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Recent discussions on upcoming industrial and social reform policies have brought the concept of social stock exchange in India. Before the introduction of such a step as discussed in various news media and articles, investigation into various opportunities and threats for such policy are required to be performed in the Indian context. The concept of social stock exchange is well-practiced in countries like Canada, Singapore, South Africa, United Kingdom. Under this context, this paper presents a scenario of choosing the best option for an individual investor, from among various investment alternatives under the implementation of social stock exchange in India. A multi-criteria decision analysis model has been applied for the purpose in order to rank the alternatives under a set of criteria such as tax benefits, return from organizations and risk involved. The proposed multi-criteria technique helps to rank the alternatives in the order of preference so that an individual can choose the best one among the alternatives. The scenario for an individual choice is an instance of various situations to be faced by an investor under the introduction of social stock exchange. A numerical example shows the application of the ranking problem as presented in this paper.

**Keywords:** Social Stock Exchange, TOPSIS, Multi-Criteria Decision Analysis, Individual Investor

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### Abstract

The political situation of India is waiting for an upcoming bill on social stock exchange. Although the concept is new in India but the concept is not virgin in the entire world. Several countries of the world are well aware of such concept and applied social stock exchange in their economy successfully. The concept of social stock exchange is well-practiced in countries like Canada, Singapore, South Africa, United Kingdom. Before the introduction of such a step as discussed in various news media and articles, investigation into various opportunities and threats for such policy are required to be performed in the Indian context for social impact investments. Under this context, this paper presents a scenario of choosing the best option for an individual investor, from among various investment alternatives after the introduction of social stock exchange in India. A multicriteria decision analysis model based on PROMETHEE has been applied for the purpose of ranking the alternatives under a set of selected criteria such as tax benefits, return from organizations and risk involved. The technique helps to rank the alternatives in the order of preference so as to enable an individual investor to choose the best one among all the possible alternatives. A numerical example shows the application of the ranking problem as presented in this paper.

**Keywords:** Social Stock Exchange; PROMETHEE; Multi-Criteria Decision Analysis; Individual Investor

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In an endeavor to compare among various Multi-Criteria Decision Analysis Techniques (MCDA), this paper is an initiative to compare among three simple but well-practiced MCDA techniques known as TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution), MAUT (Multi-Attribute Utility Theory) and MACBETH (Measuring Attractiveness by a Categorical Based Evaluation Technique). These three particular techniques are chosen because of some common characteristics among these methods in terms of their types. The method of comparison involves the graphical comparison, complexity analysis and a new method as proposed in this paper. The proposed new method is presented at the end of this paper in the last section. Among these three techniques, TOPSIS and MACBETH have seen significant number of published articles, higher than that for MAUT. However there are numerous other MCDA techniques which will also be compared in near future. The current comparison as presented in this paper indicates superiority of TOPSIS over the other two techniques, MAUT and MACBETH.

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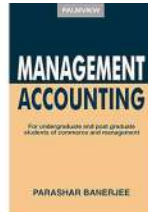
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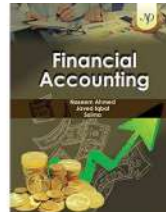
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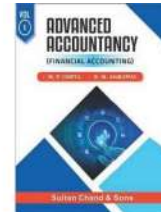
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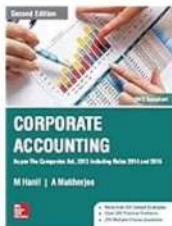


