

Formulation and standardization of natural liquid soap using palmyrah (*Borassus flabellifer*) fruit pulp and butterfly pea flower (*Clitoria ternatea*)

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This study aims to develop and standardize a natural liquid soap using locally available Butterfly Pea Flower (*Clitoria ternatea*) extract (BPF) and Palmyrah Fruit Pulp (*Borassus flabellifer*) (PFP), addressing growing consumer demand for sustainable, eco-friendly, and health-conscious personal care products. Six formulations with different BPF: PFP ratios (T1:1:2, T2:1:1, T3:2:1, T4:3:0, T5:0:3, and T6:0:0) were used in the study. To identify the best formulation, sensory and physico-chemical tests (pH, Density, Lather volume, Total free alkali) were performed. Features like texture, color, foaming ability, washing ability, skin feel after washing, and general acceptance were evaluated through sensory evaluation. T2 consistently got the highest ratings across all sensory metrics, indicating its higher consumer appeal. This combination had a 1:1 ratio of BPF to PFP. Physicochemical testing confirmed the liquid soap's stability and effectiveness. Crucial metrics like pH (10.23), foaming stability (380 cm foam height), viscosity (75.42 at 60 RPM), and washing power (0.28% total free alkali) verified that the solution complied with industry requirements while remaining skin friendly. To further guarantee adherence to quality and safety standards, the formulation of liquid soaps was evaluated according to Sri Lanka Standards (SLS). T2 was the most suitable for standardization and commercialization due to its optimal sensory and physio-chemical properties. Additionally, the soap maintained its chemical and physical qualities, exhibiting a satisfactory shelf life of one year. This study highlights the feasibility of using traditional ingredients, such as BPF and PFP, in contemporary formulations to support local resource promotion and sustainable product development. This approach makes meeting customer demand for natural products possible while promoting economic and environmental sustainability.

Keywords: *Butterfly Pea Flower, Natural liquid soap, Palmyrah Fruit Pulp*