Title: Techno-economic assessment and innovative production of nutrient-rich jam, jelly, and pickle from Sonneratia apetala fruit.

Author Name: Md. Ripaj Uddin, Md. Abu Bakar Siddique, Shahnaz Sultana, Umme Hafsa Bithi, Nahida Akter, Abubakr M. Idris, Muhammad Abdullah Al Mansur, AHM Shofiul Islam Molla Jamal, Mayeen Uddin Khandaker.

Abstract: *Sonneratia apetala*, a nutrient-rich mangrove fruit, presents an opportunity for innovative food product development, offering potential health benefits and economic value through the creation of jam, jelly, and pickle. This innovative invention reveals the nutritional content including vitamins and minerals of *Sonneratia apetala* jam, jelly, and pickles from Nijhum Dwip in Hatiya Upazila, Noakhali District. These products contain Na, Mg, K, Ca, Mn, Fe, Cu, and Zn, which are essential for human nutrition. The texture and sensory qualities of the products depend on their Total Soluble Solids (TSS), acidity, moisture, pH, and total sugar content, with each parameter receiving an average score of 7 to 8 out of 9 (hedonic scale). Trace amounts of Cd, Cr, Pb, and Hg were found to be significantly below the safe consumption limits. F^-, Cl^-, SO_4^{2-}, soluble and total PO_4^{3-} concentrations were also below safety thresholds. The moisture, ash, protein, fat, fiber, pectin, sugar, carbohydrate, and caloric values highlight the dietary benefits and energy content of these products. The products exhibited higher levels of vitamin C and minerals compared to other citrus fruits. All tested parameters met safe consumption standards, ensuring product safety. These products underwent testing for Heterotrophic Bacterial Count to guarantee their safety. A one-year shelf life is ensured by conducting quarterly storage data checks and organoleptic tests by a 10-member jury panel. The one-way ANOVA test for sensory analysis and shelf life detection indicates statistically significant results. These products help mitigate nutrient deficiencies and promote health by regulating the diet. Applying this technology in grassroots jam, jelly, and pickle production could potentially boost the local economy by approximately $10,000 annually through the creation of small industries among the coastal population.

Keyword: Sonneratia Apetala, Mangrove Fruit, Nutritional Composition, Vitamins, Minerals, Sensory Evaluation.

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