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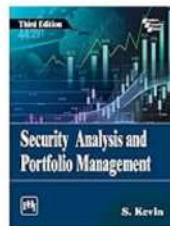
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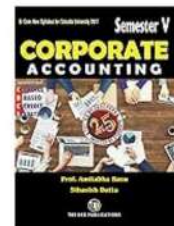
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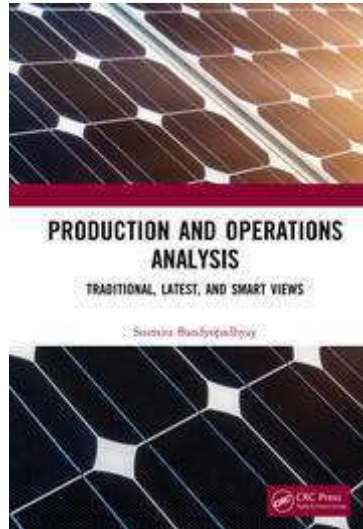
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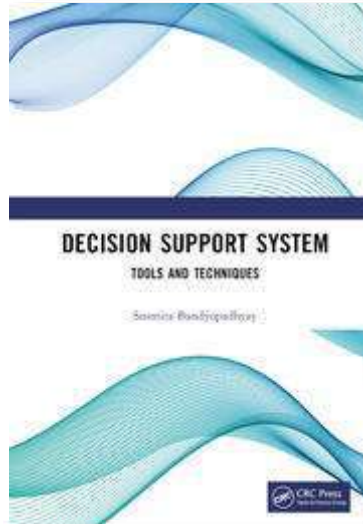
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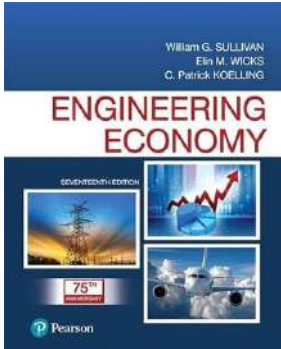
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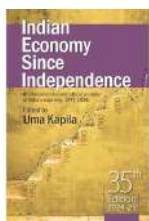
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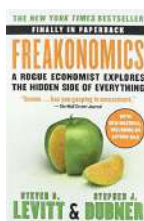
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Dr. William G. Sullivan earned his PhD from the Georgia Institute of Technology in Industrial and Systems Engineering. He has made enduring contributions to the field of engineering economy education in his more than 40 years of service to industry and the academy. A tireless lecturer, he has taught engineering economy to more than 10,000 students at five major universities (Georgia Tech, University of Tennessee, North Carolina State University,

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Arizona State University and Virginia Tech). Dr. Sullivan's textbooks in the field (five in total), including "Engineering Economy" (17th edition) continue to contribute to the education of thousands of students. He also has extensive consulting experience with 25 firms in the US.

**Elin M. Wicks** is the owner of Abacus Accounting LLC, an accounting and bookkeeping company focused on empowering small business owners to achieve financial success. She earned a BS and MS in Industrial Engineering from Rutgers University, where her masters research focused on a method of quantifying non-economic factors in monetary terms. During this time, she also developed software tools to assist Cosmair Inc. in improving scheduling and labor recording practices. She went on to earn her PhD in Industrial and Systems Engineering from Virginia Tech, focusing on the design of cellular manufacturing systems. She then joined the faculty of the University of Missouri, Columbia in the Industrial and Manufacturing Systems Department. After taking some time off to raise her children, she supplemented her education in the field of accounting and became the Senior Accountant of Glenn B. Cohen, CPA, an accounting and financial management firm. She has been an author of Engineering Economy since the publication of the 10th edition.

**Patrick Koelling** has served on the faculty in industrial and systems engineering at Virginia Tech since 1987. Dr. Koelling received his PhD in Industrial and Management Systems Engineering in 1982 from Arizona State University, an MBA in 1978, M.S.I.E. in 1977 and B.S.I.E. in 1976, all from the University of Missouri. He conducts research and teaches in operations research and management systems engineering. Prior to joining Virginia Tech, he spent two years at Hallmark Cards as a senior analyst and three years as an assistant professor at Oklahoma State University. Dr. Koelling has also served as department head of industrial engineering and management at Oklahoma State. Dr. Koelling has consulted with several private and government organizations, including the establishment of new industrial and systems engineering programs. He is a Fellow of the Institute of Industrial and Systems Engineers, Executive Director of Alpha Pi Mu, the industrial engineering honor society and Director of Accreditation Affairs for the Institute of Industrial and Systems Engineers.

