.51	5.00	3.31	5.57	8.81	31	6.96	8.60	7.98	6.92	6.85	5.17
7	8.26	8.02	4.42	6.46	7.05	9.78	32	5.05	8.59	7.99	4.82	13.50	8.75
8	8.26	8.10	5.57	3.51	6.67	9.41	33	5.03	9.80	8.23	6.73	8.86	10.11
9	8.23	6.79	4.55	3.99	6.21	8.13	34	4.38	7.83	7.09	6.74	8.65	6.82
10	5.71	9.44	3.34	3.19	5.06	8.84	35	5.01	9.20	7.28	6.79	8.35	4.49
11	6.46	5.41	5.45	8.08	7.99	3.52	36	8.25	7.12	7.77	6.35	9.38	8.36
12	4.35	5.65	4.73	8.02	3.46	3.92	37	8.56	9.35	5.95	4.53	11.57	3.87
13	4.65	6.24	2.98	11.10	5.18	7.70	38	7.14	7.43	6.55	8.07	9.99	7.99
14	5.59	3.88	6.16	5.95	8.81	4.40	39	6.36	6.02	4.78	4.43	8.58	4.91
15	3.35	3.98	4.85	6.17	3.86	4.07	40	9.69	4.55	6.24	3.89	10.58	6.44
16	7.29	8.02	5.74	7.29	9.13	6.68	41	6.39	5.77	8.65	8.55	7.88	8.23
17	2.37	6.28	7.28	8.77	10.07	7.32	42	7.23	5.40	6.98	6.09	3.11	4.86
18	4.02	8.72	7.75	7.71	7.28	4.00	43	5.80	9.00	8.24	7.54	4.36	8.13
19	4.55	10.46	6.11	7.34	9.73	7.51	44	5.86	8.62	6.03	7.02	6.94	7.70
20	2.61	6.08	6.29	7.25	2.90	6.73	45	6.36	6.83	6.29	6.14	11.48	3.34
21	9.33	7.02	8.29	7.81	4.38	5.67	46	7.71	5.34	9.28	5.97	8.91	10.78
22	9.19	6.38	7.16	5.03	6.12	10.11	47	5.29	6.19	8.57	9.08	11.97	10.43
23	8.03	3.79	8.32	6.05	2.92	8.65	48	4.19	6.05	6.91	4.41	11.98	8.74
24	8.58	7.95	6.71	5.91	2.48	6.09	49	5.18	5.81	9.35	6.25	8.42	9.81
25	7.62	6.03	7.36	3.61	9.56	7.08	50	7.78	4.22	11.14	6.76	12.62	9.32

Table C.52 Experimental data of redness for 5-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	3.23	2.39	4.25	4.60	7.76	4.11	26	6.23	4.47	7.11	3.59	4.19	4.82
2	5.70	2.55	6.00	7.54	6.66	4.36	27	5.80	2.88	3.24	5.19	4.50	3.65
3	4.73	2.89	4.09	5.55	3.73	9.56	28	5.26	2.88	3.57	2.84	5.38	2.87
4	1.62	2.77	3.19	4.71	7.34	4.48	29	6.42	1.54	3.39	5.63	3.71	4.25
5	3.32	2.78	5.29	6.87	4.23	4.99	30	5.47	3.78	6.08	5.61	5.47	2.85
6	4.37	2.78	3.04	5.70	6.29	6.96	31	5.24	4.14	1.25	3.15	6.28	7.36
7	6.89	1.96	2.79	5.06	6.21	3.78	32	7.05	3.47	4.17	2.47	5.65	3.61
8	5.43	3.67	4.73	6.61	7.12	5.40	33	8.38	5.51	2.07	4.06	7.30	3.69
9	3.72	1.82	4.06	5.68	7.49	6.29	34	4.94	4.01	2.68	4.30	8.23	7.73
10	5.93	3.24	4.92	4.45	5.20	5.45	35	8.11	2.91	1.39	3.32	4.90	3.13
11	4.36	3.88	4.33	7.66	6.82	5.08	36	4.19	4.58	6.82	5.34	6.22	4.82
12	5.37	4.27	8.59	3.74	4.45	6.00	37	3.74	3.87	8.34	3.69	4.61	5.33
13	6.96	5.85	4.26	6.55	9.59	3.01	38	2.69	2.50	2.68	5.08	5.07	6.79
14	5.25	4.06	7.74	3.26	7.43	4.73	39	4.65	4.39	5.28	3.06	5.54	4.50
15	5.72	3.50	9.51	3.20	7.22	5.77	40	2.18	2.53	3.80	3.98	4.59	3.75
16	3.51	4.17	3.51	7.57	2.59	7.04	41	2.83	3.71	2.40	4.98	4.33	2.52
17	4.76	2.90	4.95	5.49	5.31	6.59	42	4.14	3.52	5.87	4.64	5.86	2.70
18	5.40	5.55	6.85	7.85	1.98	4.83	43	6.05	6.69	7.15	5.79	2.81	4.61
19	3.50	3.53	4.58	8.09	3.73	8.29	44	2.27	5.42	4.28	4.84	4.56	3.73
20	4.24	5.10	3.84	6.57	2.74	8.58	45	3.69	3.31	2.90	5.59	5.22	3.10
21	4.27	5.78	5.47	6.83	5.37	5.65	46	5.41	2.44	2.31	3.75	3.86	2.48
22	4.59	4.47	2.95	4.59	4.68	5.17	47	4.29	3.81	7.03	3.88	4.55	3.88
23	5.01	5.84	5.20	5.90	4.13	3.60	48	3.40	2.82	6.65	2.77	3.44	3.16
24	6.68	5.18	3.52	4.88	5.79	3.14	49	6.37	2.21	5.63	4.03	3.90	2.27
25	5.26	4.80	2.53	6.49	5.13	5.83	50	4.15	3.42	2.95	3.53	3.30	3.97

Table C.52 Experimental data of redness for 5-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 3)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	5.79	5.99	3.73	6.87	5.93	6.99	26	4.21	4.24	5.12	4.13	9.65	6.68
2	6.25	7.37	2.47	8.25	5.44	5.39	27	4.32	4.64	4.09	1.38	7.85	8.22
3	4.39	8.09	3.87	7.32	4.52	6.13	28	4.45	4.65	8.15	6.16	5.44	8.91
4	4.35	6.55	2.85	8.67	6.52	5.82	29	4.03	4.08	4.27	2.12	9.42	6.84
5	6.29	5.80	4.61	6.17	8.94	3.93	30	1.65	4.54	3.27	2.03	9.33	7.43
6	4.03	5.97	1.76	5.65	6.94	7.68	31	5.11	5.14	6.60	9.41	10.85	8.57
7	3.60	3.73	1.85	2.57	9.45	8.63	32	1.95	6.39	5.80	8.48	7.78	4.78
8	3.80	5.95	3.28	5.29	8.77	5.68	33	2.75	3.70	6.88	7.32	7.22	5.75
9	3.41	5.15	1.61	2.57	8.52	7.17	34	3.99	6.68	6.76	5.83	9.14	6.81
10	3.89	6.23	1.69	4.26	8.57	3.84	35	1.87	4.18	5.60	10.45	8.98	5.83
11	4.04	7.70	2.82	7.40	6.61	5.78	36	7.80	4.28	5.11	3.80	5.65	8.31
12	6.42	6.49	2.82	9.40	4.51	7.26	37	5.34	5.89	5.24	4.50	7.63	8.36
13	3.56	6.07	5.39	7.67	2.40	7.26	38	3.85	3.76	2.02	4.42	3.81	8.53
14	3.39	7.92	2.69	6.62	5.58	5.79	39	5.22	3.50	4.44	5.88	5.50	9.04
15	5.89	7.89	2.17	8.31	3.45	5.48	40	2.57	5.07	4.25	4.65	6.04	7.87
16	6.39	5.14	6.95	3.32	10.00	4.18	41	4.72	7.54	6.89	3.54	3.16	4.87
17	5.12	8.87	7.25	5.34	8.55	4.64	42	6.02	7.42	4.83	3.59	5.34	5.42
18	6.66	5.22	7.43	5.21	8.84	4.20	43	5.48	6.60	8.24	5.69	4.89	6.86
19	5.36	5.41	6.13	3.01	10.27	7.21	44	4.66	5.93	7.71	4.19	4.28	5.22
20	6.55	7.51	5.78	6.00	6.08	4.57	45	4.61	10.99	3.73	3.06	6.06	4.58
21	3.27	4.70	6.66	4.87	7.92	5.73	46	3.45	6.78	3.32	3.02	4.17	5.72
22	2.67	3.48	5.53	2.75	8.02	4.76	47	2.73	6.13	3.63	2.14	4.62	7.35
23	4.39	3.42	4.71	4.88	7.31	4.34	48	2.69	10.16	3.00	3.43	4.71	5.80
24	3.76	4.63	5.89	4.40	7.11	5.33	49	2.54	8.00	3.07	2.44	3.13	5.21
25	2.14	2.75	4.32	2.21	8.64	5.56	50	2.31	7.02	2.85	3.12	4.73	5.59

Table C.53 Experimental data of yellowness for 5-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	37.28	34.48	37.19	34.11	37.47	30.86	26	31.03	31.27	32.73	27.76	37.76	36.86
2	31.61	27.82	32.36	32.47	30.68	29.66	27	31.65	32.33	31.51	34.86	37.01	34.86
3	36.30	34.21	39.17	31.19	35.42	36.02	28	33.04	34.60	35.83	40.09	33.48	31.47
4	30.75	33.23	36.36	36.75	30.94	31.04	29	35.11	33.51	34.23	26.74	38.39	35.10
5	36.54	35.70	35.40	34.76	32.31	34.03	30	30.51	32.23	31.17	28.73	37.98	36.88
6	31.24	38.29	34.76	30.24	32.26	30.79	31	34.61	35.33	33.97	35.24	29.96	30.96
7	33.61	32.94	34.95	34.42	32.69	35.37	32	33.40	38.41	35.39	31.18	30.45	35.54
8	34.77	33.18	35.53	31.23	31.29	37.37	33	33.59	33.59	35.73	35.16	29.43	37.35
9	38.01	34.70	32.23	34.45	31.65	32.44	34	33.36	33.64	33.41	31.65	31.11	30.72
10	33.92	39.08	30.40	32.61	31.18	35.82	35	35.38	36.00	35.30	36.23	36.38	30.03
11	30.93	30.33	33.83	35.85	32.45	30.93	36	34.62	30.45	32.39	31.37	32.18	28.26
12	29.65	33.37	36.38	30.05	29.88	31.99	37	32.57	39.39	34.30	33.92	36.26	30.99
13	30.63	35.89	31.95	33.36	32.76	34.09	38	33.30	35.36	34.85	36.48	32.90	35.04
14	34.19	30.00	34.08	32.91	32.80	30.42	39	34.29	33.23	32.70	35.44	35.52	31.67
15	30.49	30.78	37.40	30.33	31.52	31.32	40	36.20	34.11	38.30	28.66	38.40	31.53
16	34.60	36.72	34.49	35.03	31.81	35.57	41	35.97	32.12	34.48	28.65	33.61	31.28
17	32.01	34.68	37.69	33.86	33.71	34.43	42	33.39	32.33	34.74	32.70	26.48	30.61
18	32.69	36.80	34.21	35.65	34.12	27.55	43	36.20	34.29	35.72	32.95	35.99	31.58
19	33.08	35.74	31.18	35.17	33.81	35.37	44	32.16	32.52	34.12	32.39	34.17	31.54
20	27.85	32.36	32.15	36.45	28.27	35.66	45	35.47	35.62	33.41	33.70	38.80	30.29
21	33.38	30.52	32.03	35.31	27.10	32.64	46	38.06	29.27	28.86	31.99	32.28	32.22
22	33.71	36.91	31.30	30.43	33.62	35.43	47	35.89	36.22	35.77	34.17	35.75	34.37
23	33.39	30.73	35.70	35.20	28.90	35.36	48	33.09	31.53	33.12	30.74	38.66	34.09
24	33.19	34.99	32.93	33.38	27.88	32.80	49	33.80	33.94	29.97	32.68	34.68	32.02
25	35.99	32.08	28.66	26.97	33.60	31.82	50	37.63	33.75	37.03	33.51	33.31	33.43

Table C.53 Experimental data of yellowness for 5-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	25.39	24.96	26.42	31.22	26.56	28.31	26	29.06	26.80	26.54	31.58	24.85	29.54
2	27.91	28.23	27.88	29.00	29.62	27.44	27	30.33	25.68	27.91	28.74	27.30	28.63
3	25.66	28.14	27.54	31.30	25.59	27.38	28	29.16	27.15	29.13	28.32	24.16	26.90
4	32.12	26.35	23.91	25.03	25.57	27.91	29	31.34	26.69	26.95	31.29	27.84	26.70
5	24.88	29.29	28.06	30.46	28.16	31.22	30	31.02	32.61	25.83	29.57	25.34	26.49
6	31.22	28.91	25.17	32.14	30.33	26.18	31	30.71	31.27	27.12	29.71	27.97	24.24
7	31.59	29.62	28.98	26.00	24.75	27.66	32	27.08	29.53	29.27	25.40	26.43	25.28
8	31.34	20.94	20.97	29.19	24.10	27.29	33	22.01	30.78	23.34	31.08	27.60	27.34
9	30.97	27.34	29.71	31.17	27.20	25.89	34	32.79	31.84	31.19	30.67	25.47	24.88
10	30.86	29.82	22.58	28.50	26.40	26.19	35	29.67	24.92	28.29	29.60	25.94	26.19
11	29.21	30.49	29.23	28.38	25.73	28.46	36	26.82	26.16	27.41	31.81	28.34	31.54
12	30.76	34.94	30.00	26.58	27.25	26.15	37	30.53	26.83	26.56	29.86	30.04	22.90
13	32.63	31.91	26.81	27.00	27.98	25.59	38	25.11	26.58	29.77	30.63	30.21	29.60
14	32.35	30.03	29.24	29.00	27.48	29.40	39	28.57	24.78	27.65	28.99	30.16	27.26
15	31.09	30.80	27.01	24.34	24.89	31.93	40	26.70	27.81	26.44	29.55	30.57	24.28
16	28.84	27.42	25.81	30.09	21.16	24.80	41	28.36	25.05	23.97	28.94	29.36	29.58
17	28.37	28.55	32.70	30.94	26.30	30.12	42	31.12	29.53	25.84	25.29	27.76	27.65
18	32.06	31.90	30.50	28.94	24.56	28.34	43	33.32	26.29	27.37	28.48	25.74	27.76
19	29.88	30.30	30.76	27.27	27.49	28.95	44	27.89	24.98	28.18	30.06	29.31	27.41
20	27.05	31.15	27.65	31.49	28.29	26.64	45	29.29	22.72	23.01	26.65	31.34	28.83
21	29.48	28.92	27.20	32.88	23.37	27.18	46	31.59	25.52	28.02	30.60	26.89	27.61
22	29.64	29.20	26.39	27.92	32.61	29.18	47	28.82	29.27	27.58	31.53	25.09	27.10
23	30.93	28.23	25.02	31.52	30.18	29.57	48	26.54	23.45	31.12	28.38	28.22	28.45
24	32.43	30.51	25.52	28.69	28.30	29.44	49	31.06	27.80	27.96	31.32	28.25	27.31
25	29.80	29.07	25.48	32.60	32.75	28.41	50	28.61	26.34	27.20	30.98	28.92	26.93

