

Wanrada Sirisompong 2010: Extraction, Chemical and Physical Properties of Fat from Rambutan (*Nephelium lappaceum* L.) Seed. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Miss Utai Klinkesorn, Ph.D.
110 pages.

Rambutan seed is the major waste from rambutan processing. It contains high amount of fat which may be used for production of rambutan seed fat in order to add value to the waste. The purpose of this study was therefore to investigate the optimum condition for fat extraction from rambutan seed by soxhlet method. The physical and chemical properties and fatty acid composition of rambutan seed fat were also characterized. For the investigation of optimum condition, hexane and petroleum ether were used as extraction solvents. The effect of independent variables including extraction time (4-9 h), moisture content (5-15%) and particle size (0.5-1.7 mm) on the fat yield was determined using a three factor central composite design (CCD). Significant regression models which explain the effects of different levels of independent variables on fat yield and optimum conditions were determined. The results indicated that the particle size had the most significant effect on the fat yield followed by the moisture content and extraction time for both solvents. The optimum condition from response surface analysis for the extraction of fat using hexane was 5.67% moisture, 0.97 mm particle size and 9 h extraction time. Whereas the optimum condition for the petroleum ether extraction was 2.10% moisture, 1.83 mm particle size and 10.71 h extraction time. Under the optimum condition, the maximum yields for hexane and petroleum ether extraction were 37.25 and 39.85%, respectively. The high coefficients of determination values ($R^2 > 0.95$) for the models indicated that response surface analysis could be a proper methodology for optimizing the solvent extraction of rambutan seed fat. The extractable fat was a white solid at room temperature. Among the physical and chemical properties of the extracted fat, e.g. specific gravity, refractive index, iodine value, saponification number, unsaponifiable matter compared well with those of conventional fat. Rambutan seed fat contained high amount of long chain saturated fatty acids (49.5%). Besides that, x-ray diffraction study demonstrated that β -polymorph was the predominant crystal polymorphism in rambutan seed fat. From the results indicated that rambutan seed fat had high thermodynamic and oxidative stability. Rambutan seed fat might be used in cosmetic industry such as usability as emollient in lotions or lipsticks or used in food industry such as substitute or cooperative usability of hydrogenated fat.

Student's signature

Thesis Advisor's signature