

**Development of Adamant creeper (*Cissus quadrangularis* Linn.) incorporated crackers and evaluation of chemical and bio-active properties**

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**Abstract**

The Adamant creeper (*Cissus quadrangularis* Linn.), known as "Heeresa" in Sinhala and "Pirandai" in Tamil, is a versatile medicinal plant with a history steeped in traditional remedies. This valuable plant is underutilized in Sri Lanka. Therefore, present study aimed to explore the food applications of Adamant Creeper Stem Powder (ACSP) and to harness the potential of developing crackers with the ACSP. The ACSP was collected from Kilinochchi district, Sri Lanka. Stems were cleaned, dried, powdered (0.25 mm particle size) and used for formulating the cracker. The cracker was prepared using margarine, water, baking powder, sugar, salt, garlic powder, ACSP with wheat flour and finger millet flour in different ratios. Crackers were baked in the oven at 180 °C for 10 minutes and analyzed for proximate composition, antioxidants and sensory evaluation. The crackers developed without ACSP were used as the control. Based on the results of the sensory evaluation, 7% ACSP with wheat flour was selected as the best cracker. The percentages of moisture, total ash, crude protein, crude fat, crude fiber and available carbohydrate in the composite crackers were 4.4±0.0, 7.8±0.2, 15.7±0.9, 15.4±0.3, 2.2±0.8, and 54.7±0.8 respectively. Percentages of moisture, total ash, crude protein, crude fat, crude fiber and available carbohydrate determined in the control crackers were 2.7±0.2, 4.3±0.0, 13.1±0.9, 14.2±0.2, 0.4±0.1 and 65.1±0.8 respectively. Both composite and control crackers exhibited similar water activity levels (0.4±0.01), however, there was a difference in the pH values (composite cracker, 8.5±0.2; control cracker, 6.2±0.2). The present study revealed that the composite crackers exhibited enriched nutritional content, showcasing elevated levels of potassium (1.7%), phosphorus (0.4%), and calcium (0.7%) compared to the control crackers. In addition, the total phenol content in the composite and control crackers were found to be 54.2±2.9 mg gallic acid equivalents (GAE)/g of dry matter and 49.0±1.4 mg GAE/g of dry matter respectively. Total flavonoid content in composite and control crackers were found to be 59.5±4.6 mg catechin acid equivalents (CAE)/g of dry matter and 30.8±0.2 mg CAE/g of dry matter respectively. The incorporation of ACSP enhanced the nutritional properties of the composite crackers compared to the control crackers. In conclusion, present study highlights the potential of ACSP as a valuable dietary inclusion in the form of composite crackers, showcasing its potential in offering health benefits.