

Pailumpa Nimsung : Properties of Raw Banana Flour and Starch Using for Food Industries.

Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Miss. Masubon Thongngam, Ph. D. 160 pages.

Banana (*Musa* sp.) is a tropical fruit, which is cheap and has been grown in many parts of Thailand. In its green stage, banana contains mainly carbohydrate especially starch; moreover, banana is also known as a source of resistant starch, which cannot be digested by human enzyme and has many potential health benefits. Therefore, banana is suited to use as a source of starch and flour. Three Thai banana cultivars ('Kluai Namwa'; NW; 'Kluai Hom Tong'; HT; 'Kluai Khai'; KH) were chosen to characterize their flour and starch properties. NW, HT and KH had yielded 54.50%, 56.50% and 48.12% flour (based on whole fresh fruit), respectively and 33.18%, 29.67% and 30.37% starch (based on flour basis) respectively. The chemical compositions of flours (protein, fat, and ash) were higher than those of starches as well as they were varied among cultivars. Banana starches from NW, HT and KH had smooth surface and irregular in size and shape (round, long and oblong) observing by using SEM. In addition The gelatinization temperature range and enthalpy energy obtained from DSC were 73.44-86.18°C, 15.15-15.92 J/g (dry basis) and 70.70-81.50°C, 16.87-21.42 J/g (dry basis) for flour and starch respectively. After stored for 7 and 21 days, the retrogradation temperature range and enthalpy energy of flour and starch were then determined. The retrogradation temperature range and enthalpy energy of flour and starch after 7 days were 44.46-76.23°C, 6.86-7.88 J/g (dry basis) and 44.57-78.78°C, 8.93-14.04 J/g (dry basis) respectively. Furthermore, when after stored for 21 days, the retrogradation temperature range and enthalpy energy of flour and starch were 43.67-76.66°C, 8.53-8.87 J/g (dry basis) and 44.13-76.51°C, 11.24-16.25 J/g (dry basis) respectively. The pasting behavior of banana flour and starch with different concentration (7-12%) was similar. The pasting profiles have shown that the pasting temperature, peak viscosity, breakdown, final viscosity and setback of banana flours were lower than those of banana starches. In addition, the degree of syneresis of banana flours was higher than that of starches. Moreover, the degree of syneresis of both flour and starch increased when increasing the number of freeze-thaw cycles. The texture (hardness, cohesiveness and gumminess) of banana flour and starch gel were determined. From the result, it was shown that banana flour gel had lower hardness, cohesiveness and gumminess than starch gel.

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Thesis Advisor's signature