Table C.53 Experimental data of yellowness for 5-mm banana chips with moisture absorber during storage at 30 °C (Replicate No. 3)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	34.68	28.53	32.26	30.70	31.97	30.11	26	30.39	31.03	33.91	30.90	34.50	33.57
2	34.52	34.80	29.27	31.76	31.95	31.31	27	30.78	29.34	30.12	28.38	32.10	35.37
3	34.94	36.70	31.96	30.68	31.03	28.22	28	30.46	30.17	34.71	32.16	32.36	32.44
4	33.04	29.17	31.03	33.72	29.83	31.44	29	31.86	28.87	31.02	27.49	34.37	33.59
5	35.20	35.26	33.06	34.21	31.96	28.52	30	29.77	29.68	29.49	29.07	32.62	34.33
6	33.46	31.73	28.62	29.00	31.58	31.05	31	28.36	32.61	34.79	32.12	31.13	32.73
7	33.37	31.96	28.69	30.38	31.85	33.25	32	33.41	32.10	31.49	31.97	30.33	31.64
8	33.39	28.88	31.13	32.00	33.20	33.35	33	30.90	29.63	35.11	29.21	31.12	32.89
9	30.70	30.04	27.59	29.37	31.28	31.11	34	28.40	32.34	33.06	32.65	32.48	33.68
10	32.20	33.93	29.21	29.46	32.75	30.14	35	28.30	27.68	30.18	33.81	27.83	30.71
11	32.95	33.14	29.16	27.37	30.52	31.65	36	29.83	31.66	29.67	26.93	31.99	35.42
12	33.07	36.37	31.13	25.75	29.35	30.34	37	32.69	31.11	34.37	28.68	32.98	28.58
13	31.75	32.72	31.36	32.08	25.62	30.86	38	32.64	33.71	28.40	31.40	31.55	33.34
14	30.24	34.52	28.37	30.49	27.72	31.16	39	32.58	30.00	30.86	28.66	31.66	31.07
15	34.21	35.08	30.48	28.74	28.37	32.69	40	26.06	31.71	34.35	31.51	32.74	29.54
16	34.44	34.07	35.28	28.86	35.05	22.51	41	32.07	33.83	35.24	30.23	32.64	32.91
17	31.60	31.58	32.57	32.21	28.18	26.65	42	35.74	32.89	24.48	30.26	31.66	33.46
18	36.19	34.41	34.63	33.85	33.21	27.72	43	34.34	32.17	34.59	29.81	32.72	32.45
19	32.56	33.34	34.31	29.65	34.64	26.81	44	33.99	33.25	29.52	27.98	26.90	33.10
20	34.64	32.45	35.30	33.16	29.94	29.09	45	32.97	29.60	25.14	30.57	31.66	32.99
21	33.57	35.21	30.16	32.02	29.50	31.21	46	28.69	33.11	30.67	27.85	27.21	31.71
22	31.65	29.58	32.18	28.35	33.97	31.27	47	29.20	32.21	30.69	27.58	25.20	33.10
23	31.37	28.75	29.91	26.89	30.30	28.58	48	31.81	35.43	31.17	27.81	28.95	30.39
24	32.89	35.94	32.87	31.66	30.47	31.97	49	31.45	34.17	29.51	29.13	23.67	32.07
25	28.70	28.88	32.60	27.13	36.61	32.06	50	31.93	36.37	29.29	29.79	28.57	32.77

Table C.54 Experimental data of lightness for 5-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	70.77	59.27	65.32	65.20	67.16	63.39	26	56.08	69.31	67.90	68.37	70.45	75.01
2	67.56	67.19	68.32	69.63	70.43	70.83	27	68.22	69.80	63.60	56.94	75.05	64.79
3	70.22	71.33	72.21	62.53	70.64	62.11	28	62.78	68.44	64.60	69.48	66.10	69.61
4	64.87	58.97	62.80	69.37	64.98	74.46	29	67.86	63.98	70.21	64.67	74.65	74.21
5	70.22	67.70	63.48	64.52	70.74	66.13	30	68.86	69.20	67.56	63.27	74.85	74.18
6	68.07	60.47	57.44	55.52	66.38	73.35	31	60.64	67.69	67.93	69.32	64.24	69.59
7	64.73	62.38	66.55	66.75	76.88	69.53	32	56.84	70.29	66.71	61.11	70.16	73.72
8	68.04	61.00	60.05	57.44	57.42	73.38	33	64.03	61.72	59.03	62.08	65.53	68.55
9	66.65	66.17	69.31	61.62	65.72	70.84	34	63.45	56.46	71.09	69.76	66.49	67.94
10	64.54	67.88	58.00	66.86	77.86	69.90	35	53.82	67.87	65.12	63.21	68.75	72.84
11	58.61	58.64	63.33	64.22	69.55	57.60	36	55.66	70.74	70.82	62.03	68.30	72.29
12	75.64	57.75	54.95	64.54	74.84	62.31	37	69.76	61.95	71.21	53.30	66.99	70.13
13	64.30	67.61	73.36	61.18	74.79	69.48	38	60.37	70.42	73.69	58.93	70.93	69.92
14	63.70	57.17	57.89	60.17	67.36	59.34	39	64.19	66.62	69.82	58.59	67.86	75.64
15	59.10	54.23	65.45	59.98	73.14	63.09	40	65.36	70.26	69.03	62.07	66.88	76.44
16	72.06	73.84	61.20	61.78	72.98	67.32	41	59.61	62.57	69.32	72.49	64.61	70.32
17	71.73	65.62	66.37	63.02	66.96	57.26	42	46.62	57.73	74.59	73.94	52.18	64.91
18	63.41	67.00	61.81	67.36	62.77	54.41	43	60.63	62.55	74.88	75.47	76.25	65.06
19	71.72	73.43	67.28	59.24	65.67	56.38	44	50.53	57.50	73.21	71.65	63.21	65.94
20	71.74	73.21	66.08	62.52	51.97	62.29	45	59.68	65.14	71.33	67.19	74.43	69.53
21	71.67	75.40	68.97	66.34	70.28	59.65	46	60.80	67.35	62.52	56.64	70.20	69.10
22	71.13	58.76	51.95	72.93	72.68	58.32	47	62.29	67.69	65.75	66.95	73.13	73.85
23	75.19	63.88	73.37	72.09	66.20	60.57	48	55.13	70.03	70.80	62.28	72.02	66.05
24	70.81	63.27	64.37	67.83	68.71	58.89	49	68.82	59.74	74.57	53.19	71.60	55.59
25	73.43	61.32	67.51	69.42	67.33	62.10	50	55.40	65.63	65.04	66.71	74.75	72.05

Table C.54 Experimental data of lightness for 5-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	53.35	59.78	64.94	57.34	69.98	53.31	26	61.94	60.46	60.20	68.70	63.32	56.44
2	63.38	55.11	61.84	64.28	64.14	67.47	27	65.73	67.73	53.11	74.37	70.62	61.75
3	56.90	62.71	61.95	63.28	58.60	68.41	28	61.08	61.89	65.70	70.76	64.65	62.24
4	65.65	59.94	66.52	64.44	70.86	59.64	29	61.91	65.42	65.30	68.61	70.79	65.19
5	60.51	54.97	54.88	72.77	70.66	65.26	30	57.95	65.63	64.30	71.69	64.39	62.88
6	67.21	62.23	59.85	62.53	66.57	67.14	31	60.26	65.49	62.02	64.75	54.84	62.61
7	74.15	63.34	60.10	72.87	62.98	65.72	32	68.75	61.09	61.19	60.00	63.74	61.28
8	67.67	63.35	67.83	67.11	62.46	55.63	33	68.27	58.62	68.91	65.77	69.61	58.76
9	64.73	67.02	63.16	71.38	65.72	62.05	34	67.59	63.79	69.49	69.35	65.24	63.95
10	69.57	65.67	62.77	64.67	63.93	63.12	35	64.08	59.10	61.75	67.92	69.94	74.55
11	67.46	65.23	62.94	68.31	55.68	64.42	36	68.51	56.78	60.77	69.09	69.98	60.61
12	62.06	62.88	59.23	63.97	61.19	70.31	37	68.20	62.73	54.24	60.07	61.94	60.12
13	65.52	67.02	56.12	68.90	56.46	69.84	38	65.02	67.51	63.12	68.08	62.86	58.06
14	70.41	66.37	60.93	67.21	62.49	67.57	39	68.43	64.58	65.71	69.06	68.24	59.49
15	65.73	58.09	60.39	66.00	62.72	68.54	40	67.63	66.27	62.96	69.08	67.96	58.40
16	71.77	59.84	66.29	67.06	67.02	65.01	41	63.28	63.14	54.42	64.10	65.87	71.13
17	69.25	68.83	69.37	69.92	61.36	58.29	42	68.19	61.97	67.85	64.11	60.30	70.74
18	68.66	63.03	64.68	71.97	58.98	65.26	43	62.47	59.38	44.95	62.02	66.43	70.93
19	65.21	67.49	71.46	68.66	68.27	59.04	44	66.96	65.24	64.82	57.48	64.85	70.57
20	68.14	67.41	58.14	69.26	65.38	59.33	45	56.36	61.25	55.20	72.41	60.19	68.81
21	64.71	66.98	66.99	66.41	64.19	66.80	46	62.72	60.74	56.66	56.57	66.73	66.66
22	57.59	62.85	60.20	63.80	65.91	59.66	47	66.05	56.41	61.41	66.36	67.25	65.90
23	62.47	58.66	63.62	64.92	61.94	64.79	48	69.81	68.34	58.17	65.01	71.98	68.88
24	64.08	63.56	61.59	69.00	69.42	70.20	49	65.49	67.41	59.82	71.31	68.59	63.33
25	64.75	64.15	64.80	65.57	65.75	62.40	50	67.51	66.32	56.63	69.91	69.78	70.75

Table C.55 Experimental data of redness for 5-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	1.75	10.13	6.60	2.12	4.95	5.43	26	8.39	3.33	2.02	5.54	1.50	0.68
2	2.84	8.25	5.53	5.33	4.12	3.54	27	4.14	1.80	5.33	6.00	2.25	1.61
3	2.99	5.46	5.58	5.57	3.03	6.94	28	7.01	2.66	5.70	2.30	2.80	1.78
4	2.73	9.26	6.63	4.29	4.08	2.55	29	5.83	3.64	2.53	5.53	1.46	1.39
5	3.69	5.28	6.44	3.07	3.95	3.37	30	4.93	1.66	2.00	5.76	2.01	1.48
6	4.00	3.97	9.23	7.30	5.77	0.87	31	5.95	1.59	3.50	4.69	4.99	2.17
7	4.77	6.46	6.86	5.84	2.59	4.75	32	7.57	1.91	1.81	7.27	3.06	2.46
8	6.05	4.15	7.70	9.28	4.08	2.12	33	5.57	5.09	5.05	7.14	5.71	2.69
9	4.29	4.05	7.47	7.35	5.85	1.72	34	5.97	4.37	1.96	4.67	5.01	2.30
10	3.63	4.48	5.55	4.46	2.33	4.92	35	7.19	1.77	1.98	6.57	2.34	2.79
11	5.64	8.19	3.79	5.13	2.47	6.81	36	5.47	3.81	2.99	8.04	2.10	0.81
12	1.43	8.07	4.38	5.63	1.25	6.48	37	4.62	9.44	2.20	5.92	1.98	5.53
13	3.92	6.07	3.06	5.41	1.25	5.12	38	7.84	5.72	2.56	5.98	2.28	4.63
14	4.09	7.26	5.69	8.10	0.76	6.60	39	4.82	8.40	2.47	6.17	6.09	1.22
15	1.32	7.33	4.45	5.70	1.23	6.21	40	3.36	5.27	2.23	6.35	3.24	0.61
16	2.81	3.16	8.63	3.60	3.17	4.46	41	8.70	6.26	4.56	2.98	3.54	3.95
17	2.25	4.62	6.62	3.92	3.77	8.61	42	5.57	5.46	2.61	2.43	3.25	4.96
18	5.25	3.63	8.16	7.71	3.23	9.05	43	5.01	8.21	2.96	2.84	2.91	3.71
19	2.79	3.04	7.24	4.62	2.37	8.73	44	5.24	8.60	4.25	2.82	3.55	4.48
20	2.10	2.35	7.13	3.04	2.95	4.85	45	7.74	7.93	2.72	5.95	1.67	4.59
21	4.91	2.38	3.65	4.60	4.36	7.23	46	4.51	5.92	6.44	10.36	2.34	2.49
22	3.48	4.26	4.23	3.36	4.84	5.97	47	3.77	4.14	5.07	6.77	3.35	2.98
23	2.87	6.18	1.79	3.89	4.88	6.58	48	1.79	5.76	3.31	7.99	1.57	4.28
24	3.81	6.13	1.99	4.07	4.39	6.67	49	2.70	8.09	2.06	9.31	2.23	7.08
25	3.28	5.99	2.90	3.73	5.59	6.95	50	1.31	4.60	3.78	5.77	2.85	3.24

