Physicochemical, Functional and Antioxidant Properties of Wheat and Mbula (*Parinari Curatellifolia*) Peels Composite Biscuit

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Abstract

Mbula plum *(Parinari curatellifolia)* is an Indigenous fruit tree that belongs to the family *Chrysobalanaceae* that grows naturally and abundantly in tropical Africa such as Senegal, Kenya, the region of highveld in Zimbabwe and the low-veld region of South Africa. It is underutilized fruit that has the potentially health valuable for human and animal foods. The aim of this study was to determine the physicochemical, functional and antioxidant properties of wheat and *mbula* peels composite biscuits. Formulation of biscuits, wheat: mbula peel flours are 95%:5%, 90%:10%, 85%:15, 80%:20% and control (100%) wheat flour. Proximate composition, physical, colour, thermal and antioxidant properties of the composite biscuits were determined. The proximate composition was determined whereby the addition of *mbula* peel flour improved the ash and fibre content of the composite biscuits. Sample E, (wheat (80): *mbula* peel (20) % composite flour) showed significantly higher ($p > 0.05$) values on ash, crude fibre. Physical properties of the biscuits (weight, thickness, spread ratio and hardness) were also determined. However, the addition of *mbula* peel flour had improved the bioactive compounds. The results of ferric reducing antioxidant power (FRAP) ranged from 108.33 to 162.67mg CE/g, 2, 2-diphenyl-1-picrylhydrazyl free radical scavenging activity values varied from 48.70 to 94.72. The onset temperature (T_0) ranged from 57.50 to 71.95°C, peak temperature (T_p) from 74.94 to 76.74°C and end temperature (T_c) from 81.72 to 91.58°C. There was a decrease in parameter L* value, b* values and whiteness index for formulated biscuits and increases in parameter a* values and yellowness index for biscuits. It may be concluded that incorporating *mbula peel flour* with wheat flour played an important role in enhancing the nutritional properties of biscuits through improving fibre content and antioxidant activity. Therefore, the flour can be utilised to produce value-added product that can be utilised in rural or urban areas.

Key words: *Mbula*, physicochemical, colour properties, thermal properties, antioxidant properties

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