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Physiochemical characterization of critically endangered *Coscinium fenestratum* (Gaertn.) Colebr. seed fat for potential niche applications in cosmetics and nutritional supplements

Oleochemistry

KAH Thathsara and SDM Chinthaka
Email: sdmchin@sjp.ac.lk
DOI: https://orcid.org/0000-0002-2798-5810

Abstract

Coscinium fenestratum (*Sinhala Veniwalgatta*), a medicinal plant native to Sri Lanka and India, is widely utilized in traditional medical practices such as Ayurveda, Unani and Siddha. The global cosmetic and nutritional industries are increasingly shifting towards plant-based feedstock, leading to the exploration of novel sources of fats and oils. However, the seed and fat of Coscinium fenestratum remain underutilized with no prior studies conducted on them. Therefore, this study aims to characterize the seed oil of C. fenestratum by determining its fatty acid (FA) composition as their methyl esters, chemical constituents in unsaponifiable matter, and other physiochemical properties. The oil was extracted using the Soxhlet extraction method. The ash and moisture contents of the seeds, acid value (AV), iodine value (IV), smoke point and thermal stability of the oil were determined. Fatty acid methyl esters and unsaponifiable matter were analyzed using gas chromatography-mass spectrometry. Results showed an oil yield of 46.94 ± 0.01% with a moisture content of 4.10 ± 0.03%, ash content of 2.30 ± 0.28%, AV of 2.34 ± 0.10 mg KOH/g, IV of 56.33 ± 0.32 g I2/100 g, smoke point of 202.9 ± 3.9 °C, decomposition temperature of 416.88 ± 1.74 °C, and unsaponifiable matter yield of 0.57 ± 0.01%. The dominant FAs, stearic (C18:0) and oleic (C18:1), contributed to 50.54 ± 0.88% and 39.21 ± 0.86% of the composition, respectively. The main constituents of the unsaponifiable matter were stigmasterol (1.91 mg/g), gamma-sitosterol (1.29 mg/g), campesterol (0.40 mg/g), fucosterol (0.37 mg/g), and squalene (0.13 mg/g). In conclusion, the findings of this study suggest that C. fenestratum seed fat has promising potential to be valorized in both cosmetic and nutritional supplement industries.

Seeds (A), kernels (B) and seed fat of C. fenestratum (C)

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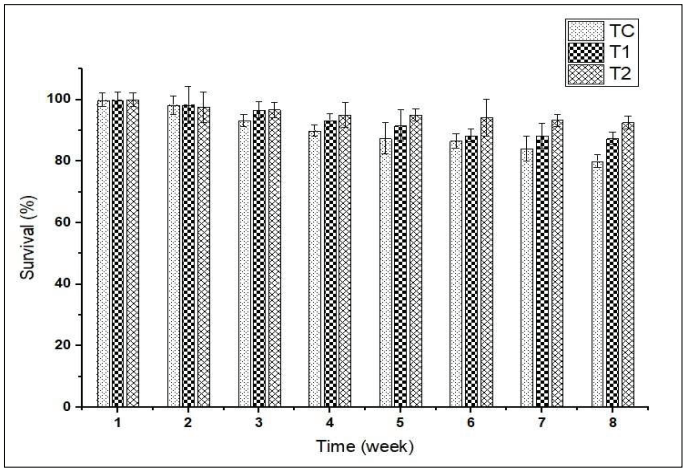
Impact of probiotics mixture as a water additive on water quality, growth performance and survival of *Catla catla* fry

Environmental Science

AKMMK Meddage, PM Manage and PM Withanage
Email: pathmalal@sjp.ac.lk
DOI: https://orcid.org/0000-0002-2014-2060

Abstract

The main objective of this study was to assess the impact of a commercial probiotic as a water additive on the survival, growth performance, and water quality of *C. catla*. A field trial was conducted for 66 days. About 360 *C. catla* fry (0.25 ± 0.01 g) were distributed randomly among 12 quadruplicate-designed cemented tanks, each containing 30 healthy fish in 0.15 m^3 of water. Control tanks were not treated with probiotics while the treatment tanks received 0.012 g m^{-2} $week^{-1}$ and 0.03 g m^{-2} $week^{-1}$ of the probiotic. Principal Component Analysis was carried out to identify key water quality factors. One-way ANOVA followed by Tukey's test was used to compare statistical differences. The results showed that adding probiotics significantly decreased ammonia concentration ($p < 0.05$). No significant differences were found in water temperature, total dissolved solids, pH, and electrical conductivity between treatments and control. The fish in tanks treated with probiotics showed a substantial increase in survival rate ($p < 0.05$), with the highest value of 92 ± 1.5%. The survival of *C. catla* fry was enhanced when a high dosage of 0.03 g m^{-2} $week^{-1}$ was administered. Despite the positive impact on survival, probiotic treatment did not influence the overall growth performance.