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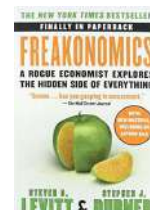


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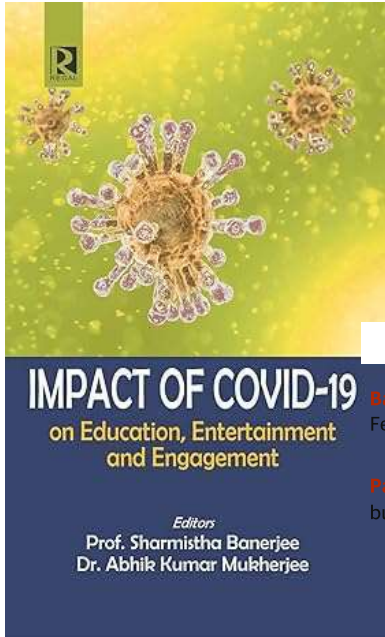
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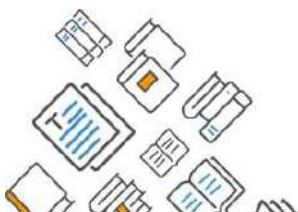
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This book improves our understanding of various dimensions of gender and transgender relations in India. It will be of interest to researchers in Gender Studies, South Asian Culture and Society, and Studies on India.

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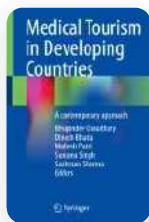
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| Chapter | First Online: 07 February 2024

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[Abhishek Mishra](#), [Ajay Wagh](#)  & [Haneer Sunil Vinchu](#)

## Abstract

Healthcare professionals have often been acclimatised as one of the most challenging (and promising as well) when it comes to the management of people at workplaces. Strange but true, the aspects of employment relations at workplaces have received little research consideration in healthcare sector even in the developed countries. India, becoming one of the most attractive destinations for medical tourism, has given substantial impetus to the healthcare sector which gave birth to new forms of employment relations practices in the sector. Adopting a qualitative approach where literature research along with the use of search engine using selected key words, the



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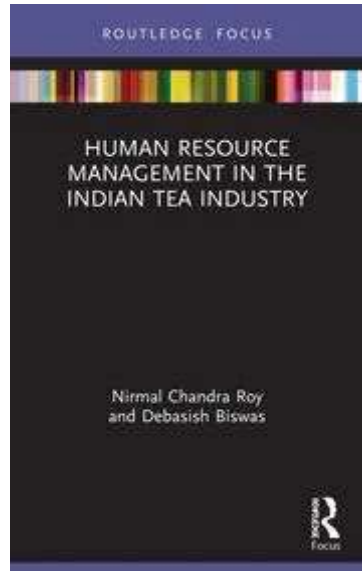
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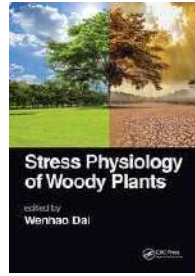
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## Abstract

Glycolipid consists of a fatty acid chain linked with carbohydrate moiety. They are basically produced by microorganisms. Due to their antifungal, larvicidal, mosquitocidal potencies, they prevent the plants from the pest and fungal infection. They have the capabilities to protect plant by stimulating the plant immune system. They are capable of stimulating plant defence genes. They are potent biopesticides as they are endowed with the properties of emulsification, pore an antibiofilm formation. This attracted the scientists and the industrialists to develop, extract, and purify the glycolipids. Biosurfactants originated from different microbes show antimicrobial activity against plant pathogens and act as biocontrolling agents to gain sustainable agriculture. The present article depicts the application of biosurfactants in agriculture.

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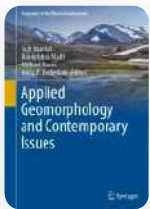
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[Home](#) > [Applied Geomorphology and Contemporary Issues](#) > Chapter

# Role of LU and LC Types on the Spatial Distribution of Arsenic-Contaminated Tube Wells of Purbasthali I and II Blocks of Burdwan District, West Bengal, India

| Chapter | First Online: 04 September 2022

| pp 245–256 | [Cite this chapter](#)



## Applied Geomorphology and Contemporary Issues

[Sunam Chatterjee](#), [Srimanta Gupta](#), [Bidyut Saha](#) & [Biplab Biswas](#) 

 Part of the book series: [Geography of the Physical Environment](#) ((GEOPHY))

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## Abstract

Earlier works suggest that the floodplain geomorphology has a close association with arsenic (As) contaminated tube wells. However, the association of As-contaminated tube wells and the Land Use Land Cover (LULC) categories is not clear. The focus area of the present study encompasses the Purbasthali I and II block, situated on the west bank of the



