

BIOBASED SURFACTANTS: A USEFUL BIOREFINERY PRODUCT THAT CAN BE PREPARED USING GREEN MANUFACTURING

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Biobased surfactants, readily prepared from common biorefinery process streams and commonly employed as emulsifiers, wetting agents, plasticizers, and agents for lowering surface and interfacial tension, are becoming increasingly popular for use in foods, cosmetics, pharmaceuticals, and other industries. This trend is driven by the increase of cost for petroleum, the enhanced environmental sustainability provided through use of renewable resources, and the increased abundance of bio-based feedstocks resulting from development of biorefineries. Although most biobased surfactants are manufactured by chemical means, their preparation via bioprocessing is very attractive for future employment due to further enhancement of sustainability and potential savings in energy, downstream purification, and disposal costs. This presentation provides an overview of current research and development to prepare biobased surfactants via conventional and enzymatic processes, and features work by the author in preparing sugar ester surfactants using lipases in solvent-free media. Yields of 90-95% have been achieved using stoichiometric feeds; therefore, minimal downstream purification would be required.