

Exploring the Possibility of Using Jak Seed Flour (*Artocarpus heterophyllus*) for Biscuit Manufacture with an Appropriate Flavor Booster

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Abstract

Biscuits are a popular food product among the Sri Lankan consumers and are mainly prepared using wheat flour. Underutilized local raw materials could be made use of in the preparation of biscuits to reduce the wheat flour consumption and to increase the nutritional quality. Jak (*Artocarpus heterophyllus*) is a common tree grown in the wild, and is also cultivated. It is used in both its ripe and unripe state. However, during the harvesting season there is usually a glut, leading to wastage and distress sale. Therefore, there is an ample scope for processing the fruit into value-added products. Hence, this study was carried out in exploring the possibility of using Jak seed flour (JF) in biscuit manufacture.

Jak seeds (8kg) from well ripen fruits were harvested and 16 treatment combinations with 4 variables (aging process, heat treatment, soaking with NaHCO₃ and refrigeration) were prepared with respect to the experimental design. Jak seeds obtained from each treatment were dried at 80 °C for 6 h, ground using a laboratory grinder and subjected to measurement of particle size. Jak seed flour obtained from each treatment was used to manufacture biscuits. Two best treatment combinations were selected, and blends of jack seed flour (JF), rice flour (RF) and wheat flour (WF) were prepared for both on a replacement basis (JF/RF/WF, 100:0:0, 90:10:0 and 90:0:10). Biscuits were produced from the blends and selected the best sample by evaluating their sensory properties. Commercial biscuit was used as a control. All sensory evaluation results were analyzed by using Kruskal–Wallis method. An appetite booster was developed using icing sugar and natural waraka (*Artocarpus heterophyllus* Lam) extract. Cream was applied in between two biscuits (the best composite biscuit). The best biscuit with filling material was selected using the Duo-trio test and analyzed for its proximate composition just after preparation and after 3 months of storage. Moreover, microbiological examination of samples was carried out after 3-months of preparation.

Results revealed that fresh Jak seeds were capable of yielding finer particle than the seeds with aging process. Raw seed without treated and raw seed soaking with NaHCO₃ were the best in preparing biscuits. JE:WF (90:10) biscuit obtained the highest mean rank for texture, crunchiness, taste, smell, hardness, mouth feel and overall acceptability and it was selected as the best. Contents of ash, moisture, protein, fat, crude fibre and carbohydrates of JF:WF (90:10) biscuits were 3.20%, 3.53%, 10.65%, 14%, 0.37% and 68.25%, respectively. Similar values were observed after 3 months of storage. Responses were clearly identified for the biscuits with waraka flavoured appetite booster. Total Plate Count (TPC) and Yeast and Mould counts of appetite booster were 1.0×10^4 CFU/g and 6.7×10^2 CFU/g, respectively and cream was free of *Escherichia coli*.

Keywords: composite flour, jak seed flour, jak fruit (waraka), sensory evaluation