## Serial No. 129

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## Applications of Next Generation Biosurfactants in the Food Sector

2023, Pages 203-237

# Chapter 11 - Application of biosurfactants as emulsifiers in the processing of food products with diverse utilization in the baked goods

Sk Mehebab Rahaman<sup>a</sup>, Ajaya Bhattarai<sup>b</sup>, Dileep Kumar<sup>c</sup>, Bula Singh<sup>d</sup>, Bidyut Saha<sup>a</sup>

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### Abstract

Over the years, the food technology has emerged in tandem with changes in dietary trends. New technologies have arisen that not only improve the flavor and shelf life of food goods, but also contain effective additives that are same for customers' health and provide nutraceutical benefits. As a result, the adoption of natural alternatives to replace synthetic additives is increasing in ongoing research. Biosurfactants have evolved as natural alternatives that can employed as an emulsifying agent in the food processing industry. Biosurfactants of the lipopeptide, glycolipid, glycoprotein, glycolipopeptide types can emulsify a wide range of vegetable oils and fats in food processing with high emulsification index. This biomolecule has a beneficial impact on texture profile analysis and sensory attributes such as color, aroma, and taste evolution in baked goods. The research in this field is still in the lab, and additional research is needed before this natural alternative, biosurfactants, may be used in large industrial sectors.

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## Applications of Next Generation Biosurfactants in the Food Sector

2023, Pages 57-89

# Chapter 4 - Application of biosurfactant in the production of beverages

Monohar Hossain Mondal<sup>a</sup>, Wasefa Begum<sup>b</sup>, Ajaya Bhattarai<sup>c</sup>, Dileep Kumar<sup>d</sup>, Bula Singh<sup>e</sup>, Bidyut Saha<sup>b</sup>

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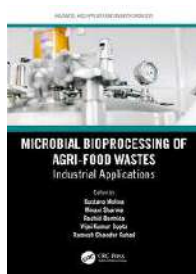
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### Abstract

Beverage or “drinks” inclusively stands for various consumable liquids, such as soft drinks, juices, milk derivatives, alcohols, beers, and hot liquids such as coffee, tea, hot chocolate, caffeinated drinks, etc. In contemporary times, various other types of beverages are produced for purposes such as immunization, personal care, and social celebrations, etc., with the main aim of compensation of thirst and balancing electrolytic equilibrium in the body system. With the evolution of health science, more consciousness regarding health and wellness has spread among people, and modification of traditional beverages is now a demand. Consumers around the globe are looking for drinks that are more sophisticated, more natural, and authentic. The definition of new generation food invokes more “green” and less synthetic foods for consumption, which includes lowering of addition of sugars, synthetic flavors, and chemicals. The demand for add-on benefits such as promotion of immunity, fitness, and overall wellness without altering taste is on top. To fulfill all these demands, the formulation of beverages needs a holistic understanding of science and technology of production and also alternative biomolecules that may replace the synthetic chemicals used in beverages. In this context, the most potential candidate in modern science has recognized is biosurfactants (BSs). BSs are termed as “new generation bio-chemicals,” because of their excellent properties,

## Chapter



## Microbial Valorization of Agri-Waste for the Production of Surfactants

By *Bidyut Saha* ([/search?contributorName=Bidyut Saha&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Bidyut+Saha&contributorRole=author&redirectFromPDP=true&context=ubx)), *Sk. Mehebab Rahaman* ([/search?contributorName=Sk. Mehebab Rahaman&contributorRole=author&redirectFromPDP=true&context=ubx](/search?contributorName=Sk.+Mehebab+Rahaman&contributorRole=author&redirectFromPDP=true&context=ubx))

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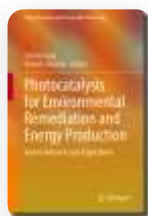


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# Visible Light Mediated Click Chemistry

| Chapter | First Online: 07 May 2023

| pp 153–165 | [Cite this chapter](#)



## Photocatalysis for Environmental Remediation and Energy Production

[Lalan Chandra Mandal](#) & [Bidyut Saha](#) 

 Part of the book series: [Green Chemistry and Sustainable Technology](#) ((GCST))

