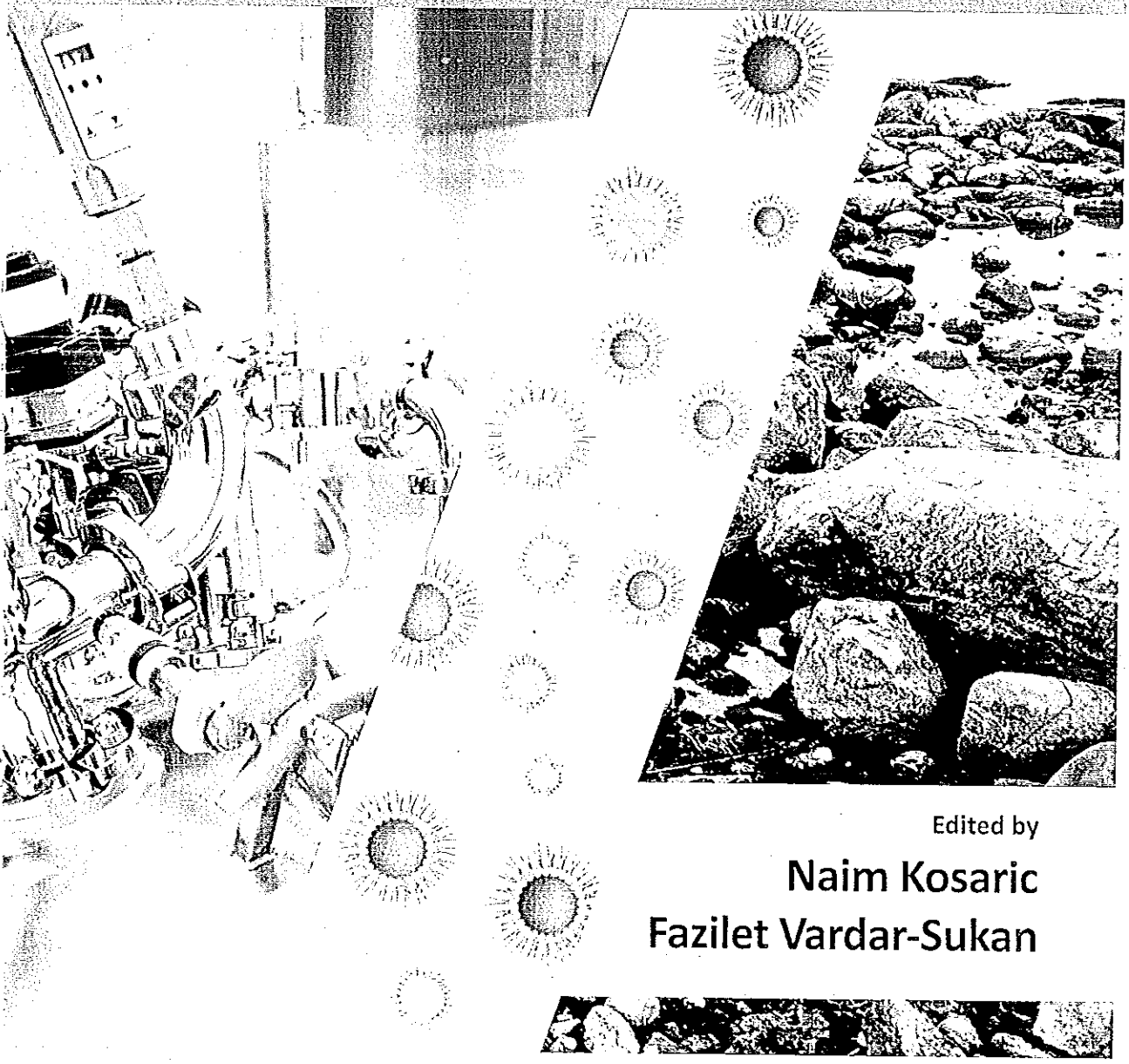
Surfactant Science Series volume 159

BIOSURFACTANTS

Production and Utilization—Processes, Technologies, and Economics



Edited by

Naim Kosaric

Fazilet Vardar-Sukan

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Parveen Jamal, Wan Mohd Fazli Wan Nawawi, and Zahangir Alam

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7.1 INTRODUCTION

Demand for surfactant chemicals for household cleaning products, personal care sectors, agriculture, food, pharmaceutical, and environmental industries is steadily increasing. According to a 2013 Acmite Market Intelligence report [1], the world markets of surfactants reached US$26.8 billion in 2012, experiencing a 10% increase since 2010. These figures are predicted to increase by 3.8% annually in the coming years and, by 2016, the market is expected to reach US$31.1 billion. However, due to the potential hazard of synthetic surfactants toward human health and increasing consumer demand for chemical products that are both effective and environmentally compatible, it is natural to turn to the microbial world to fulfill this demand by means of biosurfactant utilization. Microbial-derived surfactants are produced on living surfaces mostly microbial cell surfaces, or excreted extracellularly, and contain hydrophilic and hydrophobic moieties capable of reducing surface tension and interfacial tension between individual molecules at the surface and interface. Such properties exhibit excellent detergency, emulsifying, foaming, and dispersing traits, which can be applied in various industries. They are also commercially promising alternatives to chemically synthesized surfactants due to their inherent biodegradability, lower toxicity, better foaming properties, and greater stability toward temperature and pH [2].

BIOTECHNOLOGY

Stresses the Potential Applications of Biosurfactants in Various Industries

Environmental concerns and a demand for sustainable chemical production have become important issues in recent years. As a result, microbial biosurfactant-producing systems are gaining momentum as potential replacements for chemical surfactants.

Biosurfactants: Production and Utilization—Processes, Technologies, and Economics explores the production, utilization, and industrial/economic use of biosurfactants in modern biotechnology. This book represents comprehensive material developed by contemporary experts in the field, focusing on research and developments within the last 20 years. It highlights relevant changes in the industry. It provides a detailed account of the current applications of biosurfactants, considers the potential for further environmental, biological, and industrial applications, and concentrates on surfactants and organisms with possibilities for future use.

Emphasizes Process Scale-Up and Commercialization

Focusing on the industrial application of biosurfactant production based on renewable resources, the book determines how biosurfactants can enhance or replace the properties of chemically synthesized surface-active agents. It discusses moving beyond the laboratory scale of research and development and on to the industrial scale of commercial interest.

The book consists of 17 chapters and features expert authors discussing topics that include:

- Understanding the regulatory processes controlling the production of biosurfactants
- Strategies for feasible commercial biosurfactant production
- Examples of cost analysis based on published information
- The viability of industrial applications in food, cosmetics, and pharmaceuticals
- Patents for future trends

In addition, it contains special sections devoted to the overview and evaluation of special patents relating to biosurfactants, and methods for production of biosurfactants on a laboratory and industrial/commercial scale. It also presents novel and proven applications for biosurfactants from a number of biotechnology laboratories and research facilities around the world.

Biosurfactants: Production and Utilization—Processes, Technologies, and Economics is an ideal resource for chemists; petrochemical, chemical, biochemical, petroleum and pollution control engineers; graduate students in these disciplines; and commercial and entrepreneurial economists, engineers, and scientists.

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