

## CHAPTER 20

# Biosurfactants for sustainability

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### 20.1 Introduction

The ongoing challenges facing the environment about burning fossil fuels such as coal and petrol have resulted in increasing realization that encourages the exploration of sustainable processes. As a matter of urgency, various countries are now adopting certain measures with the application of sustainable developments to reduce global environmental and climatic challenges. The adoption of sustainable bio-based products as an alternative to synthetic products is a major solution (Ng et al., 2020). The continuous progress in science and technology has propelled humanity into the exploration of natural resources. These have opened diverse activities, including exploration of crude oil; digging of fossil fuels; utilization of crude-oil-related products such as petrol, diesel, and kerosene; and continuous use of chemicals in the pharmaceutical and agricultural products that have ameliorated the global way of life. However, the introduction of chemicals to ease lifestyle has also had some side effects on human beings and their environment as heavy metals, synthetic chemicals, materials, and solvents are needed for these developments (Wilton et al., 2018).

Moreover, the effect of using synthetic surfactants has increased concerns about the environment due to the side effect, leading to a growing body of research on biosurfactants. They are endured with reduced toxicity, minimal effects on the ecosystem, and biodegradability (Sajna et al., 2013). Because of these important properties of biosurfactants, they are being applied in diverse industrial applications, including cosmetics, food and beverage, environment, and pharmaceuticals (Varjani et al., 2021). In the global market, biosurfactant production is correspondingly low, mainly because of higher downstream processing and feedstock costs (Adesra et al., 2021). The costs of feedstocks in the production of biosurfactants amount to more than half of the overall production costs. The continuous growth has accumulated a compound annual growth rate from of 4.3% from 2014 to 2020 (Gaur et al., 2022). In 2020, about USD 1.8 billion in sales were generated as revenue from the biosurfactant market, and this revenue is forecasted to exceed USD 2.6 billion by 2027. Europe and the