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## Abstract

Since the beginning human civilization, human beings have been searching for hidden mysteries of nature. Nature by natural process synthesizes millions of compounds within itself with the help of easily available reaction conditions. These compounds are proved to have the potentiality to serve human societies in various ways. Synthetic organic chemists also have been investigating various methodologies to synthesize bio-active molecules and designing of efficient compounds. Click chemistry can be considered as one of the important workbench which is directly or indirectly connected with many branches of science like physics, chemistry, biology, nano and material sciences. It has

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## 9. Toxicity of Hexavalent Chromium: Review

Authors : Mousumi Layek, Nargis Khatun, Priya Karmakar, Sandip Kundu, Mandira Mitra, Kripasindhu Karmakar, Subhodip mondal, Ajaya Bhattarai, Bidyut Saha

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# Chapter 10: Occurrence and Speciation of Ni in the Environment and the Health Risk to Living Organisms No Access

Arnab Patra, Nargis Khatun, Trishna Mandal, Sk. Mehebab Rahaman, and Bidyut Saha

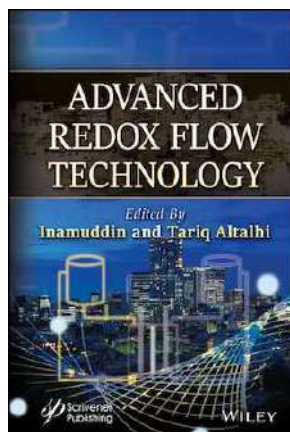
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## Abstract:

A detailed knowledge and recent advancements on the sources, speciation, toxicity and chemistry of nickel and its different compounds are discussed in this chapter. Nickel is an essential micronutrient for plant growth, and it is also a component of the enzyme urease, which plays a role in nitrogen metabolism in higher plants. Nickel and nickel compounds are also important for several biological processes in animals and soil/water microbes, and they have many industrial and commercial uses. Nickel is a known heavy transition metal and is found at very low levels in the environment. The vast industrial use of nickel leads to widespread environmental pollution. Higher levels of nickel can affect the photosynthetic function and transpiration of higher plants; it reduces seed germination, root and shoot growth, biomass accumulation and final production. Moreover, nickel toxicity leads to chlorosis and necrosis and may cause oxidative damage in plants. In addition, nickel toxicity degrades soil fertility, which may reduce crop production in the near future. The limited knowledge regarding the mechanisms of nickel tolerance in plants further highlights this fact. Furthermore, it causes many chronic diseases in humans, including allergy, cardiovascular and kidney diseases, lung fibrosis and lung and nasal cancers. The molecular mechanisms of nickel-induced toxicity, which cause the above diseases in humans, are still unknown. Mitochondrial dysfunctions and oxidative stress are mainly considered to play a crucial role in inducing toxicity from this metal. Therefore, we should pay attention in future research to find approachable and prominent ways of minimising the entry of nickel into our environment.



## Advanced Redox Flow Technology

Inamuddin Inamuddin, Tariq Altalhi

E-Book	978-1-119-90494-6	April 2024	<b>\$156.00</b>
Hardcover	978-1-119-90479-3	May 2024	<b>\$195.00</b>
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### Description

#### ADVANCED REDOX FLOW TECHNOLOGY

**This book serves as a comprehensive guide to redox flow technologies, from their basic principles to their applications. As a result, this book provides a thorough review of craftsmanship in the subject, as well as the potential for future advances.**

As energy becomes a greater global concern, redox flow technology must be considered as a possibility. There is concern over energy shortages and rising air pollution, paving the way for renewable energies like solar and wind energy which have been extensively analyzed and evaluated in recent years. These renewable sources, on the other hand, are intermittent and frequently unpredictably available, resulting in low-quality output energy and a negative influence on grid stability. To date, diverse types of energy storage systems have been designed for various purposes, each with its own set of benefits and drawbacks. In recent years, redox flow technology, particularly vanadium redox flow, has progressed substantially. Experiments at various scales have been successfully carried out, proving the viability of redox flow technology in bulk energy storage applications. In addition, innovative redox flow technologies that offer more energy storage per unit mass or a more cost-effective volume of the storage device have attracted a lot of interest.

This book is intended to serve as a comprehensive guide to redox flow technologies, from their basic principles to their applications. As a result, this book provides a thorough review of the craftsmanship in the subject, as well as the potential for future advances.