The survival rate among treatments (Initially, treatment T_1, T_2, and control tanks showed similar survival percentages. At the end of the study, control tanks showed the lowest survival and probiotic-treated tanks showed the highest survival compared to control tanks).

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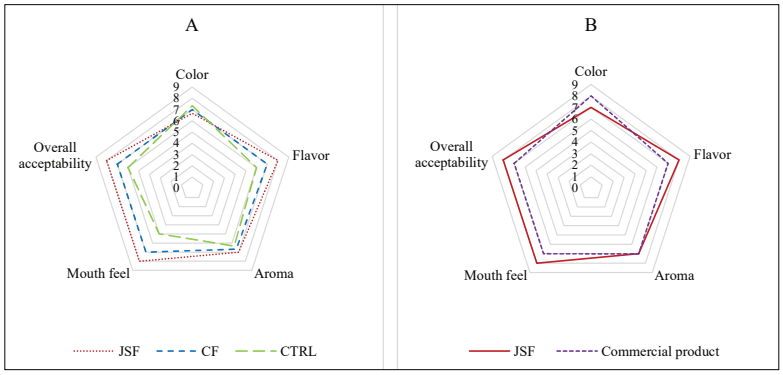
Utilization of jackfruit seed flour (*Artocarpus heterophyllus* L.) as a thickening agent in tomato sauce production

Food Processing Technology

CSDS Maduwage, SDN Kaushalya and WAJP Wijesinghe
Email: jnkwijesinghe@yahoo.com
DOI: http://dx.doi.org/DOI: 10.4038/jnsfsr.v53i2.12550

Abstract

Starch-based thickening agents are widely used in the food industry, and corn flour (CF) is the most prominent in tomato sauce manufacturing. Jackfruit seeds which are highly abundant but underutilized source of flour, have very limited industrial applications. Jackfruit seed flour (JSF) which can be acquired from jackfruit seeds is a good option to meet different industrial applications. Hence, this study aims to investigate the thickening capacity of JSF in tomato sauce production. As functional properties of flour change with their drying techniques, two drying techniques: hot-air-drying (HAD-JSF) and freeze-drying (FD-JSF) were tried, and out of them, HADJSF was used for the further studies based on its functional properties and potential to be used in commercial level. According to the proximate analysis, ash, fat, crude protein, and crude fiber were significantly higher while moisture and total carbohydrate content were significantly lower in HADJSF than CF ($p < 0.05$). HAD-JSF incorporated tomato sauce showed incredible thickening properties with increased viscosity (1083 cP) with lower syneresis than CF- incorporated tomato sauce (1004 cP). During the 8 weeks of storage period, total soluble solids and titratable acidity of JSF- incorporated tomato sauce was significantly consistent ($p > 0.05$) while the pH and the water activity significantly increased ($p < 0.05$). The microbial counts were below the standard limits. JSF incorporated tomato sauce received the highest consumer acceptance on the sensory evaluations. This study proclaims the potential of JSF as a successful thickening agent in tomato sauce.



Web diagrams of sensory evaluations; A: Web diagram for sensory evaluation 1 conducted to evaluate three treatments of tomato sauce; B: Web diagram for sensory evaluation 2 conducted to compare JSF incorporated tomato sauce and a commercial product; JSF: Jackfruit seed flour, CF: Corn flour, CTRL: Control

Link: https://www.nsf.gov.lk/index.php/component/content/article/46-jnsf/822-jnsf-volume-53-no-2-june-2025?Itemid=101
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Journal Publication Division
National Science Foundation
47/5, Maitland Place
Colombo 07
Sri Lanka

Phone: +94(0) 112696771
Fax: +94(0) 112694754