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SERIES 98

&  
CMBRI Seminar Series FY2025-12

Kaushita Banerjee  
2025-01-20

### Series - 98

Date and Time - 20 January 2025 (3.00 PM JST | 12.00 IST)

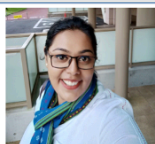
Venue - Zoom

Speaker - Kaushita Banerjee

Affiliation - School of Biosciences & Technology, Vellore Institute of Technology, Vellore, India

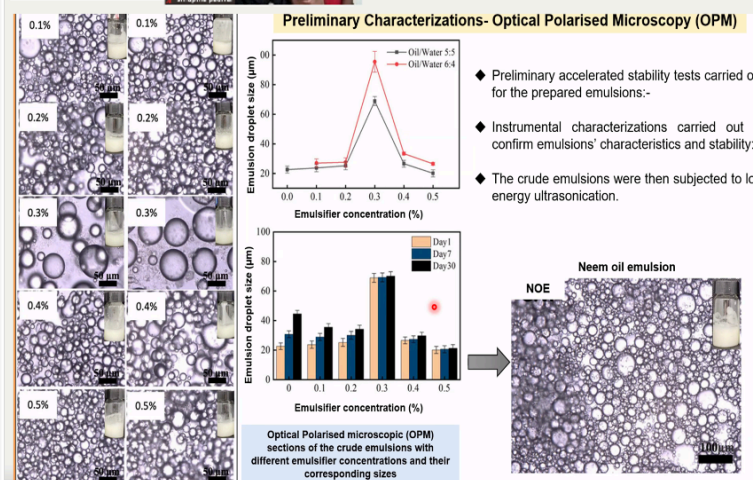
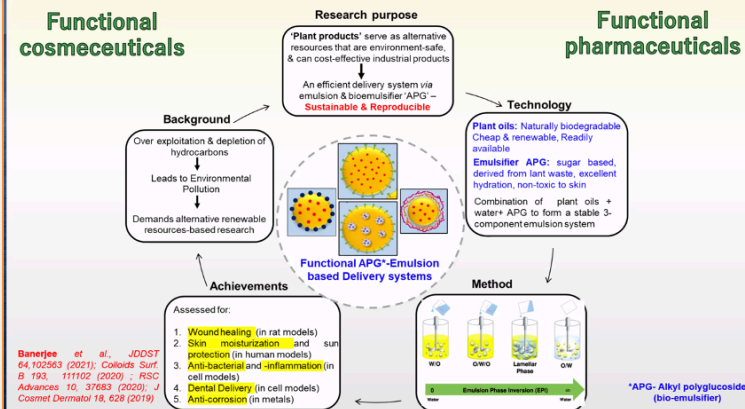
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## Biocompatible Alkyl Polyglucoside-Stabilized Plant Oil Emulsions: A Sustainable Approach for Antimicrobial, Anti-Inflammatory, and Wound Healing Applications

Emulsion formulations are of major interest due to their relative biosafety, biocompatibility and good pharmacological potential. Their structural constituents (oil and water phase) facilitate ready solubilization of incorporated hydrophilic/lipophilic actives for their targeted delivery. Moreover, the depletion of petroleum reserves and increasing environmental concerns have driven the exploration of renewable resources for industrial applications. Plant oils (both natural and essential) have emerged as sustainable alternatives due to their biocompatibility and therapeutic properties. The present study focuses on the formulation of emulsions using plant oils *viz.*, neem, clove, and sunflower oils stabilized with the biocompatible alkyl polyglucoside emulsifier. Alkyl polyglucosides (APGs) are non-ionic surfactants derived from renewable plant-based resources, such as glucose and fatty alcohols, are highly biocompatible, biodegradable, and environmentally friendly alternatives to synthetic surfactants. APGs are widely used in cosmetics, pharmaceuticals, and food industries, primarily for their emulsifying, foaming, and stabilizing properties. These APG based emulsions were extensively characterized using FTIR, WAXD, DSC/TGA, microscopy, and rheological analyses to ensure stability and functional efficacy. The formulated emulsions demonstrated significant anti-MRSA activity, anti-inflammatory properties, and wound healing potential in *in vitro* and *in vivo* models using m5S fibroblasts and Wistar rats. The emulsions exhibited potent antibacterial activity against cariogenic *Streptococcus mutans* and effectively inhibited biofilm formation, underscoring their potential in dental care applications. Moreover, the plant oil emulsions displayed promising sun protection factor (SPF) capabilities, enhanced by bioactive and nanoparticle incorporation, and exhibited favorable sensorial properties for cosmetic applications. This research thus underscores the multifunctionality of plant oil-based emulsions in addressing a wide range of applications, from dermal and cosmetic care to dental and tissue engineering therapies, offering a sustainable and eco-friendly alternative to conventional synthetic formulations.



- RW Renu WADHWA (Host, me)
- KB KAUSHITA BANERJEE
- am ajanta mazumdar
- A Anup
- AB Aswani BS IITG
- B Bharathwaj
- BR BRC-INBIO\_IDN\_Nuzian Ra...
- P BRC-INBIO\_IDN\_Putri Amalia
- G GOWDA SIDDABASAVE...
- Kevin Huynh
- KS Kumari Suraksha
- M MUKESH KUMAR
- M Malek
- MH Mangala Hegde
- MD Mayouri Das (SU)
- P Parama
- R Ruchira
- SM Samrat Mukherjee
- SS Sayantan Saha
- SJ SHRISTY JHA
- shruptha padival
- S Sosmitha
- SD Souvik Das (S.U)
- SK Sunil Kaul (AIST-Japan)
- U UZINI
- YO Y Ohmiya (AIST)
- Yogesh Dalvi
- 平野和己 (産総研)
- S Shweta