Table C.55 Experimental data of redness for 5-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	5.91	8.36	6.07	6.96	2.03	7.66	26	7.47	6.08	7.50	4.97	4.38	8.23
2	6.65	10.77	5.75	5.22	4.82	3.47	27	8.44	4.55	7.73	3.01	3.98	7.35
3	5.81	8.02	5.17	4.70	4.35	4.46	28	8.78	4.79	6.13	2.09	5.43	7.72
4	4.07	8.31	5.86	4.70	1.61	5.91	29	7.71	4.66	5.86	3.97	4.62	6.55
5	6.24	9.73	5.74	3.26	2.87	4.30	30	7.61	3.68	3.38	2.83	5.84	6.53
6	3.67	3.82	5.67	6.31	3.36	3.60	31	3.25	7.46	1.90	5.61	8.44	4.85
7	2.25	2.92	6.25	2.13	4.47	1.83	32	2.81	5.53	4.70	6.52	6.39	5.27
8	2.76	2.85	4.44	4.14	3.81	6.70	33	4.54	8.98	3.50	5.69	5.12	6.51
9	3.42	3.16	6.45	1.98	4.17	2.69	34	2.53	6.98	2.02	4.33	3.77	4.34
10	2.48	3.08	4.98	5.78	4.52	2.41	35	4.48	6.40	5.02	5.80	2.71	2.36
11	4.31	5.99	5.01	4.33	5.19	1.61	36	3.64	2.94	5.92	5.77	3.10	5.81
12	5.34	4.34	5.24	4.73	5.22	3.36	37	3.27	3.85	9.74	5.80	4.82	7.21
13	4.35	3.37	6.13	3.87	5.24	3.25	38	4.02	3.80	5.13	3.50	4.40	6.58
14	3.49	4.80	6.26	4.66	4.92	4.11	39	3.60	2.48	4.56	4.89	2.98	7.60
15	3.71	6.62	6.59	3.88	5.12	1.19	40	3.24	2.67	8.96	3.92	3.58	6.87
16	2.14	4.93	4.01	6.33	4.22	4.16	41	2.72	3.64	6.40	3.63	2.86	2.38
17	3.44	2.67	4.74	4.45	5.06	7.04	42	3.19	5.33	3.72	5.67	4.27	2.03
18	2.07	3.16	2.81	4.55	5.02	3.39	43	1.88	5.96	10.18	5.13	2.64	2.48
19	3.21	4.33	3.92	4.83	3.99	6.48	44	4.54	3.78	4.16	6.70	4.66	3.05
20	3.70	2.78	4.79	5.65	6.70	4.51	45	1.80	4.83	5.71	4.20	4.28	2.31
21	5.43	3.78	2.65	4.75	4.65	2.80	46	3.21	2.73	6.26	6.91	3.91	2.74
22	6.20	5.35	3.99	3.75	4.04	5.84	47	2.63	5.29	4.21	3.45	3.49	3.47
23	5.84	6.23	3.28	4.18	3.35	3.70	48	3.48	4.21	5.90	5.95	2.56	2.44
24	6.03	4.19	3.84	2.41	3.86	2.25	49	2.90	2.56	4.81	4.19	3.37	4.16
25	4.41	5.38	2.54	4.51	3.87	7.80	50	3.36	3.77	6.59	3.99	3.26	2.89

Table C.56 Experimental data of yellowness for 5-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	29.51	37.33	34.69	26.64	32.82	32.62	26	34.07	35.23	28.60	32.88	27.54	27.32
2	29.49	38.62	33.32	36.60	32.02	30.30	27	30.99	31.03	32.35	29.02	32.59	26.59
3	33.25	34.52	35.27	35.46	29.78	33.20	28	35.27	33.38	32.98	27.70	29.66	28.29
4	28.70	35.84	31.97	34.90	32.27	29.76	29	35.88	33.32	30.50	31.96	29.05	29.13
5	31.74	32.93	34.13	28.48	31.92	30.55	30	35.12	28.45	29.36	33.27	31.52	30.85
6	33.66	30.28	36.55	33.69	32.79	23.58	31	33.15	30.33	30.83	33.25	30.43	29.81
7	33.56	36.91	37.19	33.79	28.98	34.46	32	33.80	31.55	27.90	33.62	29.50	33.07
8	35.77	29.78	36.78	34.43	29.20	24.71	33	33.66	29.50	33.32	34.99	32.85	31.83
9	29.90	29.16	36.19	34.76	33.18	24.68	34	33.72	29.37	29.63	33.65	31.14	30.02
10	31.65	31.90	33.20	33.03	28.79	34.52	35	32.04	31.80	28.25	34.62	29.26	33.16
11	34.64	35.30	30.25	33.13	27.64	29.58	36	31.86	31.93	32.77	32.44	24.64	23.73
12	30.32	34.13	29.38	34.53	29.09	34.56	37	34.95	36.68	32.23	29.23	28.41	34.88
13	35.22	33.82	31.85	33.19	27.23	33.32	38	36.17	35.63	31.19	30.95	27.08	35.09
14	35.53	34.01	30.58	35.57	25.61	29.55	39	33.56	40.15	31.89	30.18	34.18	24.46
15	25.63	33.47	31.95	34.45	28.00	34.03	40	31.07	34.26	31.32	32.96	29.21	24.53
16	31.77	32.81	34.73	27.94	35.44	32.48	41	35.41	32.49	32.93	29.98	30.50	32.97
17	30.34	30.68	33.53	28.41	34.83	34.54	42	29.77	32.57	33.75	31.29	26.36	27.91
18	29.62	31.86	35.02	38.38	31.57	34.50	43	32.06	35.03	34.38	31.02	33.14	30.51
19	30.99	32.61	33.76	27.66	32.21	34.24	44	30.24	31.78	34.26	30.41	30.38	32.18
20	30.63	31.30	34.24	27.67	29.72	31.05	45	35.40	36.46	32.88	35.54	30.37	30.09
21	34.68	31.36	34.58	33.00	32.53	31.65	46	30.00	34.57	35.28	35.08	30.81	28.40
22	29.46	30.11	30.67	34.73	35.20	31.40	47	31.20	30.90	35.45	37.20	30.53	32.69
23	34.88	33.86	30.07	35.72	32.02	32.45	48	26.35	33.16	33.39	34.86	29.92	30.81
24	33.37	34.24	28.65	35.35	32.27	32.19	49	31.97	34.97	31.37	32.15	31.09	35.61
25	30.68	33.76	33.27	33.89	33.37	32.44	50	26.16	32.78	33.66	35.70	30.46	32.73

Table C.56 Experimental data of yellowness for 5-mm banana chips without moisture absorber during storage at 30 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	31.99	36.43	38.40	35.66	26.38	29.46	26	37.10	37.48	35.69	32.92	32.82	29.86
2	37.77	36.33	39.68	30.91	30.80	27.36	27	37.64	33.17	35.45	33.64	36.56	32.92
3	33.04	38.35	34.46	36.92	33.45	35.35	28	37.50	38.43	34.54	31.24	33.82	33.07
4	34.98	37.13	38.47	34.60	28.60	29.83	29	36.33	37.00	36.62	31.74	32.40	33.93
5	36.43	36.78	35.87	32.46	31.30	27.79	30	34.27	31.52	34.01	32.45	33.25	32.26
6	35.69	32.86	33.17	35.56	32.04	32.29	31	31.90	31.44	39.35	36.89	31.42	32.54
7	36.06	33.51	34.35	33.86	31.69	27.01	32	32.63	36.57	34.71	32.58	34.59	28.64
8	34.67	30.87	34.85	34.78	31.69	32.23	33	35.04	35.04	38.01	34.46	33.44	32.02
9	34.03	34.86	35.41	33.22	31.19	28.35	34	32.53	33.64	38.35	33.88	33.35	32.10
10	35.45	32.51	35.11	34.96	32.10	26.67	35	35.26	39.03	35.14	38.41	34.26	30.47
11	33.98	39.18	35.13	33.62	31.51	25.66	36	33.99	33.76	27.98	40.50	33.31	34.50
12	33.77	34.36	35.00	31.93	31.20	32.11	37	36.47	33.96	29.25	29.34	34.21	35.49
13	33.60	32.11	34.06	34.61	28.11	32.67	38	35.11	33.10	35.06	36.84	32.54	34.86
14	34.91	37.65	36.49	33.52	32.49	32.50	39	34.73	34.35	30.26	40.38	33.50	36.34
15	33.98	33.26	36.09	30.31	32.08	24.67	40	36.57	38.59	31.39	32.62	33.63	31.53
16	34.19	36.55	33.84	38.36	29.94	31.89	41	30.52	31.51	31.65	30.72	29.31	29.21
17	36.69	34.49	35.59	33.82	33.05	33.01	42	33.98	32.72	33.09	35.59	29.26	30.08
18	31.61	32.92	30.97	37.92	35.37	30.54	43	30.19	29.99	34.38	30.85	28.81	29.33
19	36.74	38.45	35.81	36.64	30.94	33.62	44	37.93	31.75	32.61	30.20	33.74	31.79
20	35.93	34.11	32.71	37.25	37.11	31.14	45	28.15	30.04	33.81	37.17	27.19	29.50
21	37.53	31.79	30.93	33.55	32.42	31.73	46	34.09	31.84	28.68	35.88	31.15	27.52
22	36.13	33.95	32.87	33.61	33.63	30.49	47	33.03	32.58	30.87	30.51	28.83	32.18
23	35.87	32.21	34.71	36.23	31.76	30.72	48	33.50	32.34	34.56	38.47	30.25	28.94
24	37.40	32.05	34.46	32.07	35.98	32.07	49	32.92	33.99	31.23	35.37	30.73	30.18
25	39.07	34.37	31.53	33.75	32.42	32.84	50	34.09	34.08	33.99	34.90	30.25	33.44

Table C.57 Experimental data of lightness for 5-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	67.81	58.91	54.02	61.87	61.06	62.74	26	64.31	61.22	60.24	58.18	57.60	62.64
2	63.53	67.20	65.13	61.40	56.22	52.26	27	55.61	57.68	62.19	56.55	49.07	65.94
3	69.17	66.64	68.19	61.02	57.75	59.90	28	54.27	62.24	63.64	55.93	59.78	61.06
4	64.52	68.16	58.62	57.17	56.92	62.83	29	67.24	63.05	57.63	54.93	61.59	57.04
5	71.83	72.04	61.38	61.21	61.09	57.08	30	73.76	62.60	56.82	56.50	62.35	66.10
6	58.84	57.12	64.32	66.51	60.03	56.27	31	77.54	69.44	73.27	61.24	56.47	59.76
7	71.59	67.03	59.19	65.81	59.18	68.70	32	65.44	68.84	69.60	56.61	67.47	55.37
8	61.25	67.84	56.41	64.06	52.43	54.10	33	68.82	69.60	76.06	62.19	56.52	54.58
9	64.27	64.73	65.51	64.31	56.68	60.95	34	62.00	71.15	64.94	53.33	65.35	58.64
10	60.06	58.03	54.20	62.00	58.32	69.07	35	67.00	71.30	58.31	61.30	42.92	54.94
11	61.78	67.28	58.43	65.86	63.48	54.69	36	57.32	60.85	72.88	57.65	58.55	52.21
12	69.12	67.52	63.13	65.91	65.84	46.49	37	64.84	57.56	72.42	55.15	64.06	59.16
13	70.93	71.79	65.83	62.90	60.92	59.22	38	63.23	64.62	51.83	55.81	62.91	55.77
14	57.59	69.24	58.04	56.23	63.28	57.99	39	64.98	62.34	74.05	62.51	54.37	60.24
15	63.90	70.55	59.57	69.87	64.22	59.93	40	64.30	42.38	68.58	65.71	51.07	57.86
16	74.47	71.75	56.09	63.01	59.51	51.36	41	63.60	65.23	52.99	67.94	56.24	52.63
17	62.40	65.22	64.21	55.18	61.01	48.56	42	67.27	66.06	69.73	59.81	60.44	66.00
18	65.21	71.57	57.42	57.52	62.67	49.12	43	60.36	57.20	52.93	64.09	61.84	55.00
19	68.53	75.99	58.51	60.20	63.59	53.37	44	69.61	62.45	61.58	64.55	60.28	55.16
20	75.21	67.46	60.38	51.74	69.83	53.18	45	65.78	57.34	68.37	60.98	61.94	62.74
21	61.51	57.95	63.07	53.38	65.15	55.85	46	69.05	73.08	67.06	55.30	60.70	60.67
22	69.17	46.77	65.66	60.89	57.63	47.42	47	69.25	65.27	59.37	65.43	69.24	59.73
23	67.42	73.88	67.38	53.23	54.13	52.54	48	64.37	64.77	73.15	68.94	68.64	66.43
24	54.43	73.54	63.71	60.80	63.98	53.72	49	76.07	73.16	62.30	61.64	61.24	59.41
25	50.49	73.23	60.78	53.37	57.82	52.97	50	69.03	70.16	50.78	67.63	68.90	67.05

Table C.57 Experimental data of lightness for 5-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	76.85	64.07	54.61	68.06	73.13	57.60	26	60.69	64.70	76.13	60.12	64.91	63.89
2	49.22	59.31	71.39	68.23	71.05	57.11	27	66.75	65.08	69.28	59.39	66.29	78.44
3	62.64	61.15	57.05	61.07	62.69	48.82	28	58.39	70.06	57.29	56.76	69.98	62.03
4	70.16	67.18	72.10	65.28	70.54	60.02	29	61.36	57.23	75.94	60.66	70.05	70.53
5	61.38	66.24	69.98	62.98	65.33	62.91	30	71.15	41.14	62.13	60.87	67.04	58.33
6	76.08	60.84	66.59	77.32	61.59	67.30	31	58.94	71.44	57.73	60.61	62.65	56.25
7	67.58	68.68	74.13	66.36	65.93	67.23	32	64.15	73.60	71.97	62.29	68.30	71.32
8	75.22	63.49	62.49	58.28	61.03	64.22	33	48.32	70.29	69.16	70.69	68.38	69.45
9	70.00	74.92	59.37	70.98	62.33	63.44	34	65.46	77.80	59.85	61.88	70.22	80.11
10	60.22	66.45	74.52	77.83	62.06	68.63	35	68.15	74.90	70.85	72.45	76.35	62.74
11	71.20	73.30	68.96	58.65	69.63	61.17	36	73.22	66.99	65.90	64.18	54.23	70.31
12	77.48	66.66	60.59	60.22	69.98	60.96	37	69.01	59.10	65.30	59.90	55.46	72.88
13	67.73	75.29	71.07	64.62	60.00	62.26	38	59.85	69.47	60.17	61.13	59.69	67.07
14	71.37	67.50	70.74	57.10	65.00	70.76	39	71.10	68.91	70.10	57.04	59.55	77.45
15	65.21	68.68	69.25	54.33	73.34	66.90	40	55.36	72.59	71.53	56.68	58.65	72.88
16	68.12	60.54	52.78	62.81	65.81	61.16	41	60.93	69.13	61.80	68.07	72.88	70.51
17	58.11	67.04	59.79	75.32	65.19	70.05	42	66.56	68.44	59.62	66.53	73.97	71.12
18	76.15	65.18	57.49	66.23	65.47	65.01	43	64.38	68.58	74.32	61.06	74.71	66.69
19	51.62	68.49	64.28	69.41	67.08	61.80	44	62.44	69.89	60.98	68.74	64.98	70.49
20	66.51	70.99	71.29	78.00	64.92	70.25	45	63.86	66.11	65.35	62.58	75.95	70.08
21	69.08	70.55	75.78	66.20	71.59	67.63	46	64.99	76.42	67.48	56.23	64.65	77.44
22	69.09	70.63	72.07	61.13	73.69	58.67	47	78.71	63.20	63.00	66.57	75.41	72.38
23	63.10	66.43	75.88	55.88	78.21	73.86	48	62.62	74.48	60.36	60.45	64.97	65.18
24	59.86	62.80	76.32	57.76	76.78	67.83	49	58.20	76.20	63.18	63.08	62.52	74.28
25	68.78	64.26	72.27	61.62	72.35	69.52	50	53.51	76.99	61.09	60.69	77.33	73.88

