Tropentag, September 11-13, 2024, hybrid conference

"Exploring opportunities …
for managing natural resources and a better life for all"

Utilisation of nut and fruit processing byproducts for sustainable cosmetic formulations: A pathway to microplastic-free beauty products

Binal Dobariya, Dirk Bockmühl

Rhine-Waal University of Applied Sciences, Fac. of Life Sciences - Hygiene and Microbiology, Germany

Abstract

Microplastic pollution presents a significant challenge to the cosmetic industry, prompting the search for eco-friendly alternatives. This study explores the potential of waste from nut and fruit processing in Central Asia, particularly ground walnut shells (WS) and apricot kernel shells (AKS), as substitutes for synthetic abrasive particles in cosmetics. This project employs innovations and current research to address the issues concerning the use of WS and AKS in cosmetics and to maximise resource efficiency and profitability in the nut processing sector. The research begins with microbial analysis, which provides insights into the microbial quality of the shells. Refining the grinding process to create finely textured WS and AKS powder suitable for cosmetic use. Alternative methods for treating microbial contamination are being developed to ensure compliance with bio-cosmetic standards. Formulation frameworks are customized for foot, face, and rich cream products, with a focus on achieving smooth-edged particles sized between 50 and 100 micrometers. Stability testing confirms the effectiveness and scalability of the formulated products for commercial production. Furthermore, this project highlights the dual benefits of reducing microplastic pollution in cosmetics and reducing waste from fruit processing. The research helps achieve sustainable development goals by addressing environmental issues related to microplastics in wastewater, promoting agriculture, and generating employment opportunities by upholding the circular economy's fundamentals. The study's conclusions have worldwide relevance and mark an important step in the direction of a more environmentally responsible cosmetics sector. The potential for widespread acceptance highlights the significance of creative use of natural resources for a greener future, from Germany to Central Asia and beyond.

Keywords: AKS, bio-cosmetics, Central Asia, Germany, microplastic, resource efficiency

Contact Address: Binal Dobariya, Rhine-Waal University of Applied Sciences, Fac. of Life Sciences - Hygiene and Microbiology, Marie-Curie-Str. 1, 47533 Kleve, Germany, e-mail: binal.dobariya@hochschule-rhein-waal.de