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Phytochemical, Antioxidant, Vitamin, and Mineral Profiling of a Nigerian Herbal Tea: Nutritional and Safety Evaluation

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ABSTRACT

Introduction: Herbal teas are gaining widespread attention for their therapeutic potential and sensory appeal. This study aimed to assess the phytochemical constituents, antioxidant activity, and nutritional profile—particularly vitamins A and C—of a locally formulated herbal tea blend. The blend contained a variety of aromatic spices, including cinnamon, cloves, cardamom, lemongrass, black pepper, ginger, star anise, fennel seed, and doum palm fruit.

Methods: Dried tea samples were pulverized and subjected to cold maceration. The extracts were filtered, concentrated using a rotary evaporator, and stored for subsequent analyses. Phytochemical screening was conducted using standard qualitative colorimetric assays. Antioxidant activity was measured via the DPPH radical scavenging method. Vitamin A (as total carotenoids) and vitamin C (ascorbic acid) levels were determined using spectrophotometric and iodometric methods, respectively. Mineral content was analyzed using atomic absorption spectroscopy.

Results: Phytochemical analysis confirmed the presence of tannins, sterols, triterpenoids, glycosides, saponins, phenols, alkaloids, terpenoids, flavonoids, and resins, with carbohydrates notably absent. The extract demonstrated 43.42% DPPH radical scavenging activity at a concentration of 2 mg/mL, compared to 91.41% for the vitamin C standard. Vitamin A content was recorded at 6.189 mg/100 g. Mineral analysis revealed concentrations of lead (71.85 mg/L), zinc (19.80 mg/L), iron (212.49 mg/L), copper (26.42 mg/L), potassium (6290.19 mg/L), magnesium (773.38 mg/L), calcium (2640.54 mg/L), and nickel (8.85 mg/L).

Conclusion: This study suggests that the herbal tea may play a dual role as both a flavorful beverage and a potential natural therapeutic agent. Its phytochemical and nutritional composition could support the value of traditional herbal formulations in modern preventive nutrition and wellness practices, though further research is needed to confirm these effects.

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