

## Development of a value-added pumpkin (*Cucurbita spp.*) and curry leaves (*Murraya koenigii*) instant soup mixture and its proximate analysis.

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A healthy diet for humans should include a variety of foods, prioritizing providing a variety of nutrients. Nowadays, soup is considered a good food supplement due to its ability to provide a variety of nutrients, hydration, and support for digestion. In the modern world, soup is now commercially available in the form of instant soup as an alternative to homemade soup. Pumpkins (*Cucurbita spp.*) are a nutritious food source, with essential vitamins, minerals, antioxidants, and carotenoids. In Sri Lanka, a significant portion of the pumpkin harvest is wasted, and therefore, we aimed to make an instant soup mix with pumpkin. Curry leaves (*Murraya koenigii*), black pepper (*Piper nigrum L.*), salt, and sweet potato (*Ipomoea batatas*) starch were used as other ingredients, creating a synergy that enhances

both flavour and nutrition. The composition of the soup mix was selected via a sensory test, and the proximate analysis was done according to the AOAC standard methods. Moisture content was  $15.52 \pm 0.90\%$ , and the total ash content was  $11.67 \pm 0.54\%$ . The fat content of the soup mix was  $0.97\%$ . The protein content determined by the Kjeldahl method was  $2.17 \pm 1.53\%$ . The crude fibre content was  $0.90\%$  and the total carbohydrate content was  $68.77\%$ . These findings revealed promising results from the proximate analysis, highlighting the nutritional quality of the instant soup mix.

### Keywords:

Pumpkin, Curry leaves, Sweet potato, Instant Soup Mix, Proximate analysis

## Determination of the antibiotic amoxicillin in milk

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Milk proteins are among the most essential constituents of milk in terms of biological and nutritional properties. The use of antibiotics in food-producing animals causes the subsequent deposition of these drug residues in milk. Therefore, the quality of milk can be impaired due to antibiotics, leading to serious health concerns worldwide and in Sri Lanka, including antibiotic resistance and other adverse effects. Since milk is a highly consumed product globally, it is essential to conduct thorough testing to detect and quantify these residues to guarantee their safety. Therefore, this study aimed to determine the residue level contamination of amoxicillin, a commonly utilized veterinary antibiotic, in selected raw and processed milk samples and assess

their human health risks. The processed, pasteurized, and raw milk samples were collected from local markets and stored at  $-20\text{ }^{\circ}\text{C}$  till further analysis. Amoxicillin was extracted by an acetonitrile-methanol-distilled water (40:20:20) solvent system, and further analysis was conducted by Thin Layer Chromatography (TLC), High-Performance Liquid Chromatography (HPLC), and Ultra High-Performance Liquid Chromatography (UHPLC). TLC results indicated no visible spots associated with amoxicillin in the milk sample. HPLC chromatogram indicated a peak at 3.610 mins with characteristic UV peaks at 276, 228, and 194 nm for the amoxicillin standard (AS). The pasteurized milk sample indicated a peak at 4.085 mins with a UV peak at 276

nm, indicating the necessity for further verification. UHPLC analysis using isocratic and gradient techniques indicated peaks for AS at 2.950 and 2.949 mins, respectively, but corresponding peaks were not detected in the pasteurized or raw milk samples. Our study confirmed that amoxicillin residues were either absent or below the detectable level in the pasteurized milk samples analyzed. As a result, the pasteurized milk samples were confirmed to be free of amoxicillin

residues, ensuring compliance with safety regulations in Sri Lanka.

**Keywords:**

Antibiotic; Amoxicillin; Milk; HPLC; TLC.

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## Antioxidant and photoprotective properties of *Flacourtia indica* fruit extract: fractionation, and application in lipstick formulation

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*Flacourtia indica*, known as Ugurassa in Sri Lanka, is widely recognized for its ethnomedicinal applications. Despite its traditional use, scientific studies on its antioxidant and photoprotective properties remain limited. This study aimed to evaluate the antioxidant and photoprotective properties of *F. indica* fruit extract, perform sequential fractionation to identify bioactive fractions and incorporate a suitable bioactive fraction into a lipstick formulation to develop a herbal multifunctional lipstick. Chemical constituents in dried fruit powder were extracted by maceration using hexane, acetone, ethanol:water (80%v/v), and methanol. The highest extraction efficiency (12.13%) was obtained with ethanol:water (80%v/v). The total phenolic content (TPC) and total flavonoid content (TFC) in ethanol: water (80%v/v) extract were determined using Folin-Ciocalteu and aluminum chloride assays, respectively, yielding  $21.10 \pm 0.01$  mg GAE/g and  $34.70 \pm 2.20$  mg CE/g. Antioxidant potential was assessed using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging ( $IC_{50} = 782.94 \pm 12.61$   $\mu$ g/mL) and ferric reducing antioxidant power (FRAP) ( $0.348 \pm 0.008$  mg BHT/g) assays. The photoprotective property

was evaluated by determining the sun protection factor (SPF) spectrophotometrically with the Mansur equation, which indicated moderate UV protection ( $17.19 \pm 1.63$ ). Sequential fractionation of the extract was performed using hexane, chloroform, ethyl acetate, and methanol. SPF evaluation showed notable values for the hexane ( $30.85 \pm 2.84$ ), chloroform ( $17.19 \pm 1.63$ ), and methanol ( $15.99 \pm 0.65$ ) fractions. The methanol fraction exhibited the highest antioxidant activity (DPPH,  $IC_{50} = 296.50 \pm 2.27$   $\mu$ g/mL). As the methanolic fraction was red and exhibited antioxidant and photoprotective properties, it was incorporated into a lipstick formulation. The developed lipstick formulation was evaluated for color (dark red), texture (smooth), pH (5.6), melting point (53 °C), and skin compatibility (no skin irritation), confirming its suitability according to the Bureau of Indian Standards 9875:2018 guidelines for application, contingent upon the completion of toxicity studies.

**Keywords:**

*Flacourtia indica*; Antioxidant; photoprotective properties; lipstick.