

Development of a Gluten-Free Fibre- and Iron-Rich Snack Bar Using Palmyrah Tuber Flour

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Snack bars serve as convenient, nutrient-dense energy sources; however, the utilization of underutilized tropical crops like Palmyrah remains limited. This study aimed to formulate a healthy, gluten-free fibre rich snack bar using Palmyrah tuber flour (PTF) and Palmyrah jaggery as primary ingredients. Four formulations (F1–F4) were developed by varying the Palmyrah tuber flour ratio (10g, 20g, 25g, and 30g) while maintaining constant levels of auxiliary ingredients. The Sensory evaluation using a 9-point hedonic scale (n=20 trained panelists) identified F3 (25 g Palmyrah tuber flour) as the most acceptable formulation. The optimized bar contained 60.34 g/100 g carbohydrates, 8.20 g/100 g crude fibre, 3.83 g/100 g protein, 11.39 g/100 g fat, and 2.40 mg/100 g iron, delivering 420.15 kcal/100 g. Comparative analysis against a commercial Oat bar confirmed the Palmyrah snack bar's superior fibre and iron content alongside lower sugar and salt levels. Texture profile analysis indicated the formulated bar (hardness - 76.00 g) was slightly softer than the commercial counterpart (96.00 g). Shelf-life studies confirmed microbial stability for up to three months (90 days). A consumer survey (n=250) targeting health-conscious young adults (20–40 years) revealed strong commercial viability for the snack bar. Overall, 84.8% of respondents were willing to purchase the product, with health benefits identified as the primary purchase driver (75.7%). Product perception scores were highly positive. Supermarkets emerged as the preferred retail channel (40.4%). Regression analysis indicated that preference for traditional ingredients significantly influenced willingness to pay ($p < 0.05$). Future work should prioritize gluten-free certification, standardized production protocols, and targeted marketing emphasizing Palmyrah's superior fiber, iron content, and traditional heritage to maximize commercial potential.

Keywords: Palmyrah tuber flour, Gluten-free snack bar, Functional food, Jaggery, Consumer acceptance, Shelf-life