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Composite Flour Blends: Effect of Particle Size of Peeled and Unpeeled Orange Fleshed Sweet Potato Flours on Quality Characteristics of Cookies

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Abstract

Orange fleshed sweet potato (OFSP) has great potentials to combat malnutrition; especially vitamin A deficiency due to its high beta-carotene and other essential nutrients. The OFSP flour has the potentials to replace wheat flour in bakery foods production. This will reduce wheat flour importation and increase intake of essential nutrients in sub-Saharan Africa countries. The quality attributes and consumer acceptability of baked products may be affected by flour particle size and percentage of different flours in composite flour formulations.

Thus, this study investigated the effect of sieve particle size on the physical, nutritional, anti-oxidant and sensory properties of peeled and unpeeled OFSP composite flour cookies. Peeled and unpeeled OFSP flours sieved through 250 μm or 500 μm mesh particle size were produced. OFSP and wheat composite flours were made and used to produce cookies baked at 170°C for 11 minutes. The quality attributes and consumer acceptability tests were conducted in accordance with international standard methods. The 100 % wheat flour cookie was used as control. The evaluations showed sieve particle size had no significant ($p > 0.05$) influence on the baking loss, thickness, diameter, spread ratio, water activity (aw) and CIE colour attributes (L^* , a^* , b^* , chroma and hue angle) of cookies. However, both 100 % peeled and unpeeled OFSP and their composite flours cookies had significantly ($p < 0.05$) lower baking loss, high diameter and spread ratio than the control cookies. Similarly, proximate, mineral and bioactive compounds as well total antioxidant activity of cookies were not significantly ($p > 0.05$) affected by sieve particle size. The unpeeled OFSP flours cookies had significantly ($p < 0.05$) lower crude protein but higher β -carotene, total phenols, flavonoids and antioxidant activity. The sensory assessment however showed that sieve particle size had significant ($p < 0.05$) influence on overall acceptability of cookies. The colour, aroma, crispiness and taste were not significantly affected by sieve particle size. Cookies prepared from OFSP flour sieved with 250 μm mesh particle size performed better in terms of overall acceptability. Generally, 10–50 % peeled and 10–20 % unpeeled OFSP composite flours sieved through 250 μm mesh particle size and control cookies had the best overall acceptability.

Keywords: Bioactive compounds, composite flour, cookies, orange fleshed sweet potato, physical properties, sensory properties

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