Table C.58 Experimental data of redness for 5-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	6.29	9.07	4.71	6.55	9.40	7.27	26	6.68	9.00	8.10	8.34	9.43	6.39
2	5.95	5.65	6.91	8.73	12.46	9.54	27	8.20	10.44	8.19	8.63	9.12	6.26
3	6.12	3.59	5.07	7.28	10.68	7.42	28	10.87	6.39	6.96	11.00	10.73	7.99
4	5.09	6.44	4.98	10.05	12.71	8.81	29	5.32	9.40	9.79	8.93	5.81	10.50
5	5.13	4.78	7.88	7.99	9.36	7.92	30	3.32	9.89	7.87	8.83	8.53	6.39
6	8.26	9.29	6.36	5.77	11.18	9.68	31	2.73	3.40	4.24	4.84	11.24	8.27
7	4.10	8.83	8.71	6.22	9.72	6.80	32	5.76	3.73	2.78	7.64	7.70	9.45
8	8.24	6.87	7.96	5.31	11.60	9.71	33	5.21	5.62	2.78	9.73	11.10	8.73
9	8.09	8.22	5.76	5.35	9.33	9.43	34	5.99	2.96	4.44	4.84	8.55	9.54
10	8.76	9.60	7.15	7.44	9.47	6.45	35	8.87	2.58	9.25	8.00	13.55	10.36
11	4.92	7.73	7.33	4.69	6.43	8.64	36	8.26	4.80	3.49	6.32	11.14	10.11
12	3.96	2.59	7.50	7.41	8.20	9.66	37	4.22	5.06	3.99	8.49	7.92	8.11
13	5.50	4.33	6.50	6.45	8.04	7.97	38	7.88	5.10	9.17	8.39	10.77	10.03
14	6.95	4.25	8.29	9.55	6.74	7.85	39	4.00	5.55	3.30	7.16	11.24	8.48
15	3.11	5.96	9.48	4.90	8.54	8.73	40	2.56	3.29	3.22	5.98	12.56	7.88
16	3.34	2.95	6.49	7.15	11.34	9.23	41	6.18	4.31	10.20	5.97	10.42	11.83
17	5.71	1.85	7.90	7.63	10.17	11.53	42	4.21	3.58	7.37	7.47	8.92	7.22
18	4.00	2.97	6.71	9.50	10.30	11.86	43	4.08	8.52	10.02	5.16	10.76	8.68
19	3.54	2.14	7.22	7.04	6.23	9.02	44	5.98	6.22	7.88	7.05	10.31	11.69
20	2.59	1.83	5.55	10.95	7.69	11.47	45	4.06	3.91	7.28	7.94	6.92	8.76
21	7.51	5.85	4.45	12.02	9.47	9.40	46	5.49	1.93	6.19	9.66	9.57	7.69
22	5.32	0.78	6.05	9.58	10.73	9.15	47	4.16	2.56	7.92	7.11	8.06	7.74
23	3.25	3.43	4.69	9.88	10.46	9.82	48	5.59	3.21	5.08	4.99	7.50	6.59
24	7.24	2.84	5.25	9.19	10.70	9.44	49	2.36	1.96	7.85	6.22	7.50	8.16
25	10.76	2.15	8.25	12.19	10.08	10.53	50	4.26	2.45	10.23	4.95	8.41	5.74

Table C.58 Experimental data of redness for 5-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	1.20	6.24	7.41	2.51	2.17	7.39	26	3.75	6.10	2.96	6.79	5.99	4.83
2	1.82	7.07	3.17	3.22	3.05	8.31	27	3.73	7.51	3.56	6.70	4.84	3.14
3	1.48	6.37	5.79	4.12	5.48	12.46	28	3.79	4.22	6.27	8.06	4.02	6.89
4	0.98	4.83	2.96	3.52	3.44	7.12	29	3.63	6.40	2.80	8.00	4.10	3.43
5	2.72	3.92	3.61	6.01	3.79	7.90	30	3.25	2.28	3.61	6.13	5.28	7.56
6	0.76	7.69	4.84	1.88	4.61	4.97	31	2.72	3.87	2.57	7.07	5.38	7.81
7	1.78	6.78	4.36	4.13	6.18	4.53	32	4.15	3.54	3.35	4.03	3.85	3.34
8	2.29	3.90	6.23	7.35	8.89	4.58	33	2.60	2.93	2.21	3.45	4.19	5.28
9	3.19	4.83	6.68	3.35	5.24	2.61	34	5.38	2.01	3.98	7.04	3.74	2.39
10	1.76	4.29	3.43	1.57	7.87	4.08	35	3.44	3.23	2.31	1.05	2.36	6.11
11	2.39	2.24	4.30	7.69	4.97	6.54	36	3.84	5.02	7.05	5.80	11.42	3.24
12	2.21	3.48	2.51	5.27	3.11	9.17	37	2.41	7.57	8.35	5.99	9.95	3.68
13	1.82	2.23	3.59	4.26	6.45	6.88	38	3.39	4.14	7.03	5.28	10.31	4.40
14	4.11	2.72	4.18	6.57	2.19	5.69	39	3.24	5.92	6.55	7.42	6.35	0.83
15	5.04	2.28	5.25	8.64	4.33	6.83	40	4.20	3.30	7.00	4.58	9.44	3.65
16	0.65	3.55	8.98	4.53	6.99	4.20	41	2.14	4.51	6.91	3.08	3.47	1.54
17	1.24	3.83	3.62	1.25	6.84	5.14	42	6.20	5.69	4.27	3.72	3.66	4.71
18	0.31	2.31	7.24	4.46	5.33	7.14	43	3.90	4.79	2.95	6.85	3.95	3.89
19	1.00	3.69	6.58	2.52	7.29	5.37	44	6.85	5.75	7.42	2.10	2.64	4.16
20	0.68	4.14	4.19	0.77	7.59	1.91	45	2.90	2.46	4.65	4.84	2.97	3.96
21	3.59	4.73	3.45	5.63	3.05	4.22	46	1.39	2.35	6.67	6.73	4.94	0.49
22	3.24	3.82	1.67	5.88	1.86	6.67	47	1.14	5.98	7.19	3.23	2.32	1.59
23	1.58	6.10	2.08	8.33	1.85	2.12	48	3.03	3.82	9.13	7.53	3.46	3.30
24	2.41	3.83	3.16	8.51	1.40	5.38	49	8.04	2.61	6.71	5.00	4.92	0.83
25	3.39	3.35	1.82	7.39	2.69	3.23	50	6.59	3.76	8.02	6.47	2.47	0.88

Table C.59 Experimental data of yellowness for 5-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	34.38	35.71	27.58	33.39	32.64	33.78	26	33.23	35.66	35.47	35.25	30.92	29.83
2	34.42	34.85	36.11	34.99	34.21	30.04	27	30.15	35.26	36.12	33.22	26.90	33.32
3	36.51	30.25	32.83	33.04	35.16	32.85	28	35.01	32.51	35.04	33.66	35.25	32.96
4	34.55	36.71	28.44	35.71	34.88	33.74	29	35.54	36.12	33.64	33.19	28.26	34.00
5	36.02	33.94	34.88	36.44	33.61	32.50	30	30.12	37.08	31.28	34.15	32.74	31.91
6	34.29	32.65	33.12	32.77	34.78	34.92	31	31.96	31.68	34.38	29.77	32.68	33.74
7	30.83	37.56	34.21	35.35	34.35	35.04	32	33.01	31.50	26.27	31.81	34.13	33.50
8	31.89	35.33	32.78	31.07	31.62	33.28	33	36.00	35.40	33.05	37.46	32.51	31.71
9	32.99	35.31	33.72	32.12	30.46	36.21	34	33.07	30.98	30.80	28.30	34.95	33.51
10	35.44	35.07	32.47	36.94	34.39	35.05	35	37.23	30.44	33.27	35.13	27.66	36.41
11	30.56	37.56	33.96	29.91	29.84	31.16	36	34.52	30.49	32.36	29.36	34.99	34.45
12	33.69	29.50	33.76	33.64	32.36	30.08	37	31.45	30.40	30.22	31.56	34.07	33.50
13	34.21	33.53	34.79	31.45	30.71	34.89	38	35.82	32.33	31.09	31.10	37.79	36.54
14	33.77	31.91	32.51	32.88	30.67	31.18	39	28.99	32.07	32.20	33.72	30.36	34.91
15	30.97	37.09	34.83	31.00	31.76	32.74	40	28.56	25.08	28.39	33.85	33.07	32.72
16	33.26	33.15	31.95	32.55	34.36	30.23	41	31.84	30.05	31.67	33.79	30.82	31.86
17	33.70	27.62	35.60	32.16	35.39	29.06	42	30.27	31.10	35.07	33.61	30.72	36.00
18	30.47	31.51	32.30	33.49	36.12	30.72	43	28.07	33.16	32.56	32.56	35.74	29.68
19	28.95	33.17	33.19	32.33	29.48	31.36	44	34.63	32.12	32.40	33.30	34.92	33.25
20	31.30	30.18	29.09	30.98	34.61	35.03	45	31.72	28.10	34.64	35.61	30.87	35.98
21	33.33	31.26	31.32	33.87	36.16	32.17	46	34.06	28.63	32.70	29.52	32.88	32.42
22	33.37	19.59	32.30	35.41	34.56	30.35	47	33.03	29.01	30.38	31.80	34.82	29.87
23	32.29	36.51	31.49	32.53	32.33	31.43	48	32.24	26.59	34.87	30.54	33.24	28.98
24	29.45	31.98	32.37	33.50	36.49	29.46	49	31.58	30.85	31.79	30.49	31.16	32.07
25	33.95	33.12	32.14	33.89	33.77	34.01	50	31.05	29.29	30.26	31.89	35.29	32.37

Table C.59 Experimental data of yellowness for 5-mm banana chips with moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	28.39	35.73	32.18	27.43	29.86	30.17	26	30.44	33.49	30.65	28.53	31.95	35.31
2	22.24	29.24	32.55	28.48	30.97	30.18	27	32.64	38.80	30.41	32.61	31.72	31.51
3	27.22	31.91	27.27	28.07	34.52	32.16	28	30.71	33.77	29.42	34.38	29.62	34.09
4	26.01	33.40	31.45	28.88	31.52	30.80	29	30.52	31.39	29.92	32.00	32.60	28.67
5	28.11	30.85	32.47	31.36	29.95	33.67	30	33.00	23.05	27.28	32.85	32.18	36.90
6	28.62	30.63	31.29	30.16	31.30	33.53	31	28.67	33.18	26.13	35.95	27.91	33.50
7	29.31	37.15	30.15	31.61	34.82	34.25	32	33.00	30.36	32.26	30.98	30.40	29.06
8	28.97	27.65	33.24	34.60	37.10	30.39	33	24.76	29.83	27.15	31.10	30.94	32.38
9	32.50	36.50	29.98	31.55	32.28	26.37	34	34.58	28.61	30.23	35.71	29.01	31.05
10	26.53	29.71	29.12	29.09	35.87	33.52	35	32.25	33.60	29.17	29.44	31.14	34.21
11	30.13	31.61	27.48	32.50	33.25	30.81	36	33.38	32.08	34.48	32.19	32.40	29.32
12	33.04	30.96	26.08	30.11	30.51	37.81	37	31.74	32.26	35.33	30.92	31.56	30.37
13	28.81	30.04	27.53	31.54	32.40	32.39	38	27.87	30.93	32.68	33.18	36.19	33.13
14	31.91	29.24	31.62	30.08	27.53	36.78	39	31.49	34.42	35.80	33.95	30.34	25.59
15	33.00	27.76	30.87	31.87	34.25	34.56	40	29.37	33.45	37.61	25.93	33.10	30.07
16	25.85	31.14	31.09	32.16	35.20	29.89	41	25.64	32.54	35.43	30.75	30.77	24.90
17	24.58	31.44	26.20	26.55	33.32	32.98	42	33.33	35.66	30.28	31.40	31.00	36.59
18	26.27	28.16	27.87	30.12	32.77	34.00	43	31.51	33.33	32.32	34.85	31.95	30.36
19	23.14	33.23	31.61	32.00	35.51	31.34	44	33.56	35.77	35.44	26.05	28.46	30.17
20	25.49	33.46	31.71	26.48	33.77	28.42	45	28.43	26.44	32.19	32.21	29.57	35.63
21	31.17	34.36	29.92	34.75	31.72	32.51	46	26.24	29.79	35.32	32.55	28.61	21.62
22	30.36	32.82	23.70	31.93	27.82	31.12	47	28.41	32.50	33.51	30.14	27.44	28.29
23	27.45	33.85	26.24	31.96	27.82	26.63	48	28.22	32.46	35.18	34.78	26.74	24.33
24	26.20	31.14	29.74	32.60	26.73	33.81	49	33.03	31.42	34.91	31.73	28.88	21.41
25	30.77	30.21	25.22	34.25	30.99	31.20	50	31.29	31.71	33.49	34.78	28.32	26.07

