

QUALITY AND SAFETY EVALUATION OF A NOVEL AVOCADO-BASED (*Persea americana*) BEVERAGE DURING REFRIGERATED STORAGE

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INTRODUCTION & AIM

Fruit juices, which are made from fresh juices, are high in vitamins, antioxidants, and other nutrients that support immunity, digestion, and heart health.

The nutrient-dense climacteric fruit Avocado (*Persea americana*) is rich in vitamins, fiber, and monounsaturated fats. The Hass variety, popular in Sri Lanka, is well-suited for value-added products, such as avocado juice, and exports. Avocado is a tropical fruit rich in monounsaturated fatty acids, antioxidants, and vitamins, and offers great potential for producing a nutrient-dense beverage.

However, due to its high lipid content and tendency towards enzymatic browning, avocado-based beverages are prone to oxidative deterioration, microbial spoilage, and phase separation, which limit their shelf life and consumer acceptance.

This study was therefore conducted to,

To develop and evaluate a novel avocado beverage

Selection of the most suitable avocado variety for the beverage

Formulate and standardize the juice type

Evaluate nutritional profiles and assess sensory attributes

Determine storage stability under refrigerated conditions

Analyze market potential and consumer preferences



Figure 1.0- Avocado

METHOD

The research was carried out at the Food processing, Food analysis, and microbiology laboratories of the Department of Food Science & Technology, University of Sri Jayewardenepura, Sri Lanka.

Fresh ripe avocados were peeled and blended with bee honey and water to create the base formulation.

A trial-and-error pre-experiment was conducted to determine consumer-preferred texture and taste.

The Taguchi L9 orthogonal array was used to optimize ingredient levels systematically.

Sensory assessment was carried out using: Ranking test (for initial screening), 9-point Hedonic Scale (for acceptability), Just-About-Right (JAR) scale (to identify attribute improvements)

Key attributes evaluated: Green color, Fruity aroma, Sweetness, Texture, and Overall acceptability

Preservation and Refrigerated storage

Nutritional, quality, and safety analysis

RESULTS & DISCUSSION

1. Sensory Optimization

The Taguchi approach enabled the identification of an optimal formulation that achieved high consumer preference in color, sweetness, and aroma. JAR results suggested minor improvements in sweetness and aroma levels for enhanced acceptability.

2. Physicochemical Stability

Samples with higher preservative concentrations (30:300 ppm) showed: stable pH (5.86 ± 0.02), constant TSS (11.70°Brix), and minimal color degradation ($L = 54.597 \pm 0.015$) during refrigeration. The combination of mild heat treatment and low preservatives (10:150 ppm) slightly improved stability compared to low preservative use alone.

3. Microbial Quality

High-preservative-treated samples exhibited significantly lower microbial counts ($3.9 \times 10^4 \text{ CFU mL}^{-1}$) throughout storage, meeting acceptable microbiological safety limits for refrigerated fruit juices.

4. Oxidative Stability

The product maintained low TBA and PV values across 14 days: TBA: $0.0297 \pm 0.0004 \text{ mg MDA kg}^{-1}$, PV: $2.492 \pm 0.0033 \text{ O}_2 \text{ kg}^{-1}$. This indicates good lipid oxidation control, attributed to both preservative action and antioxidant compounds naturally present in avocado and honey.

