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“Filling gaps and removing traps
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Effect of Sieve Particle Size on Quality Attributes of Peeled and Unpeeled Orange Fleshed Sweet Potato Composite Flours

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Abstract

Orange fleshed sweet potato (OFSP) is an important source of vitamin A and other health promoting nutrients. With the need to preserve these nutrients, processing of OFSP into high quality flour is seen as a timely strategy. Substituting wheat flour with OFSP flour in processed food products could reduce foreign exchange outlays, create new markets for producers, and result in especially increased vitamin A consumption among consumers provided there is adequate retention of β -carotene during processing. The objective of this study was to assess the effect of sieve particle size on the physicochemical, functional, and nutritional properties of peeled and unpeeled OFSP composite flours. Peeled and unpeeled OFSP slices were pretreated by soaking in sodium metabisulphite solution (0.5 % w/v), dried in hot air dryer at 60°C, milled separately and sieved using 250 μm or 500 μm mesh particle size. Each OFSP flour was used to prepare blends of OFSP and wheat flours and evaluated for quality using standard procedures. The sieve particle size had no significant ($p > 0.05$) effect on moisture content, water activity and CIE colour attributes of OFSP flours. However, the peeled OFSP composite flours had higher L^* , b^* and C^* values than unpeeled OFSP flours. The sieve particle size significantly ($p < 0.05$) affected water absorption capacity (WAC), swelling capacity (SC) and water solubility (WS). The OFSP flours sieved with 500 μm mesh particle size had significantly ($p < 0.05$) higher WAC and SC but lower WS as compared to 250 μm sieve. The peeled OFSP flours had significantly ($p < 0.05$) higher WS but lower WAC and SC than the unpeeled OFSP flours. Generally, OFSP flours had lower pasting temperature and peak time than 100 % wheat flour. The final trough, setback viscosity and pasting temperature did not vary ($p > 0.05$) between the corrective unpeeled and peeled OFSP flours. The sieve particle size did not significantly ($p > 0.05$) affect the nutritional composition of flours. With exception of Vitamin C, unpeeled OFSP whole flour had the highest phytonutrients composition and antioxidant activity while wheat flour obtained the least values. Both unpeeled and peeled OFSP flours sieved with 250 μm or 500 μm have high potentials as ingredients for novel food developments.

Keywords: Composite flour, functional properties, orange fleshed sweet potato, phytonutrients, sieve particle size, total antioxidant activity