Table C.60 Experimental data of lightness for 5-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	72.64	73.76	69.34	73.49	58.11	67.19	26	68.66	70.93	72.41	69.47	74.18	70.88
2	71.65	64.53	56.27	70.56	74.70	77.02	27	67.00	71.65	76.57	68.53	73.24	67.49
3	70.94	63.24	77.59	70.87	66.07	73.19	28	71.26	66.44	79.00	70.92	69.59	70.15
4	70.03	69.31	59.72	69.75	61.80	66.05	29	73.07	62.72	72.89	68.44	71.92	68.55
5	66.71	61.68	71.00	76.83	70.15	77.05	30	72.23	71.32	77.28	71.16	66.74	65.77
6	54.35	71.61	71.70	79.34	74.83	71.48	31	62.51	66.78	72.44	71.87	72.98	75.17
7	74.77	74.05	71.02	77.20	74.61	71.34	32	74.97	68.83	78.05	75.04	71.98	73.31
8	67.95	72.21	68.27	77.42	72.75	71.34	33	70.81	68.20	72.72	77.35	71.44	74.00
9	71.63	71.46	74.29	84.10	72.98	75.96	34	59.81	65.12	67.35	70.98	75.96	75.27
10	73.38	71.79	76.68	74.98	77.31	74.97	35	73.62	68.10	72.99	73.35	71.12	75.09
11	74.12	71.70	74.97	71.44	64.34	64.59	36	77.07	71.74	63.27	74.99	72.81	67.20
12	79.62	73.95	70.36	78.18	72.95	75.11	37	73.74	76.58	68.95	77.34	77.31	61.87
13	77.86	72.95	71.56	67.69	59.50	79.98	38	67.91	74.24	71.26	75.17	75.00	60.55
14	79.12	63.70	74.27	72.97	67.14	74.75	39	76.38	73.58	63.65	76.08	74.12	60.97
15	75.10	71.18	74.59	78.18	69.09	70.07	40	74.09	73.25	67.59	77.53	75.09	71.44
16	76.97	71.80	76.55	70.48	65.68	71.63	41	69.44	72.70	64.34	67.20	67.66	69.01
17	77.79	72.76	72.25	66.57	63.97	68.22	42	71.60	72.53	64.39	77.95	70.75	54.48
18	74.25	72.07	74.77	71.15	70.44	65.75	43	74.00	70.89	72.77	68.84	71.15	59.03
19	73.94	73.37	76.60	70.37	64.33	71.16	44	73.23	72.40	48.50	74.46	72.92	62.04
20	72.24	67.80	70.64	65.07	63.44	72.69	45	76.13	75.13	76.51	73.75	69.17	72.78
21	70.46	70.92	67.05	69.73	67.63	69.46	46	63.52	77.54	70.77	63.21	71.89	69.12
22	77.60	65.99	74.13	72.37	67.28	72.27	47	74.97	75.03	68.15	66.91	70.71	70.79
23	77.79	76.67	74.25	75.57	68.08	68.32	48	80.04	76.47	71.89	70.24	74.95	67.44
24	70.32	71.82	71.85	73.63	69.35	70.51	49	74.04	71.25	70.61	64.25	70.39	68.50
25	54.26	75.09	73.25	67.36	68.00	67.97	50	73.26	79.47	68.94	69.82	72.52	71.04

Table C.60 Experimental data of lightness for 5-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	66.05	62.25	55.26	59.46	66.31	49.99	26	69.78	56.55	65.96	62.16	57.86	52.79
2	65.27	63.54	55.04	47.65	62.69	59.50	27	68.64	57.10	66.81	60.83	55.71	53.59
3	67.15	66.73	59.10	60.90	46.19	68.43	28	64.96	61.63	54.27	55.27	54.75	52.58
4	64.79	67.53	58.85	70.60	62.00	49.99	29	64.20	61.77	69.97	63.04	55.47	67.09
5	72.30	68.27	58.18	49.89	65.60	52.87	30	71.23	56.80	65.71	57.94	58.54	53.37
6	61.77	65.14	65.15	67.28	50.09	63.31	31	63.25	58.40	61.54	51.29	47.04	55.41
7	69.02	68.61	64.98	63.74	51.40	58.64	32	68.14	64.27	64.89	55.62	67.70	59.50
8	70.95	65.80	67.15	54.60	55.66	65.68	33	70.62	56.15	55.75	51.45	66.50	60.31
9	73.24	67.01	54.23	59.04	52.10	59.80	34	61.92	60.96	65.19	55.37	59.88	52.24
10	68.77	61.42	62.11	67.74	54.17	64.00	35	70.14	60.91	62.56	61.90	51.24	63.39
11	62.91	62.13	64.58	56.11	56.18	65.58	36	68.11	58.10	65.45	53.04	58.45	61.72
12	69.31	52.77	69.76	54.14	52.98	61.93	37	70.56	49.15	61.45	51.32	60.67	59.99
13	60.70	61.95	59.70	52.13	59.19	63.58	38	63.85	56.42	61.47	54.09	46.45	62.82
14	67.89	61.88	70.89	59.79	60.28	55.97	39	67.83	49.44	62.60	55.10	61.11	66.15
15	63.47	53.86	62.12	56.05	65.78	54.77	40	70.45	62.68	53.89	53.99	58.32	61.92
16	60.71	66.78	65.48	65.56	54.09	49.87	41	50.45	54.20	61.44	52.21	50.85	48.33
17	67.09	69.04	59.54	69.78	53.80	62.50	42	65.18	62.58	61.46	56.10	58.51	45.20
18	64.19	56.21	59.49	69.40	73.44	59.17	43	66.90	63.15	63.89	58.10	61.89	59.82
19	53.38	69.52	68.66	67.19	58.33	55.04	44	63.56	63.72	48.98	52.16	53.74	53.12
20	66.49	66.43	67.26	65.94	53.54	56.66	45	58.07	65.87	57.04	59.86	60.33	52.16
21	60.41	57.09	60.56	66.47	53.71	51.11	46	66.68	63.59	65.56	55.31	61.00	65.27
22	65.30	64.61	67.94	61.39	58.49	57.81	47	61.90	63.48	57.42	61.77	52.61	59.55
23	56.20	55.04	51.56	49.20	63.15	59.70	48	61.87	56.84	56.83	62.92	61.68	56.47
24	75.07	63.37	68.30	63.79	52.14	51.28	49	54.62	65.93	64.05	62.46	49.93	67.31
25	67.52	63.83	65.05	63.85	60.83	60.24	50	71.85	65.34	58.71	65.45	56.17	59.29

Table C.61 Experimental data of redness for 5-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	2.89	1.54	2.64	2.61	2.38	4.56	26	3.12	2.79	2.24	2.13	2.78	5.34
2	2.85	3.85	2.09	3.27	2.92	3.06	27	1.14	1.30	1.69	1.46	3.57	5.76
3	2.29	1.71	1.49	3.69	5.22	2.64	28	1.63	1.75	1.90	1.26	4.43	5.50
4	2.85	1.97	2.02	1.39	2.46	4.73	29	2.15	1.70	1.98	1.39	2.79	4.55
5	4.16	1.70	2.90	4.39	4.07	3.01	30	1.91	1.30	1.83	1.45	2.25	6.42
6	5.48	2.76	1.51	3.75	1.18	2.17	31	3.01	3.13	3.06	1.59	2.45	2.03
7	1.34	2.48	1.51	3.59	1.34	2.13	32	2.22	4.61	2.13	0.94	3.62	3.30
8	1.81	2.23	1.25	2.23	2.08	4.47	33	2.36	3.56	2.47	0.20	2.86	2.09
9	1.16	2.17	1.84	1.34	1.23	2.20	34	2.30	4.74	2.08	0.92	2.16	2.06
10	1.15	2.89	2.43	1.23	2.51	1.73	35	2.40	4.22	2.55	1.78	4.29	2.81
11	2.41	1.42	3.23	2.94	3.59	7.76	36	3.60	2.74	4.77	1.85	2.79	4.86
12	2.18	1.74	1.40	1.77	2.07	2.42	37	2.46	1.12	3.39	1.26	1.84	6.34
13	2.43	2.26	2.98	3.39	1.76	2.22	38	2.83	1.84	2.63	0.68	1.71	5.67
14	2.08	1.18	3.00	3.67	2.99	1.73	39	3.77	1.35	4.63	1.44	2.40	6.71
15	2.75	0.82	1.52	2.63	2.87	5.64	40	0.75	1.63	2.70	2.74	2.09	4.12
16	1.67	3.06	1.53	2.13	5.85	1.08	41	1.20	1.94	6.37	2.48	4.52	2.70
17	1.86	3.33	1.60	5.71	6.97	2.04	42	5.18	2.62	3.72	0.71	2.63	6.77
18	2.18	3.83	1.71	1.58	4.07	3.58	43	2.16	4.20	1.98	2.13	4.15	5.31
19	1.91	3.26	1.58	1.57	3.47	1.01	44	2.73	2.08	1.43	0.72	2.56	4.74
20	1.77	2.08	1.94	3.57	6.73	1.50	45	1.32	2.32	2.79	1.51	3.51	2.07
21	1.50	3.05	4.85	3.22	3.65	3.47	46	3.71	1.06	2.23	2.91	3.32	2.14
22	1.08	4.02	2.82	4.09	3.43	3.27	47	2.15	1.82	2.18	1.90	2.31	1.43
23	0.73	0.80	1.61	1.54	2.48	3.95	48	1.65	0.81	2.84	1.70	3.09	2.36
24	0.98	2.26	4.10	2.54	3.54	4.43	49	1.14	1.11	2.76	3.23	3.60	2.49
25	1.09	0.78	2.19	2.29	4.59	3.26	50	1.33	1.13	1.32	1.69	2.38	2.53

Table C.61 Experimental data of redness for 5-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	2.32	3.81	10.33	8.61	6.58	9.74	26	2.49	9.62	4.19	7.82	6.69	6.52
2	3.17	6.24	8.81	11.88	5.63	3.87	27	2.96	10.13	4.25	9.15	8.36	7.47
3	2.48	4.31	6.34	7.11	10.55	5.81	28	3.25	10.33	5.63	11.43	7.55	6.82
4	1.99	4.74	8.29	6.69	5.54	8.21	29	3.09	9.10	3.79	7.61	7.08	4.27
5	3.19	4.81	10.03	10.69	6.04	7.04	30	2.61	9.41	4.24	8.80	8.46	5.83
6	6.89	5.51	7.57	5.73	9.83	6.81	31	1.69	7.14	7.04	8.38	9.80	5.49
7	4.00	5.60	7.36	7.87	7.05	6.55	32	3.85	6.92	4.45	8.96	7.13	5.74
8	5.50	2.79	5.97	10.59	8.74	5.10	33	3.69	9.11	9.37	9.10	6.77	7.14
9	3.38	3.72	5.40	7.05	10.00	7.96	34	2.90	6.72	5.17	6.91	8.15	7.72
10	3.69	7.65	5.29	6.63	7.01	5.65	35	2.96	9.32	4.55	8.77	10.07	6.37
11	4.91	7.24	7.68	12.59	9.71	6.49	36	2.89	8.40	6.35	11.19	8.72	6.41
12	2.85	8.22	3.81	13.37	12.35	7.73	37	3.59	10.54	5.35	10.18	7.52	6.02
13	2.46	6.19	6.53	12.63	9.57	6.05	38	4.88	7.69	7.88	8.64	13.27	6.48
14	2.07	6.75	3.93	11.41	11.12	8.39	39	3.88	9.42	5.96	10.55	7.50	5.31
15	5.10	3.74	6.61	9.21	8.67	5.78	40	3.04	3.11	10.91	10.60	8.22	6.66
16	6.64	4.28	5.52	6.27	7.60	10.28	41	0.11	9.05	7.65	9.02	10.84	9.46
17	6.88	3.11	5.84	4.14	7.23	6.05	42	2.07	2.96	8.57	7.84	9.72	8.06
18	6.24	7.03	7.33	4.63	3.54	8.04	43	4.12	6.33	8.12	8.13	9.36	7.08
19	4.57	3.69	5.74	5.93	6.20	8.55	44	0.37	6.42	12.30	7.82	10.24	8.30
20	3.09	4.58	5.79	4.42	8.24	9.22	45	1.22	2.86	8.46	6.25	9.58	7.09
21	6.98	6.82	6.38	8.01	9.09	6.98	46	3.45	6.71	5.09	10.55	7.35	6.47
22	3.99	3.72	6.85	6.86	7.17	7.70	47	2.05	7.38	6.73	8.64	7.85	7.65
23	5.10	6.09	7.04	10.46	7.81	8.23	48	3.06	9.25	7.45	9.88	6.98	8.73
24	3.60	5.04	6.17	8.78	7.89	6.48	49	2.75	6.45	5.13	8.74	8.78	5.79
25	4.65	4.73	6.59	6.64	6.67	7.12	50	2.51	5.62	6.75	8.05	8.73	7.53

Table C.62 Experimental data of yellowness for 5-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	31.01	22.37	27.62	26.09	24.27	27.28	26	29.71	24.46	30.63	21.82	28.42	29.88
2	28.20	32.11	23.66	26.25	28.43	28.18	27	22.95	21.06	27.73	22.02	29.29	27.63
3	28.71	24.67	22.67	25.10	29.10	22.88	28	25.67	23.41	28.83	20.95	30.37	30.08
4	30.33	22.59	24.60	20.59	25.43	27.29	29	28.38	22.85	29.31	19.78	28.79	26.63
5	29.10	24.61	27.61	30.92	29.34	28.13	30	26.29	21.19	27.95	22.78	25.33	32.42
6	30.14	25.23	24.78	31.63	20.93	21.72	31	29.56	28.51	28.86	25.80	26.26	23.81
7	25.70	26.83	24.85	29.54	22.07	22.88	32	24.60	29.94	29.50	22.34	28.09	28.31
8	25.28	26.85	22.19	27.88	24.75	27.37	33	30.01	29.31	29.56	18.13	27.14	22.68
9	25.92	24.63	25.97	24.07	20.82	22.74	34	26.49	27.97	26.72	23.22	26.19	23.99
10	23.67	27.85	28.07	23.25	25.73	22.85	35	24.86	30.12	28.39	26.03	29.10	27.32
11	29.67	23.43	30.80	31.28	26.50	33.02	36	33.27	26.75	26.56	23.38	26.01	27.75
12	32.34	27.55	23.66	28.74	23.46	25.65	37	31.48	25.57	27.04	25.36	24.51	29.79
13	31.83	29.43	28.25	31.51	20.93	27.06	38	30.59	23.54	27.72	19.20	23.24	27.13
14	31.86	22.14	30.05	33.74	26.35	23.44	39	33.22	25.51	25.64	26.39	25.34	29.91
15	30.28	19.46	24.66	30.06	25.06	33.10	40	26.47	23.18	25.48	26.83	25.37	27.23
16	27.23	28.36	25.67	26.76	29.59	18.68	41	26.24	26.98	33.33	24.40	27.01	22.23
17	28.79	30.42	24.11	33.72	29.65	19.87	42	35.78	28.48	25.89	22.23	24.82	29.38
18	31.79	28.89	25.54	22.35	26.32	23.11	43	29.89	30.32	24.67	23.55	27.20	27.07
19	28.27	30.39	25.68	23.57	25.97	18.58	44	31.44	27.84	16.65	20.88	24.08	28.14
20	26.20	24.91	24.46	28.05	29.25	19.30	45	28.31	28.14	25.79	24.34	26.42	21.89
21	24.10	27.96	32.04	29.12	26.94	26.47	46	30.43	24.26	25.15	27.16	26.51	24.76
22	26.77	25.06	31.59	31.64	26.57	27.07	47	26.58	24.36	25.53	25.68	25.03	21.69
23	24.62	24.34	27.51	27.28	22.60	27.00	48	29.33	20.12	26.46	21.19	26.44	26.33
24	23.03	25.93	32.85	28.32	26.87	27.99	49	28.34	22.44	29.07	28.23	28.11	24.46
25	19.48	23.34	29.03	27.38	30.57	25.71	50	27.48	23.96	24.15	25.32	25.26	24.03