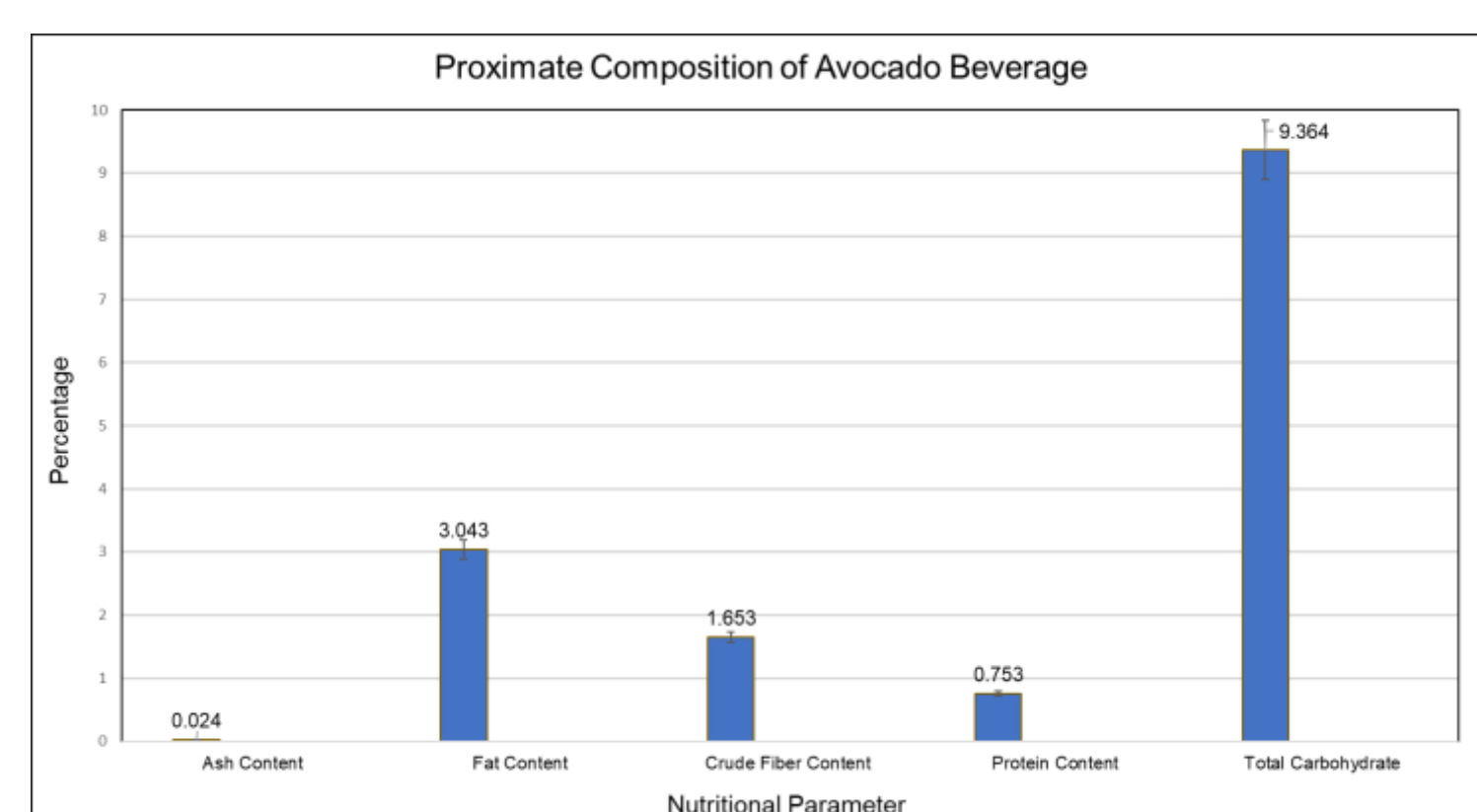


Figure 2.0- proximate composition of the beverage

Overall Findings

The developed avocado beverage demonstrated,

- ☐ Acceptable sensory attributes,
- ☐ Good oxidative and microbial stability
- ☐ Feasibility for short-term refrigerated storage (up to 14 days).

CONCLUSION

The developed avocado-based beverage showed good sensory acceptability and stability during 14 days of refrigerated storage. The use of mild heat treatment and suitable preservatives ensured safety, quality, and short-term shelf-life feasibility.

FUTURE WORK / REFERENCES

Future studies should focus on extending the product's shelf life, exploring natural preservative alternatives, and evaluating its commercial-scale potential.

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