Abstract

Physicochemical Characterization of *Alocasia macrorrhiza* Corm Flours as Affected by Thermal Processing

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Alocasia macrorrhiza is an underutilized corm that can play an important role in food security. High moisture content and acrid flavor were two major problems of corms that could be overcome by converting into flour and altering their flour properties by the application of thermal processing. Therefore, this study aimed to evaluate physicochemical properties of flours as affected by thermal processing. After milling raw, boiled and roasted corm into flour, the proximate and mineral composition of the flours were analyzed. Then, granular morphology, particle size, and color of flours were analyzed. Carbohydrate (76.96±0.16%-79.57±0.08%), protein (2.75±0.07%-2.82±0.21%), and moisture contents (9.10±0.03%-11.89±0.52%) showed a significant difference between the samples while fat (0.90±0.03%-0.91±0.01%), ash (3.39±0.11%-3.73±0.02%), and fiber contents (3.76±0.19%-3.91±0.35%) were not significantly affected by thermal processing of corm. Thermal processing increased sodium (1.45 to 2.44-2.99 mg.100 g^{-1}), potassium (145.27 to 159.85-193.13 mg.100 g^{-1}), calcium (234.04 to 244.44-269.28 mg.100 g^{-1}), iron (16.99 to 17.69-18.32 mg.100 g^{-1}), and zinc (7.26 to 8.91-10.45 mg.100 g^{-1}) contents of flours. The water activity of flours was ranged from 0.25±0.01 to 0.58±0.01 which was safe from microbial growth. Flours were slightly acidic according to the obtained pH values (5.67±0.02-6.05±0.03). Both raw and processed corms produced gluten free flours. Color analysis results revealed that boiled corm flour was the brightest, and the highest whiteness index was recorded for raw corm flour followed by the wheat flour. The particle size of flours (1.050-1.527 μm) were not significantly changed by thermal processing of corms. The scanning electron micrographs revealed corm flours had irregular shaped granules and poor protein network when compared to wheat flour. In conclusion, boiled corm flour exhibited better physicochemical properties and can play an important role in human nutrition.

Keywords: *Alocasia macrorrhiza*; Physicochemical Properties; Proximate Composition; Thermal Processing