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ORIGINAL RESEARCH

Comparative Effects of Water and Microwave Blanching on Mineral and Antinutrient Composition in Pumpkin Components

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Abstract

Pumpkins offer high nutritional benefits, though the peels and seeds are often discarded due to perceived antinutritional factors. However, there is a need to promote the utilization of the different parts through anti-nutrient reduction and the development of composite flour. This study investigated the effect of water and microwave blanching on mineral content and anti-nutrient levels in pumpkin peels, pulp and seeds. The samples for the different treatments were analyzed for mineral content by Atomic Absorption Spectroscopy and Ultraviolet-Visible Spectroscopy methods, while anti-nutrients were determined by titration and Ultraviolet-Visible Spectroscopy method. Pumpkin seeds had significantly higher mineral levels than peels and pulp. For the unblanched samples, copper, zinc, magnesium, iron, and phosphorus ranged from 0.86±0.27 to 1.55±0.21mg/100g, 23.81±4.71 to 32.27±0.70mg/100g, 54.27±1.44 to 91.01±0.68, 5.45±1.37 to 16.14±1.35 mg/100g, 248.57±3.18 to 312.76± 4.18mg/100g respectively in the pumpkin peels, pulp and seeds. For blanched samples copper, zinc, magnesium, iron, and phosphorus ranged from 0.33±0.02 to 0.92±0.02, 16.95±1.31 to 24.44±1.29, 16.04±2.32 to 89.76±0.32, 2.92±0.79 to 12.75±1.55, 219.90±1.42 to 276.04±1.17 in mg/100g respectively. All microwave blanched samples had significantly higher levels of minerals than the water blanched samples. Seeds had significantly higher levels of phytic acid but showed the lowest levels of tannins than the other parts. Water blanching led to higher loss of phytates, tannins and minerals compared to microwave blanching. Therefore, microwave blanching is recommended for pumpkin parts composite flour production, as it better retains minerals while reducing anti-nutrients. Utilizing peels and seeds can enhance nutrition, reduce waste, and ultimately support sustainable, value-added food processing.

Keywords: Pumpkin, microwave, blanching, anti-nutrients, minerals