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| Thesis Title | Nondestructive Determination of Fruit's Quality Using Single Wavelength of Infrared Light |
| Thesis Credits | 12 |
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## Abstract

Determination of fruit's quality using nondestructive method with several wavelengths of infrared light is a complexity in data processing. It is time consuming and expensive. This thesis proposes a nondestructive method using a suitable wavelength of infrared light to determine inner quality of a fruit. The thesis also proposes two new methods of infrared penetrating through the fruit skin in order to check the fruit quality (wave scattering and reflexing from insides of fruit). An intensive consideration was made in choosing a suitable wavelength of light that easily passes the fruit's peel and can absorbed chemical constituent of fruit's flesh.

In using nondestructive method, two important problems are encountered in transmitting infrared light through the fruit. First, it is difficult for a ligh to pass inner side of the fruit. The fruit skin and its flesh almost absorb the light. Secondly, size and asymmetric shape of the fruit has an effect on the process of quality determination.

This thesis proposed two new methods in solving a distortion of infrared transmission through the fruit for measuring fruit's quality. The first method, called inside scattering method, is to transmit light from the bottom up through the core of the fruit. The light will scatter through

the fruit, and the output signal will be detected on the fruit skin. This method will gain more benefit for some fruits having hollow core structure. The method has an advantage that it is less time consuming because the light can easily pass through the fruit. However, a disadvantage is impacted by size and shape of a fruit.

The second method, called inside reflexing, is to send and receive signal in the vicinity area. It will reduce the impact of the fruit's size and shape. However, the method takes much longer time.

The experimental results indicated that the wavelength at 960 and 980 nm are suitable for measuring sugar content of an orange and also for the flesh translucent disorder of a mangosteen, respectively.

The determining accuracy of a mangosteen flesh translucent disorder is 54 %, whereby the determination of sugar content of an orange fruit gives an error of 0.153 Brix.

Keywords : Fruit's Quality Determination / Infrared / Nondestructive Testing