

Development of composite flour incorporated with banana pseudo-stem flour and application in waffle cones

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In Sri Lanka, the *Embul* banana (*Musa acuminata* L.), is a widely grown and frequently consumed fruit. Pseudo-stem is its main by-product, after harvesting a bunch of bananas. This study aimed to develop gluten-free composite flour using banana pseudo-stem flour (BPSF) as a wheat flour substitute for usage in waffle cones. BPSF was made by treating pseudo-stem pieces with 0.2% citric acid and 0.3% sodium metabisulphite, drying at 60°C for 24 hours, and then grinding. The waffle cone was prepared by blending BPSF, rice flour, manioc flour, and chickpea flour in different ratios (5:25:15:5, 10:20:17:5, 15:20:19:5) with other ingredients. The sensory evaluation for three treatments was done by thirty semi-trained panelists on a 7-point hedonic scale to select the best recipe evaluating their appearance, color, texture, taste, smell, and overall acceptance. The accepted sample with 10% (w/w) BPSF, was selected for proximate analysis (AOAC, 2000) and the shelf-life assessment, which included measuring the total plate count (TPC), yeast and mould count (YMC), moisture content, and water activity. During storage, water activity and moisture content of flour were changed to 0.46-0.53 and 7.05%-7.07%, respectively. The developed cone was analyzed for proximate composition; carbohydrates ($69.23 \pm 0.14\%$), crude fiber ($2.34 \pm 0.10\%$), crude protein ($12.92 \pm 0.18\%$), crude fat ($13.43 \pm 0.25\%$), and ash ($1.63 \pm 0.12\%$). The water activity, TPC, and YMC of the cone were not significantly ($P > 0.05$) changed at room temperature until 4th week. Banana pseudo-stem flour incorporated composite flour, with its elevated fiber content, offers a viable alternative to wheat flour in waffle cones.

Keywords: Banana pseudo-stem, Gluten-free flour, Waffle cone, Wheat substitution

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