

Effect of Salt, Citric Acid and Sorbitol on the Quality of Fresh Grated Coconut upon Frozen Storage

Muhamad Ridzuan Karim^{a*}, Fadhilah Jailani^{ab*}

Structured Abstract

Background: *Cocos nucifera* (L.), commonly known as the coconut, is native to Southeast Asia, particularly Malaysia, Indonesia, and the Philippines. This versatile plant is used for its nutritional and medicinal properties, including antimicrobial, anti-neoplastic, anti-inflammatory, and insecticidal applications. Various parts of the coconut, such as the epicarp, mesocarp, endocarp, and testa, are utilized in different ways, with coconut water being a natural drink rich in electrolytes and nutrients, and coconut meat providing healthy fats, fibre, vitamins, and minerals. Despite the extensive use of coconut kernels, the coconut testa remains underutilized.

Methods: The study evaluated the effectiveness of preservative formulations on grated coconut's shelf life. Four formulations were tested: 2% salt (Formulation 1), 2% salt + 0.3% citric acid (Formulation 2), 2% salt + 0.3% sorbitol (Formulation 3), and 2% salt + 0.3% citric acid + 0.3% sorbitol (Formulation 4). Samples were stored at -10°C for one month and analysed weekly for density, pH, water activity, moisture content, colour, Total Plate Count, Mould and Yeast Count, and sensory attributes to determine each preservative's effectiveness in inhibiting microbial growth.

Results: The study demonstrated that moisture content decreased over time across all formulations. pH levels remained stable, with higher values in the control and Formulation 3, while Formulations 2 and 4 exhibited lower pH values. Water activity decreased consistently, most notably in Formulation 1. Density generally increased, reaching its peak in the fourth week, particularly in the control and Formulation 4. Colour measurements showed no significant differences. Microbial counts were significantly reduced, especially with the combination of salt, citric acid, and sorbitol. Sensory evaluation rated all formulations as acceptable, with the highest scores for samples treated with multiple preservatives.

Conclusion: The study on grated coconut preservation found that a combination of salt and sorbitol effectively maintained sensory qualities and inhibited microbial growth, while citric acid alone adversely affected odour and acceptability. These results highlight the importance of selecting appropriate preservatives to extend shelf life without compromising quality, showcasing the potential of natural preservatives for sustainable food preservation.

Keywords: *Cocos nucifera*, Grated Coconut, Preservatives, Microbial Stability, Mould and Yeast Count, Shelf-Life Extension, Citric Acid, Sorbitol.

*Correspondence: fadhi478@uitm.edu.my

^a School of Industrial Technology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia

^b Food Science Research Group, Universiti Teknologi MARA, Shah Alam, Malaysia