Table C.62 Experimental data of yellowness for 5-mm banana chips without moisture absorber during storage at 40 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	33.39	30.35	35.90	33.00	33.91	33.58	26	33.16	33.41	29.66	35.39	31.47	30.32
2	33.19	32.92	33.24	31.43	31.70	27.89	27	34.66	35.33	30.26	35.09	33.58	31.24
3	33.38	31.04	32.26	31.35	30.26	33.98	28	33.67	38.51	28.85	35.09	30.65	28.85
4	31.48	34.27	34.00	35.90	31.27	32.08	29	32.59	35.56	31.76	36.00	30.78	31.56
5	35.60	33.97	37.41	33.30	33.22	28.32	30	34.00	35.00	32.91	33.90	35.97	30.45
6	33.43	33.99	34.71	32.69	30.35	34.55	31	31.00	39.20	35.33	27.32	27.96	26.27
7	33.89	36.32	35.57	33.57	28.29	30.29	32	35.35	37.96	31.71	33.12	36.67	29.89
8	38.60	33.64	34.06	31.90	34.83	30.80	33	36.67	38.17	34.34	30.51	33.94	33.21
9	34.76	31.95	31.05	32.30	33.03	33.62	34	32.83	33.59	33.59	27.13	33.28	29.52
10	33.32	35.59	33.30	33.73	29.19	31.61	35	34.80	36.83	30.50	36.27	30.67	32.02
11	35.20	35.06	36.77	36.57	35.39	36.41	36	33.76	35.77	34.62	31.83	35.07	34.00
12	31.10	33.37	31.05	35.66	37.45	34.59	37	36.26	30.94	30.01	31.72	34.45	31.54
13	28.90	34.22	31.37	33.04	37.68	34.80	38	36.18	32.07	34.67	32.19	33.95	32.10
14	31.78	34.55	31.88	38.20	41.25	32.96	39	35.83	32.80	31.62	32.25	34.67	34.66
15	36.34	28.28	34.89	34.48	38.89	29.91	40	34.83	28.86	34.19	32.41	34.49	33.59
16	34.89	32.66	32.97	31.21	32.69	29.09	41	20.32	34.89	35.90	31.26	31.97	29.51
17	38.52	32.42	32.87	31.19	30.60	31.69	42	30.38	29.21	37.42	30.87	35.37	27.16
18	35.65	31.01	35.82	32.42	31.90	32.06	43	38.82	34.88	37.55	33.46	36.15	33.37
19	31.33	32.99	35.52	31.71	32.05	29.46	44	24.52	35.07	32.17	29.39	33.82	31.30
20	33.41	33.00	36.53	30.43	33.62	32.50	45	27.03	31.89	36.48	32.37	36.12	29.15
21	37.29	33.82	34.27	35.66	33.46	27.98	46	34.51	31.59	33.13	31.83	35.00	32.98
22	34.41	31.06	36.00	32.67	29.66	33.34	47	30.19	33.83	33.03	32.91	31.38	32.52
23	28.46	32.35	31.40	30.86	35.04	33.95	48	32.61	36.02	35.12	35.33	34.47	30.89
24	36.65	34.59	34.88	35.06	26.68	27.56	49	28.41	32.58	32.90	33.35	29.81	33.32
25	36.31	32.95	36.43	33.23	31.60	33.92	50	34.87	32.58	33.89	34.89	35.06	31.96

Table C.63 Experimental data of lightness for 5-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	67.81	57.09	65.13	59.40	55.56	44.49	26	64.31	52.06	49.77	58.26	59.51	45.11
2	63.53	54.32	57.22	44.48	49.24	53.68	27	55.61	57.52	52.97	53.40	54.27	49.79
3	69.17	64.65	66.05	56.30	47.54	43.54	28	54.27	52.74	66.74	62.02	43.58	40.84
4	64.52	57.02	60.00	38.38	56.91	39.68	29	67.24	59.61	57.29	57.69	57.39	39.18
5	71.83	58.90	56.99	46.14	46.64	51.59	30	73.76	61.78	52.81	53.41	57.60	46.90
6	58.84	58.96	63.95	40.06	54.51	43.56	31	77.54	53.54	61.81	48.58	45.10	40.89
7	71.59	57.92	58.60	51.97	43.61	39.89	32	65.44	64.40	54.09	57.31	39.58	48.22
8	61.25	52.53	48.20	46.45	52.22	44.84	33	68.82	55.44	62.10	52.81	47.15	46.99
9	64.27	56.18	57.96	48.94	57.85	44.73	34	62.00	48.10	57.88	46.70	46.68	45.01
10	60.06	61.55	66.03	54.12	45.36	48.70	35	67.00	56.92	54.29	51.30	43.62	43.00
11	61.78	62.23	53.51	59.20	54.93	49.83	36	57.32	55.80	61.46	48.86	50.65	49.68
12	69.12	59.22	61.33	52.16	44.02	43.16	37	64.84	59.45	58.29	50.13	43.73	47.92
13	70.93	59.08	53.06	62.61	51.14	44.06	38	63.23	47.45	53.67	52.85	53.95	38.36
14	57.59	67.18	58.69	50.56	51.73	51.12	39	64.98	53.20	54.23	48.11	59.34	56.46
15	63.90	65.85	59.09	58.01	50.56	49.11	40	64.30	59.63	58.33	60.82	48.77	47.10
16	74.47	53.19	48.59	55.37	52.91	39.34	41	63.60	61.91	50.51	56.53	41.55	43.50
17	62.40	53.96	54.81	45.82	42.01	55.19	42	67.27	59.30	49.78	50.86	45.53	48.17
18	65.21	55.73	54.79	53.64	49.16	45.30	43	60.36	69.04	55.61	48.78	45.05	50.85
19	68.53	56.95	54.81	51.72	48.93	46.78	44	69.61	61.65	60.86	52.18	39.05	38.04
20	75.21	60.14	53.05	51.08	45.49	50.19	45	65.78	61.58	57.84	58.55	47.19	43.93
21	61.51	56.61	54.82	41.34	51.40	47.87	46	69.05	63.23	64.31	56.70	47.06	52.53
22	69.17	66.54	45.35	49.36	47.97	42.01	47	69.25	60.84	50.08	55.95	49.75	52.34
23	67.42	57.06	60.94	40.66	46.86	46.95	48	64.37	65.44	55.97	57.84	50.78	51.57
24	54.43	59.79	47.12	45.96	45.65	55.10	49	76.07	50.26	66.08	43.04	48.86	50.15
25	50.49	54.52	54.76	47.03	51.60	50.86	50	69.03	48.72	58.75	60.71	52.25	56.40

Table C.63 Experimental data of lightness for 5-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	76.85	59.94	62.25	60.98	57.08	35.89	26	60.69	71.89	55.98	55.57	62.93	50.97
2	49.22	72.94	55.97	61.24	57.18	43.22	27	66.75	57.47	73.41	61.36	48.89	44.74
3	62.64	68.19	71.01	57.59	57.65	42.19	28	58.39	61.23	72.84	58.82	56.33	49.65
4	70.16	72.68	65.60	62.65	50.22	35.93	29	61.36	62.79	69.07	56.04	61.14	49.00
5	61.38	72.68	61.62	65.30	55.32	48.58	30	71.15	75.42	68.66	59.11	60.34	59.91
6	76.08	64.51	69.85	56.54	60.91	61.53	31	58.94	66.57	60.16	58.53	55.13	53.62
7	67.58	69.80	67.79	62.09	56.75	51.42	32	64.15	75.81	65.76	60.42	45.45	46.14
8	75.22	74.35	67.84	58.29	56.67	51.06	33	48.32	63.59	56.19	48.08	52.27	54.23
9	70.00	67.60	71.77	61.18	60.53	56.68	34	65.46	70.55	65.00	54.73	52.51	49.27
10	60.22	65.96	57.28	60.78	59.78	51.60	35	68.15	71.14	61.43	57.65	52.57	63.27
11	71.20	69.36	65.75	60.86	63.81	49.96	36	73.22	69.66	65.32	43.48	56.27	47.87
12	77.48	68.09	66.91	51.81	59.69	53.17	37	69.01	60.99	61.92	54.18	55.94	49.35
13	67.73	66.07	62.51	51.70	58.95	46.13	38	59.85	74.19	59.80	44.31	44.66	47.41
14	71.37	72.03	65.18	66.18	59.23	56.09	39	71.10	60.07	72.15	52.85	53.62	51.68
15	65.21	68.37	69.18	71.31	65.40	58.30	40	55.36	69.96	73.91	62.37	47.78	48.89
16	68.12	63.48	69.03	54.12	63.25	67.11	41	60.93	59.91	48.15	56.23	45.10	62.57
17	58.11	69.98	63.15	51.53	61.75	47.08	42	66.56	69.88	57.44	65.59	51.90	45.47
18	76.15	71.22	64.27	61.78	51.40	55.99	43	64.38	67.61	57.17	61.88	47.08	47.61
19	51.62	72.50	60.97	50.89	62.01	54.69	44	62.44	64.20	59.25	70.68	47.21	60.91
20	66.51	57.01	62.17	56.48	64.56	53.67	45	63.86	62.63	59.29	63.93	70.39	49.59
21	69.08	75.40	53.98	67.06	64.22	61.11	46	64.99	68.20	58.50	51.81	60.51	43.29
22	69.09	74.21	57.84	56.15	61.35	53.79	47	78.71	67.10	60.84	55.12	50.96	55.52
23	63.10	60.51	64.72	50.52	65.35	51.85	48	62.62	66.34	58.68	52.10	55.83	40.69
24	59.86	69.95	59.57	53.92	60.71	42.94	49	58.20	63.94	49.54	56.82	60.76	47.21
25	68.78	73.42	60.40	58.59	63.02	61.82	50	53.51	59.45	67.24	65.07	62.10	60.89

Table C.64 Experimental data of redness for 5-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	6.29	11.44	9.38	9.22	12.89	14.34	26	6.68	9.41	11.82	33.18	12.13	16.17
2	5.95	9.36	10.10	12.81	12.76	12.51	27	8.20	4.62	12.05	35.58	14.38	13.35
3	6.12	8.74	10.19	11.60	14.21	13.29	28	10.87	8.87	9.35	39.85	15.76	14.96
4	5.09	10.17	9.27	13.84	12.37	13.27	29	5.32	8.50	12.04	33.27	12.98	14.23
5	5.13	10.43	11.04	13.25	13.74	15.06	30	3.32	7.24	13.34	34.63	13.05	14.86
6	8.26	9.38	8.82	13.83	12.78	13.45	31	2.73	7.86	10.42	34.79	11.10	14.68
7	4.10	8.16	9.20	9.13	16.50	12.63	32	5.76	8.07	10.79	37.24	14.24	13.70
8	8.24	8.71	11.32	13.59	15.42	13.83	33	5.21	8.58	9.37	32.85	10.77	13.56
9	8.09	11.07	11.20	13.59	12.24	12.92	34	5.99	5.77	11.16	32.10	15.83	13.09
10	8.76	9.04	8.34	11.02	16.14	15.08	35	8.87	9.01	11.52	37.72	14.61	15.21
11	4.92	8.40	10.91	9.45	14.10	14.24	36	8.26	10.56	9.71	33.99	12.63	11.35
12	3.96	6.13	9.33	9.11	14.72	15.00	37	4.22	9.39	9.40	34.92	13.65	13.93
13	5.50	10.62	12.82	9.49	12.14	14.07	38	7.88	9.06	12.02	35.84	14.70	12.72
14	6.95	6.06	11.46	10.00	14.01	12.38	39	4.00	10.71	10.20	33.47	13.06	11.20
15	3.11	8.03	6.57	10.16	15.53	14.53	40	2.56	9.21	9.09	37.64	15.26	14.30
16	3.34	8.63	14.14	12.38	13.83	13.87	41	6.18	6.30	8.41	36.57	15.72	13.69
17	5.71	9.93	13.44	13.25	15.78	12.51	42	4.21	6.67	12.56	35.91	15.88	14.60
18	4.00	11.57	11.98	12.47	13.87	15.12	43	4.08	5.33	11.11	32.83	15.33	15.61
19	3.54	8.09	12.82	13.01	14.65	13.85	44	5.98	7.23	9.03	37.35	15.51	14.27
20	2.59	9.68	13.00	13.40	15.83	13.56	45	4.06	8.40	9.65	37.69	16.32	14.12
21	7.51	8.14	11.25	13.63	14.01	13.03	46	5.49	9.72	7.00	36.39	13.31	9.99
22	5.32	6.84	12.10	9.33	16.02	14.34	47	4.16	6.76	12.21	34.66	14.51	11.92
23	3.25	10.49	10.93	13.26	14.84	14.61	48	5.59	5.69	10.50	36.06	14.80	11.25
24	7.24	8.98	13.72	13.68	13.84	12.74	49	2.36	6.64	6.95	29.54	13.22	11.57
25	10.76	8.70	10.26	12.66	15.68	12.48	50	4.26	7.57	11.89	35.72	16.12	11.04

