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Potential use of purified sophorolipids subspecies in Skin care and wound healing formulations

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Surfactants are commonly used in skin care and wound healing formulations as emulsifying agents. However, most of these surfactants are of synthetic origin, and many have been reported to be a major cause of allergic reactions, skin irritations and delay in wound healing. Hence, growth in consumers demand for natural, sustainable, and biocompatible ingredients in skin care and wound healing formulations with better or equal performance to synthetic surfactants. In this regard, microbial sophorolipids (SLs) are a type of glycolipid biosurfactants mainly produced by Starmerella bombicola and exist as crude mixtures of lactonic (LSL) and acidic (ASL) forms. Glycolipids are well-known to possess bioactive properties such as antimicrobial, anticancer, and immunomodulatory effects. However, most in-vivo and in-vitro studies on these bioactive properties of sophorolipids were determined using their crude mixtures, resulting in significant inter-study variations, which are difficult to interpret. Therefore, to broaden the potential applications of SLs investigations, using their pure subspecies would be advantageous. In this study, we evaluated the cytotoxicity and wound healing effects of purified LSL (≈ 90%) and ASL (≈ 100%) on spontaneously transformed human keratinocytes (HaCaT) using XTT and in-vitro wound healing assays and compared to synthetic surfactants (SLES). Cell viability assay revealed that up to 500 □g mL -1, ASL were not toxic to HaCaT cells while in the in-vitro wound healing assay, both ASL and LSL significantly enhanced wound closure (99% and 71% closures respectively), making them potential candidates for use in skin care and wound healing formulations.

Biography

Simms Adu is currently a final year Ph.D. student at Ulster University, Coleraine, Northern Ireland. Simms completed his undergraduate degree in Biosciences and Biotechnology (majored in biology) from the University of Camerino (Italy) in 2019 and currently works with the Microbial Biotechnology Research Group at Ulster University. Simms Adu's doctoral research focuses on the potential beneficial effects of microbial biosurfactants on the normal human skin and skin microbiome.