



Physicochemical and Nutritional Characterization of *Polyalthia longifolia* Seed Flour and Oil

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Abstract

Seeds of *Polyalthia longifolia* were subjected to extraction with *n*-hexane using a Soxhlet apparatus to obtain the seed oil (PLSO) and residual cake (PLSC). The residual cake was evaluated for its mineral and amino acid compositions, while the oil was analyzed for mineral content, fatty acid profile, unsaponifiable components, and lipid classes using standard analytical procedures. The amino acid analysis of PLSC revealed that glutamic acid (8.25 g/100 g), aspartic acid (6.20 g/100 g), leucine (5.17 g/100 g), glycine (4.23 g/100 g), along with lysine, phenylalanine, arginine and alanine were the most abundant amino acids, whereas tryptophan (0.50 g/100 g) was present in the lowest amount. The ratio of essential to non-essential amino acids (0.79) suggests a well-balanced protein composition. Mineral analysis of PLSO showed relatively high levels of potassium (756.04 ppm), calcium (692.86 ppm) and magnesium (160.03 ppm), with a similar trend observed in PLSC. The oil exhibited notable physicochemical properties, including an unsaponifiable matter content of 23.02%, a saponification value of 197.25 mg KOH/g, and an iodine value of 64.04 mg I₂/g, indicating a high degree of unsaturation and potential industrial applications. The predominant fatty acids identified were oleic acid (44.20%), palmitic acid (36.62%), linoleic acid (11.52%), and stearic acid (4.13%), resulting in a composition of 57.70% unsaturated and 42.22% saturated fatty acids, which highlights its nutritional and cosmetic relevance. Neutral lipids constituted the major fraction (93.52%) of PLSO, while the unsaponifiable fraction contained bioactive compounds such as α -ergosterol, stigmasta-7,25-dien-3-ol, phytol, and beta- tocopherol. Overall, the seed flour and oil of *P. longifolia* demonstrate considerable potential for nutritional, functional, and industrial applications.

Keywords: *Polyalthia longifolia*, Amino acid profile, Fatty acid analysis, Physicochemical properties, unsaponifiable fraction

