

Analysis of physicochemical properties of *Olu (Nymphaea pubescens Willd.)* seeds and production of *Olu* seed-incorporated snack bars

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This study was conducted to determine the physicochemical properties of *olu (Nymphaea pubescens Willd.)* seeds and to develop an *olu* seed snack bar incorporating sesame seeds and peanuts. *Olu* seeds, sesame seeds, peanuts and other ingredients were used for formulating this snack bar. The best of four formulations of *olu* snack bars was selected using sensory evaluation (hedonic test). *Olu* snack bars developed using the selected formula was subjected to a shelf-life study. *Olu* seeds had an arithmetic mean diameter of 0.15 ± 0.01 cm, geometric mean diameter of 0.18 ± 0.02 cm, a sphericity of 0.61 ± 0.01 , a roundness ratio of 0.47 ± 0.06 , and a roundness of 0.52 ± 0.01 . Proximate analysis of *olu* seeds showed a composition comprising (dry basis) $81.24\pm 0.16\%$ carbohydrate, $2.5\pm 0.08\%$ crude protein, $0.65\pm 0.03\%$ crude fat, $0.65\pm 0.03\%$ crude fibre and $0.67\pm 0.32\%$ ash. The moisture content of *olu* seeds were $14.31\pm 0.22\%$. Solubility of *olu* seed flour at 30°C and 100°C were 1.24 ± 0.01 and $26.44\pm 0.59\%$, respectively. The pH value, water holding capacity and water absorption index of *olu* seed flour were 6.4 ± 0.01 , 1.39 ± 0.02 and 2.05 ± 0.08 g/g, respectively. Ni, Ca, Fe, Cu, and Zn contents were 0.07 ± 0.005 , 18.89 ± 1.45 , 1.06 ± 0.04 , 0.069 ± 0.01 , and 0.069 ± 0.01 mg/100g, respectively. Cd and Pb were not present at detectable levels in *olu* seeds. The four formulations of snack bars significantly differed ($P<0.05$) from each other in odour, texture, and overall acceptability but not in colour and sweetness. Based on these results, the formulation comprising 60% *olu* seeds, 5% sesame seeds and 15% peanuts was selected. Proximate composition (dry basis) of the *olu* snack bar was $59.89\pm 0.11\%$, carbohydrate, $13.48\pm 0.33\%$ protein, $12.53\pm 0.69\%$ fat, $2.59\pm 0.09\%$ ash while the moisture content was $11.33\pm 0.2\%$. Levels of Ca, Fe, Cu, Zn and Mg were 71.08 ± 2.28 , 1.611 ± 0.255 , 0.158 ± 0.076 , 0.788 ± 0.118 , and 27.05 ± 0.57 mg/100g, respectively. The caloric value of the snack bar was 17.5 ± 0.12 kJ/g. Total plate counts, yeast and mould counts and coliform counts were less than the maximum acceptable limit and moisture content not significantly ($P>0.05$) different after one month of storage. Thus, there is a high potential to produce nutritionally rich *olu* snack bars with sesame seeds and peanuts which have acceptable sensory properties and shelf-life.