

The Effect of Drying Methods, Particles Size and Fermentation on the Quality Evaluation of Water Apple Black Tea

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Structured Abstract

Background: Black tea, valued for its distinct taste and recognized health benefits, is widely preferred. The leaves of water apple (*Syzygium samarangense*), often deemed waste, contain trace bioactive compounds with diverse health benefits. The potential health advantages of water apple in edible beverages remain unexplored. This research addresses the gap by extensively using water apple leaves, converting waste into potentially health-beneficial black tea. The purpose of this study is to determine the effect of different drying methods, particles size and fermentation methods on the physical and chemical attributes of the water apple black tea.

Methods: Water apple leaves were harvested, cleaned, soaked, withered, size-reduced, oxidized, fermented, dried, and ground to achieve the final tea product. The leaves were divided by different drying methods (oven drying and microwave), different particles size (>2mm and <2mm) and treatment (fermented and non-fermented). The physical analysis included moisture content, colour measurement ($L^*a^*b^*$), and pH determination. Chemical analysis involved assessing total phenolic content and antioxidant capacity using the 2,2-diphenyl-1-picryl-hydrazyl (DPPH) method. Additionally, the caffeine level in the tea was determined.

Results: This study reveal drying methods, particles size and fermentation show a significant difference in physical and chemical analysis of tea. The most appropriate method for producing high-quality black tea is non-fermented oven drying with a particle size <2mm. This method yields tea with colour parameters (lightness, redness, and yellowness) closest to the control values of 47.77, 2.027, and 15.137, respectively. It maintains a pH value of 6.13, registers the highest total phenolic content at 24.354 mg GAE/g, and exhibits the lowest IC₅₀ values (0.198), indicating superior antioxidant activity compared to control and presents selection percentage of 66.67%, outperforming other parameters.

Conclusion: These findings suggest that non-fermented oven drying with particle size <2mm present as the appropriate method in producing black tea from water apple leaves, highlighting its potential to enhance the overall quality and characteristics of the black tea and provide more benefits compared to commercial guava tea leaves.

Keywords: Black Tea, Water Apple, Drying Method, Particles size, Fermentation

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