Table C.64 Experimental data of redness for 5-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	1.20	7.62	7.35	8.76	13.12	12.28	26	3.75	2.85	8.10	9.94	10.77	12.47
2	1.82	4.46	8.20	8.49	10.47	15.05	27	3.73	1.34	2.83	8.03	13.36	13.70
3	1.48	3.94	2.81	10.86	12.87	11.20	28	3.79	5.62	2.96	7.27	12.53	12.25
4	0.98	5.44	5.77	8.28	16.31	12.11	29	3.63	3.09	4.16	6.52	11.62	13.49
5	2.72	4.12	7.77	7.28	11.30	13.48	30	3.25	3.45	3.18	6.90	10.97	11.15
6	0.76	4.62	6.22	9.41	9.50	9.33	31	2.72	3.10	5.22	10.06	12.29	9.89
7	1.78	4.14	7.47	9.24	7.08	11.65	32	4.15	2.16	5.12	9.45	14.20	10.67
8	2.29	2.82	5.46	7.97	8.81	11.88	33	2.60	4.12	8.55	12.73	12.96	10.89
9	3.19	4.06	5.86	9.77	7.77	11.57	34	5.38	2.29	7.10	11.16	13.20	11.89
10	1.76	4.94	7.39	6.11	7.45	11.52	35	3.44	3.86	3.96	9.71	12.76	7.08
11	2.39	5.63	6.38	6.63	6.03	10.75	36	3.84	6.22	7.43	12.84	9.37	12.01
12	2.21	5.71	4.77	10.72	7.96	10.22	37	2.41	5.08	5.76	10.85	8.11	13.14
13	1.82	6.92	7.24	7.89	5.61	12.59	38	3.39	5.09	5.04	13.33	14.20	13.16
14	4.11	5.51	4.88	5.29	8.27	11.10	39	3.24	4.64	5.38	9.71	6.37	10.53
15	5.04	5.78	3.79	4.87	5.05	9.54	40	4.20	5.92	2.66	11.66	13.14	12.98
16	0.65	5.78	6.26	10.83	9.00	7.17	41	2.14	5.47	11.82	7.26	11.26	8.41
17	1.24	4.33	5.81	9.52	10.40	12.18	42	6.20	5.80	7.11	6.38	9.15	12.78
18	0.31	3.90	7.69	5.80	11.31	8.93	43	3.90	4.95	7.75	9.49	12.27	11.67
19	1.00	3.35	4.76	9.11	9.43	8.65	44	6.85	5.70	6.62	6.38	10.89	8.51
20	0.68	5.56	5.09	10.17	8.86	11.84	45	2.90	4.98	7.54	6.43	7.82	11.42
21	3.59	2.60	4.02	6.57	8.47	10.30	46	1.39	4.70	6.35	5.28	6.94	12.65
22	3.24	3.49	9.74	8.98	8.82	12.47	47	1.14	4.26	9.74	10.40	12.15	10.53
23	1.58	6.59	4.25	11.04	7.26	12.31	48	3.03	6.50	9.51	6.94	8.48	12.60
24	2.41	3.66	5.85	8.78	9.80	12.32	49	8.04	6.08	11.45	5.56	4.75	12.50
25	3.39	3.46	7.93	9.46	8.91	10.08	50	6.59	4.80	6.91	9.58	9.72	9.44

Table C.65 Experimental data of yellowness for 5-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	34.38	35.23	38.35	33.69	35.87	30.75	26	33.23	31.90	33.40	33.18	37.38	32.55
2	34.42	32.80	36.62	29.85	33.18	35.09	27	30.15	29.76	35.72	35.58	36.30	35.95
3	36.51	36.79	39.13	36.01	33.10	27.46	28	35.01	32.07	37.22	39.85	30.28	28.17
4	34.55	34.67	35.18	23.66	36.25	29.58	29	35.54	35.39	36.20	33.27	37.53	32.92
5	36.02	35.38	35.84	31.83	32.84	35.83	30	30.12	34.24	36.96	34.63	35.74	33.65
6	34.29	36.86	34.18	27.16	35.27	30.18	31	31.96	31.08	36.99	34.79	28.72	28.51
7	30.83	34.27	34.96	31.10	28.27	26.30	32	33.01	33.43	32.05	37.24	25.86	31.36
8	31.89	31.84	31.37	30.81	34.75	32.48	33	36.00	32.09	34.74	32.85	29.64	30.32
9	32.99	35.64	36.55	32.07	36.76	30.09	34	33.07	26.99	35.52	32.10	30.18	28.22
10	35.44	38.69	34.67	32.16	29.88	36.54	35	37.23	34.22	32.93	37.72	29.79	30.64
11	30.56	34.06	34.17	36.09	38.65	35.12	36	34.52	34.66	37.18	33.99	28.37	30.47
12	33.69	30.56	35.71	33.70	30.80	32.29	37	31.45	36.47	36.19	34.92	26.10	33.49
13	34.21	36.24	35.37	37.39	34.77	32.69	38	35.82	31.59	36.22	35.84	35.89	25.05
14	33.77	33.08	37.20	32.66	36.21	36.47	39	28.99	33.82	35.08	33.47	37.22	35.84
15	30.97	34.57	32.02	36.23	37.12	35.23	40	28.56	35.81	35.85	37.64	31.82	32.98
16	33.26	33.18	32.44	35.66	37.26	28.12	41	31.84	32.86	31.64	36.57	28.19	30.29
17	33.70	31.75	36.97	28.87	29.78	37.94	42	30.27	28.52	32.66	35.91	31.02	34.13
18	30.47	36.29	36.14	35.22	34.34	32.90	43	28.07	32.63	36.31	32.83	29.24	36.40
19	28.95	33.84	36.69	33.14	33.69	34.34	44	34.63	31.88	35.62	37.35	26.16	23.52
20	31.30	33.33	36.08	34.67	33.24	36.12	45	31.72	34.01	35.03	37.69	32.96	32.29
21	33.33	33.34	36.90	25.82	35.86	33.19	46	34.06	38.89	33.32	36.39	33.62	32.77
22	33.37	34.30	32.78	28.72	35.86	27.95	47	33.03	34.22	32.49	34.66	34.04	35.12
23	32.29	34.24	36.64	25.79	33.28	31.10	48	32.24	33.04	33.39	36.06	35.85	32.47
24	29.45	34.21	34.29	30.52	31.03	36.47	49	31.58	28.66	33.83	29.54	35.34	33.39
25	33.95	32.86	34.82	31.87	37.30	34.52	50	31.05	30.84	38.34	35.72	36.87	37.15

Table C.65 Experimental data of yellowness for 5-mm banana chips with moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	28.39	32.52	30.49	33.23	35.34	24.00	26	30.44	27.42	29.01	29.87	38.06	32.96
2	22.24	33.26	32.13	33.67	34.40	32.07	27	32.64	22.12	28.12	34.58	31.44	30.79
3	27.22	30.71	27.14	34.06	37.34	29.20	28	30.71	30.94	28.10	29.91	39.35	32.31
4	26.01	34.13	31.62	33.77	35.12	25.30	29	30.52	26.86	28.53	27.88	38.06	32.08
5	28.11	32.72	35.34	33.35	36.30	37.02	30	33.00	28.42	28.40	31.05	37.79	37.37
6	28.62	28.65	34.91	32.01	35.39	36.08	31	28.67	27.03	30.43	32.90	36.25	31.50
7	29.31	33.98	36.38	34.65	30.94	33.05	32	33.00	28.46	31.45	37.38	32.08	28.24
8	28.97	28.94	31.93	29.83	29.93	33.25	33	24.76	27.40	31.92	32.25	34.13	33.25
9	32.50	32.78	34.48	34.69	32.26	36.36	34	34.58	28.02	34.19	35.94	35.09	31.81
10	26.53	28.97	33.25	29.66	32.63	32.99	35	32.25	29.29	29.10	33.12	34.27	32.13
11	30.13	33.58	32.95	29.51	29.78	33.30	36	33.38	37.11	34.15	29.55	32.29	31.69
12	33.04	33.50	29.76	32.79	33.00	33.11	37	31.74	29.07	27.76	32.21	31.93	35.20
13	28.81	33.48	32.76	29.34	28.97	31.46	38	27.87	35.03	27.01	29.68	31.71	31.57
14	31.91	34.48	30.60	29.72	29.85	36.80	39	31.49	29.89	33.78	30.87	28.00	33.82
15	33.00	33.79	28.61	30.90	31.53	35.44	40	29.37	36.59	28.39	38.27	33.02	34.81
16	25.85	33.67	35.07	33.56	35.32	34.68	41	25.64	29.64	30.07	30.54	31.69	36.21
17	24.58	32.25	31.78	30.82	38.12	32.56	42	33.33	34.15	30.89	32.20	28.05	30.41
18	26.27	31.32	35.41	29.70	33.84	33.11	43	31.51	31.13	30.21	35.39	30.25	28.53
19	23.14	31.22	29.31	29.28	36.42	31.32	44	33.56	32.64	29.84	33.74	29.69	35.54
20	25.49	31.08	32.27	33.44	35.80	35.25	45	28.43	30.16	32.65	32.20	37.75	31.67
21	31.17	27.41	26.79	35.34	35.82	35.50	46	26.24	31.72	30.30	26.99	29.77	26.31
22	30.36	30.95	34.51	32.22	33.48	34.04	47	28.41	31.71	34.78	34.60	33.16	33.88
23	27.45	30.47	29.85	32.46	35.32	33.15	48	28.22	35.77	37.07	30.33	30.47	25.60
24	26.20	31.08	30.85	30.92	35.78	25.51	49	33.03	31.79	33.51	28.83	28.98	29.44
25	30.77	27.73	33.75	35.93	34.33	37.13	50	31.29	29.03	34.38	38.53	37.02	35.06

Table C.66 Experimental data of lightness for 5-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	61.73	56.47	62.68	68.32	55.62	61.91	26	60.79	71.03	66.64	52.98	48.25	51.26
2	65.08	73.58	60.87	60.83	45.44	39.16	27	65.59	72.04	59.80	62.43	52.96	65.11
3	62.42	62.31	57.87	67.11	55.86	46.75	28	63.74	66.80	65.18	58.49	53.11	50.76
4	65.18	63.18	65.97	70.74	44.86	61.56	29	63.53	74.98	74.66	60.96	52.51	44.66
5	65.53	75.33	59.95	63.78	55.53	40.38	30	69.49	68.06	49.75	53.63	51.20	65.96
6	75.26	53.56	63.83	65.89	55.91	47.22	31	62.04	56.66	55.78	59.52	70.04	46.76
7	69.77	67.91	54.87	58.89	49.22	47.12	32	74.08	63.11	62.66	68.09	51.28	57.97
8	63.98	63.25	51.57	58.42	54.78	43.23	33	72.83	55.86	65.22	59.56	70.31	49.56
9	74.28	59.40	55.13	63.18	51.50	51.78	34	75.12	60.88	59.02	60.49	45.73	46.11
10	63.95	50.13	64.73	52.13	59.55	56.20	35	66.93	65.30	58.99	66.10	60.49	59.38
11	75.96	52.67	49.69	51.51	63.15	35.07	36	67.72	71.03	59.66	52.34	43.11	47.42
12	62.84	66.52	57.81	54.92	60.30	52.41	37	63.31	72.75	64.93	65.54	55.19	56.93
13	78.04	62.90	60.18	59.06	46.61	56.13	38	68.05	67.76	54.60	61.35	61.09	49.87
14	61.65	60.33	60.17	54.71	62.11	42.62	39	67.02	73.33	67.11	71.00	56.92	51.35
15	57.31	70.18	46.71	53.79	58.16	55.26	40	58.86	73.05	57.58	67.26	43.07	61.13
16	73.61	63.54	68.29	54.99	52.65	64.93	41	73.16	67.73	58.52	61.27	66.25	46.28
17	64.69	60.53	68.33	53.59	57.51	58.24	42	70.42	52.17	68.35	49.13	58.96	48.91
18	65.73	63.65	58.69	59.17	49.62	49.94	43	63.23	50.04	67.95	62.50	49.90	47.52
19	72.29	74.49	62.76	57.69	49.84	62.75	44	62.16	55.16	63.84	57.38	57.61	48.16
20	65.04	54.40	65.93	46.30	64.85	58.29	45	67.36	68.70	70.48	54.45	68.36	51.47
21	77.85	71.04	57.04	59.92	65.20	52.02	46	68.53	65.16	61.55	55.28	67.87	60.04
22	70.40	66.80	58.29	55.67	56.40	58.57	47	60.96	60.52	54.39	61.41	66.10	43.24
23	70.78	67.13	51.64	45.61	48.03	52.02	48	68.61	67.35	57.98	47.36	61.26	52.06
24	60.71	69.97	58.59	63.52	63.48	45.48	49	74.44	73.51	55.09	61.31	65.47	44.16
25	67.20	60.21	60.08	46.47	57.27	50.66	50	66.50	68.82	55.50	65.66	62.26	43.54

Table C.66 Experimental data of lightness for 5-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	66.05	48.90	43.50	48.94	42.67	36.25	26	69.78	54.22	44.81	48.10	41.82	40.25
2	65.27	60.40	48.46	44.79	35.80	40.27	27	68.64	56.91	48.97	47.22	40.54	43.12
3	67.15	56.35	37.97	48.27	39.33	38.40	28	64.96	58.00	42.35	48.66	43.44	39.88
4	64.79	52.92	45.39	54.08	39.83	31.21	29	64.20	56.66	53.53	48.98	41.63	39.60
5	72.30	61.35	42.74	41.74	39.89	31.54	30	71.23	59.64	55.38	47.21	46.91	48.37
6	61.77	64.59	52.61	43.24	36.30	45.84	31	63.25	59.05	45.52	45.55	40.20	27.19
7	69.02	56.85	49.33	37.78	34.17	35.27	32	68.14	62.48	50.64	49.25	39.54	42.18
8	70.95	60.52	50.01	42.51	41.01	42.02	33	70.62	60.97	50.04	47.22	33.06	28.71
9	73.24	60.51	58.95	44.28	38.62	46.45	34	61.92	53.56	45.45	48.20	41.88	35.70
10	68.77	55.16	53.28	50.28	43.08	40.10	35	70.14	65.68	46.90	47.94	37.92	44.42
11	62.91	53.21	47.32	42.42	35.30	39.56	36	68.11	49.15	51.07	52.31	39.23	33.30
12	69.31	60.33	54.31	49.88	42.98	33.04	37	70.56	62.49	43.78	46.83	44.12	35.44
13	60.70	59.11	46.54	51.64	44.87	38.31	38	63.85	61.02	40.47	54.17	34.50	34.86
14	67.89	52.29	53.30	44.50	37.71	34.42	39	67.83	57.78	42.24	50.11	43.66	31.29
15	63.47	58.08	55.34	45.73	47.82	37.12	40	70.45	53.89	52.11	53.98	44.53	38.79
16	60.71	60.31	41.94	51.64	43.03	41.83	41	50.45	50.28	56.60	51.43	41.61	36.84
17	67.09	53.95	57.35	45.89	33.11	37.35	42	65.18	52.34	44.97	58.50	32.83	43.49
18	64.19	60.97	34.61	51.78	38.93	47.29	43	66.90	58.28	51.89	45.98	36.46	41.60
19	53.38	62.63	46.42	56.04	45.47	39.30	44	63.56	57.78	49.88	52.32	46.10	40.08
20	66.49	64.72	59.18	44.95	40.62	33.04	45	58.07	54.96	42.44	61.38	42.78	42.53
21	60.41	60.78	59.94	48.52	40.23	42.72	46	66.68	59.74	51.87	52.64	45.13	32.43
22	65.30	52.71	52.67	41.85	42.37	41.12	47	61.90	56.53	61.55	48.78	39.13	45.93
23	56.20	59.85	33.34	46.49	40.11	34.42	48	61.87	57.37	55.60	46.85	44.29	44.57
24	75.07	62.67	58.09	44.17	47.15	42.29	49	54.62	56.45	55.02	42.23	40.18	41.01
25	67.52	53.57	53.48	54.40	38.91	38.77	50	71.85	68.02	60.94	53.10	40.23	34.14

