

Effect of Vahl Leaf (*Justicia secunda*) on the Sensory, Chemical and Microbial Properties of Zobo (*Hibiscus sabdariffa*) Drink

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Abstract

Introduction: *Justicia secunda* is an underutilized plant rich in both macronutrients and trace elements of which calcium and iron are in high quantity. Zobo (*Hibiscus sabdariffa*) is utilized in the production of many food products including beverages, jam, and sauces, consumed by all. Since the nutrient content of zobo is very low, it is important to fortify the beverage with *Justicia secunda* which have been reported to be rich in these nutrients. The effect of the addition of vahl leaf (*Justicia secunda*) on the sensory, chemical, and microbial properties of zobo (*Hibiscus sabdariffa*) drink was studied.

Methodology: The experiment was a mixture design from Design expert (12) software. A total of 15 zobo samples were produced using varying quantities of vahl leaf and zobo leaf extract. The samples were subjected to sensory evaluation and the five most preferred samples were selected for chemical and microbial analyses.

Results and Discussion: The values obtained for proximate composition (%) of the samples differed significantly and ranged between 0.50-0.70, 75-85, 0.30-0.90, 0.40-0.55, 3.0-7.0, 10.20-16.45 respectively for ash, moisture, fat, fibre, protein, and carbohydrate. Minerals (calcium, sodium, potassium, magnesium, and iron) as well as Vitamins (C and B) were also analyzed. The values obtained ranged between 2.6-4.0 mg/100g, 205-234 mg/100g, 7.0-14 mg/100g, 0.4-1.3 mg/100g, 7.1-10 mg/100g, and 0.1-0.9 mg/100g respectively. Also, the values obtained for pH and TTA were low and ranged between 3.0-4.0 and 0.90-0.98 g/L respectively. Furthermore, the microbial load of the samples was analyzed after 1, 3 and 6 days of storage. The bacterial count showed that all samples had no growth on day one. Sample NNF (30 g *Justicia*:100 g zobo:2492.5 mL water) had the highest growth on day three in all replicas (4.35 x 10², 4.33 x 10², 4.28 x 10² cfu/ml), while sample NNB (30 g *Justicia*:87.5 g zobo:2505 mL water) recorded no bacteria growth at the end of the 6 days storage period.

Conclusions: Sample NNA (35 g *Justicia*:87.5 g zobo:2500 mL water) was most preferred and contained enough nutrients. The study further enhances the strengths of zobo drink in new product formulation for the beverage industry.