

Teeranuch Chysirichote 2011: The Development of Reduced-Calorie Flaky Chinese Pastry (Kha-Nom Pia Lek) by Using Fat Replacer and Sugar Replacer. Doctor of Philosophy (Tropical Agriculture), Major Field: Tropical Agriculture, Interdisciplinary Graduate Program. Thesis Advisor: Associate Professor Anchane Utaipatanacheep, D.Sc. 249 pages.

Flaky Chinese pastry (Pia) is one of baked products which most consumers prefer the small size stuffed with mungbean conserve. The objectives of this research were to develop the formula and process of reduced-calorie flaky Chinese cake (Kha-Nom Pia Lek), calculate cost and evaluate its shelf life. To develop the formula and process, the study was separated into crust and filling parts. The crust was reduced fat and added the fat replacers, maltodextrin gel and inulin gel. The result indicated that panelists liked the product, in which the fat content in outer crust was reduced by 45% and replaced by 50% of its weight with inulin gel at a moderate level. The formula of crust included inner and outer layers. The inner crust consisted of 28.77% cake flour and 11.51% shortening. The outer crust was composed of 32.88% all-purpose flour, 2.94% shortening, 2.94% inulin gel, 6.57% sugar and 14.39% water. The filling was reduced oil and sugar and added inulin solution, a fat replacer, combining with sorbitol solution and maltitol solution, sugar replacers. The results showed that the crust of pastry was harder and less expanded, but the filling stuff was friable, rough, yellow-less and sweet-less. Pastry with 80% (w/w) inulin solution of oil and 10% (w/w) maltitol solution of sugar in 25% reduced-oil filling was accepted by trained panelists. Moreover, consumers liked this pastry at moderate level. Concerning to the formula of filling consisted of 53.69% mashed, steamed, peeled-mungbean, 28.99% sugar, 3.22% maltitol solution, 2.82% rice bran oil and 11.28% inulin solution. The qualities of this product were water activity (a_w) 0.842, hardness 2041.55 g, fracturability 1587.79 g, springiness 0.292 mm, cohesiveness 0.117 and chewiness 88.85 g.mm. The crust was yellow (L^* 74.65, a^* 5.73 and b^* 38.69). The filling was yellow (L^* 69.67, a^* 5.23 and b^* 44.52). The product's diameter was 3.70 cm, height was 3.35 cm. and specific volume was 1.20 cm³/g. The 100 g of product contained total calories, cholesterol, total saturated fat and trans fatty acid were 340.89 kcal, 5.23 mg, 5.62 g and 0 g, respectively. Comparing with the standard formula, fat and total calories of this formula could be reduced by 69.44% and 25.51%, respectively. The production cost of this pastry was 0.79 baht per piece. The shelf-life at room temperature was 2 weeks in ON/PE bag, 4 weeks in ON/PE bag with oxygen absorber, 5 weeks in KON/PE bag and 6 weeks in KON/PE with oxygen absorber. The long time storage led to the increases in the hardness, friability and TBA value, while the moisture content, a_w of both crust and filling, bean odor, candle-smoke fragrant and overall acceptance were decreased.

Student's signature

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