Table C.67 Experimental data of redness for 5-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	6.98	4.51	7.64	7.00	9.19	10.96	26	6.62	5.10	6.56	14.20	11.71	12.26
2	7.52	4.49	10.24	8.26	12.77	12.29	27	4.30	5.64	6.69	11.14	10.82	7.55
3	9.42	6.31	8.08	7.52	9.84	11.89	28	5.70	4.65	6.87	10.15	11.68	13.36
4	6.94	4.24	7.22	6.25	12.79	10.64	29	5.05	5.66	6.69	11.30	11.96	14.24
5	7.38	4.64	10.41	7.97	9.76	13.39	30	4.23	5.91	5.33	13.50	11.11	7.77
6	5.01	8.38	7.96	9.62	9.00	12.35	31	6.65	5.54	8.15	9.84	7.91	13.82
7	7.19	6.68	10.69	10.24	10.65	12.17	32	3.71	7.17	8.40	8.48	13.44	12.92
8	7.04	8.46	9.85	8.62	8.85	12.25	33	4.64	9.33	5.66	7.98	7.74	12.72
9	4.80	9.61	9.89	9.29	11.75	13.16	34	4.57	6.05	9.00	9.79	13.95	13.73
10	5.32	7.25	8.00	11.71	9.52	12.41	35	4.03	6.44	8.39	8.93	10.47	13.18
11	2.66	12.17	9.22	9.87	10.00	14.72	36	6.23	4.72	5.84	12.61	13.17	13.83
12	7.07	7.71	8.73	8.51	10.44	13.29	37	6.64	3.40	8.59	8.46	11.64	10.00
13	2.80	9.30	6.64	8.64	10.85	12.51	38	4.66	5.45	11.34	10.79	8.84	11.16
14	5.98	10.98	8.20	9.73	9.91	16.59	39	6.44	4.45	6.70	5.84	11.69	12.74
15	7.07	6.62	8.92	8.85	10.58	15.44	40	6.82	3.78	9.93	7.90	12.95	9.52
16	5.22	4.52	7.03	8.80	10.66	9.26	41	3.36	7.12	8.12	9.80	7.57	13.86
17	4.13	5.36	7.88	8.61	10.23	9.25	42	4.29	9.54	8.11	11.05	9.25	11.13
18	5.40	4.85	5.87	8.15	9.63	11.35	43	4.50	10.53	6.12	8.12	11.65	13.31
19	5.35	4.15	7.88	8.38	10.88	9.82	44	5.83	9.74	8.10	11.89	9.35	14.27
20	4.09	6.89	7.84	8.12	9.45	9.23	45	3.36	6.94	8.37	13.07	7.69	11.34
21	3.71	6.83	7.19	9.68	10.30	12.26	46	4.18	5.01	9.32	11.41	7.79	11.95
22	3.33	6.32	9.47	12.88	9.07	12.78	47	1.04	5.35	10.24	8.82	9.76	12.90
23	2.89	6.73	11.02	14.01	10.81	11.95	48	2.04	6.41	11.40	14.55	7.40	12.08
24	7.34	7.00	7.06	9.84	10.36	12.63	49	1.95	5.38	8.89	11.03	7.64	13.17
25	4.57	5.30	7.38	11.98	8.49	11.57	50	4.19	4.67	10.06	8.16	10.80	15.22

Table C.67 Experimental data of redness for 5-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	2.32	8.91	12.23	12.99	15.54	14.77	26	2.49	9.45	12.76	14.94	14.58	15.08
2	3.17	8.89	11.41	16.15	10.98	14.25	27	2.96	9.17	11.95	16.44	13.25	14.27
3	2.48	11.96	13.44	15.00	12.03	13.89	28	3.25	9.49	12.87	16.19	13.86	13.58
4	1.99	10.71	12.26	13.23	12.01	13.46	29	3.09	9.54	12.26	15.93	14.39	14.41
5	3.19	9.14	10.37	15.77	14.79	10.41	30	2.61	8.50	12.18	16.68	14.92	15.34
6	6.89	9.60	10.34	15.32	11.80	13.95	31	1.69	6.98	13.63	16.48	15.25	9.88
7	4.00	9.78	14.12	13.85	12.36	13.42	32	3.85	8.36	12.51	15.43	14.08	10.50
8	5.50	7.95	12.15	14.21	12.93	13.89	33	3.69	8.62	13.07	16.73	12.93	10.78
9	3.38	10.13	9.23	14.79	13.56	13.95	34	2.90	7.22	13.65	16.54	15.61	12.29
10	3.69	9.35	14.61	16.02	13.81	15.30	35	2.96	7.06	13.04	16.87	13.86	12.66
11	4.91	9.50	14.76	16.50	12.94	15.61	36	2.89	11.73	13.52	12.85	12.21	12.32
12	2.85	10.12	11.71	16.93	11.80	14.67	37	3.59	11.32	10.80	13.30	12.61	12.24
13	2.46	11.34	13.28	15.47	14.20	15.07	38	4.88	10.74	13.69	14.96	11.58	12.03
14	2.07	9.44	11.83	16.35	13.82	13.27	39	3.88	11.01	13.59	13.14	12.49	10.42
15	5.10	9.99	11.66	16.63	12.73	14.15	40	3.04	9.90	10.96	13.74	13.69	13.15
16	6.64	11.07	12.92	15.60	13.45	13.59	41	0.11	9.87	10.94	15.03	12.01	13.92
17	6.88	10.87	13.26	16.05	14.43	13.89	42	2.07	9.63	10.28	14.63	12.94	13.91
18	6.24	11.12	13.66	14.26	11.96	14.92	43	4.12	9.04	12.52	12.75	13.51	14.68
19	4.57	8.56	12.99	16.26	13.55	13.24	44	0.37	9.59	11.44	14.87	12.91	14.63
20	3.09	8.64	12.94	16.12	14.05	13.31	45	1.22	9.76	11.56	14.47	15.04	14.32
21	6.98	11.21	11.86	14.31	12.52	13.69	46	3.45	9.40	10.56	14.49	15.09	12.52
22	3.99	10.42	11.95	12.88	13.93	15.25	47	2.05	11.36	9.38	15.85	14.67	15.37
23	5.10	8.86	12.96	16.05	11.11	13.55	48	3.06	9.36	11.08	14.63	15.08	14.25
24	3.60	11.11	11.61	13.64	12.87	13.71	49	2.75	11.13	10.95	13.35	14.56	12.22
25	4.65	10.73	12.01	12.83	12.59	14.87	50	2.51	6.18	9.81	16.50	15.67	13.42

Table C.68 Experimental data of yellowness for 5-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 1)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	33.05	27.62	31.90	33.58	32.88	38.12	26	32.33	31.12	33.39	36.33	32.41	32.08
2	35.15	29.96	35.17	32.22	33.36	24.27	27	31.38	30.26	31.47	37.47	32.39	30.60
3	36.36	33.30	30.52	35.02	33.54	32.26	28	33.12	28.83	32.71	34.33	33.83	33.66
4	34.53	28.70	32.15	34.01	33.32	37.65	29	30.69	31.02	35.87	36.74	34.97	30.37
5	35.09	30.18	34.91	33.58	34.12	28.32	30	29.47	32.00	25.70	39.48	32.32	31.03
6	34.57	29.62	33.39	37.41	32.49	32.21	31	30.12	28.55	31.36	35.53	34.99	32.98
7	34.70	31.95	33.79	33.97	33.88	31.16	32	32.28	31.75	33.39	36.79	34.10	36.80
8	35.41	32.33	32.40	33.10	32.66	29.03	33	33.44	31.75	26.73	32.98	34.96	35.06
9	34.69	35.07	34.40	36.53	35.64	35.30	34	32.72	30.29	32.13	36.96	31.26	32.53
10	31.15	26.11	33.95	36.05	34.14	36.87	35	31.67	31.16	32.74	37.89	35.95	37.99
11	26.03	33.39	31.79	32.48	35.86	23.19	36	34.64	29.42	28.60	32.72	29.04	32.15
12	34.96	32.49	33.96	29.85	36.25	36.36	37	34.38	27.27	34.98	36.06	33.73	34.36
13	26.70	33.99	29.69	31.73	32.19	38.27	38	31.27	30.44	32.07	35.52	33.82	30.84
14	33.10	36.52	34.17	32.50	35.75	30.51	39	34.64	29.71	31.55	33.41	35.38	33.50
15	33.24	32.32	30.67	31.20	35.06	40.74	40	34.25	28.10	32.96	33.83	29.50	35.37
16	35.26	30.01	34.58	31.66	33.30	34.53	41	31.68	32.75	31.88	35.31	34.29	32.58
17	32.43	29.66	35.32	30.18	33.95	33.80	42	32.15	31.49	35.96	31.01	32.86	32.64
18	34.90	30.92	30.32	33.77	30.29	32.15	43	30.75	31.54	33.38	32.56	30.80	32.69
19	35.01	31.50	34.34	32.22	32.59	33.96	44	31.07	34.34	34.43	36.04	32.57	34.60
20	32.92	29.61	34.52	29.87	36.39	34.21	45	30.71	32.73	37.52	37.80	35.34	34.09
21	30.12	34.04	29.12	35.62	37.58	35.50	46	33.93	30.22	34.33	33.61	33.64	37.96
22	31.97	33.12	33.61	36.91	33.63	37.67	47	26.54	30.65	33.69	33.57	37.48	31.20
23	26.34	32.54	31.14	31.73	30.41	33.29	48	30.19	32.06	36.02	34.07	33.75	34.48
24	34.00	35.03	29.31	36.61	36.91	30.78	49	33.09	34.37	32.47	36.78	32.48	31.94
25	33.26	28.86	31.04	36.02	33.61	33.93	50	32.84	31.41	33.15	34.41	37.03	30.86

Table C.68 Experimental data of yellowness for 5-mm banana chips without moisture absorber during storage at 50 °C (Replicate No. 2)

Chip No.	Storage time (week)						Chip No.	Storage time (week)					
	0	2	4	6	8	10		0	2	4	6	8	10
1	33.39	33.14	30.48	30.11	27.54	24.68	26	33.16	33.62	27.96	30.47	28.51	27.08
2	33.19	36.03	31.21	30.16	20.25	24.26	27	34.66	34.80	33.02	32.01	25.06	28.14
3	33.38	39.00	26.11	32.17	23.72	24.50	28	33.67	35.86	28.73	32.45	28.82	24.00
4	31.48	35.93	31.74	33.64	24.71	18.84	29	32.59	35.08	36.67	32.14	28.53	26.32
5	35.60	36.87	32.41	26.87	23.96	12.63	30	34.00	35.36	38.87	32.08	32.51	34.13
6	33.43	37.76	31.33	27.39	19.62	32.69	31	31.00	33.35	29.71	33.21	25.06	12.59
7	33.89	37.47	32.97	22.40	19.74	23.36	32	35.35	35.62	35.10	31.28	26.23	23.79
8	38.60	35.99	31.44	26.17	24.39	27.30	33	36.67	35.12	37.16	34.05	17.46	14.49
9	34.76	36.08	34.36	28.47	26.74	32.73	34	32.83	31.53	31.15	33.75	26.58	20.96
10	33.32	36.57	39.23	33.42	30.26	27.61	35	34.80	35.90	32.47	36.05	24.94	28.23
11	35.20	30.91	32.88	28.50	22.60	25.91	36	33.76	31.10	34.83	33.91	22.79	19.94
12	31.10	36.03	35.17	35.33	26.89	21.94	37	36.26	39.03	27.13	31.69	28.25	23.75
13	28.90	36.38	30.30	35.76	32.18	25.59	38	36.18	37.31	25.90	37.15	19.34	22.69
14	31.78	29.98	34.11	30.71	25.58	20.20	39	35.83	36.63	27.98	33.74	27.43	16.95
15	36.34	34.90	37.34	33.37	31.22	24.57	40	34.83	33.42	33.11	36.18	29.87	26.43
16	34.89	38.31	33.08	36.28	29.48	28.62	41	20.32	30.94	35.19	35.71	25.96	24.63
17	38.52	33.97	38.91	31.68	24.52	26.84	42	30.38	32.35	32.12	38.29	20.87	29.21
18	35.65	38.37	25.13	35.18	24.70	32.87	43	38.82	35.18	34.44	30.89	24.44	26.75
19	31.33	35.60	30.59	38.75	31.16	25.46	44	24.52	34.61	32.73	35.82	29.73	27.50
20	33.41	36.86	39.82	31.64	30.97	22.60	45	27.03	33.79	35.12	40.26	31.96	29.51
21	37.29	38.79	38.34	33.62	23.90	27.69	46	34.51	35.59	33.21	33.63	32.89	18.25
22	34.41	35.09	33.75	27.73	27.68	27.57	47	30.19	36.74	34.05	33.35	27.20	32.31
23	28.46	34.58	28.22	33.49	26.17	24.42	48	32.61	32.97	35.25	31.25	32.17	30.88
24	36.65	38.92	37.12	29.42	32.45	28.28	49	28.41	36.03	35.04	24.99	27.26	25.28
25	36.31	35.67	37.38	34.83	23.22	25.72	50	34.87	34.44	35.67	36.48	28.04	21.69

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