Advanced redox flow technology has sparked interest in bulk energy storage due to its flexibility in design, safety in operation, efficient energy storage, and near-zero environmental impact. The technology has been extensively developed and tested at a range of levels in recent years, demonstrating its applicability and usage.

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**Inamuddin, PhD**, is an assistant professor at the Department of Applied Chemistry, Zakir Husain College of Engineering and Technology, Faculty of Engineering and Technology, Aligarh Muslim University, Aligarh, India. He has extensive research experience in multidisciplinary fields of analytical chemistry, materials chemistry, electrochemistry, renewable energy, and environmental science. He has worked on different research projects funded by various government agencies and universities and is the recipient of awards, including the Department of Science and Technology, India, Fast-Track Young Scientist Award and Young Researcher of the Year Award 2020 from Aligarh Muslim University. He has published about 210 research articles in

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various international scientific journals, 18 book chapters, and 170 edited books with multiple well-known publishers. His current research interests include ion exchange materials, a sensor for heavy metal ions, biofuel cells, supercapacitors, and bending actuators.

**Tariq Altalhi, PhD**, is working as an associate professor in the Department of Chemistry at Taif University, Saudi Arabia, where he has served as the head of the chemistry department and vice dean of the science college. He has co-edited various scientific books and established key contacts in major industries in Saudi Arabia. His group is involved in fundamental multidisciplinary research in nanomaterial synthesis and engineering, characterization, and application in molecular separation, desalination, membrane systems, drug delivery, and biosensing.

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# Sustainable Management of Toxic Industrial Effluent of Coal-Based Power Plants

| Chapter | First Online: 05 March 2020

| pp 193–219 | [Cite this chapter](#)



## Emerging Eco-friendly Green Technologies for Wastewater Treatment

[Ramesh Kumar](#), [Alak Kumar Ghosh](#) & [Parimal Pal](#)

 Part of the book series: [Microorganisms for Sustainability](#) ((MICRO,volume 18))

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## Abstract

Millions of tons of coke are produced to meet the demand of manufacturing of iron and steel industry and coal-based power plants with rapid urbanization. The conversion of coal to coke is one of the major sources of environmental pollution, because this process generates huge volume of coke-oven wastewater (COWW) during quenching of hot coke. The discharged wastewater contains cyanide, thiocyanide, ammonium-N, phenols with high biological oxygen demand, chemical oxygen demand, total dissolved solids, total suspended solid, and polyaromatic compounds pose a threat to the existing flora and

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## Handbook of Biofuels

2022, Pages 31-44

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## Chapter 2 - Technoeconomic analysis of biofuel production with special reference to a downstream process

Ramesh Kumar<sup>1,2</sup>, Rashmi Dhurandhar<sup>3</sup>, Sankha Chakraborty<sup>4</sup>, Bikram Basak<sup>1</sup>,  
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### Abstract

Slowing down the global climate change and earth's sustainable management are critical in the present scenario, and they could be made possible through partial replacement of fossil fuels in the transport sector with biofuels such as bio-EtOH and biodiesel. However, the cost and the purity of the biofuels are the major limiting factors for the widespread application of these biofuels. The technoeconomic evaluation of biofuels production helps in lowering the overall cost, which in turn largely depends upon the feedstocks and technology chosen for production. The competitiveness between first-generation bio-EtOH and petroleum fuels is generally considered as the technoeconomic analysis for commercial success. In the past, several research works have focused mainly on the selection and cost of feedstocks, process design, yield, productivity, conversion, and energy factors during technoeconomic evaluation using appropriate technology. The present chapter provides a comprehensive literature review and directs the research to achieve a sustainable technoeconomic process as well as an eco-friendly process performance using a multilevel framework through early-stage analysis of risk assessment. Besides, a novel membrane-based multistaged system in the production of biofuels has been discussed in terms of eco-friendliness, flexibility, cost of equipment,



## Handbook of Biofuels

2022, Pages 249-260

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## Chapter 12 - Downstream process: toward cost/energy effectiveness

Ramesh Kumar<sup>1,2</sup>, Rashmi Dhurandhar<sup>3</sup>, Sankha Chakraborty<sup>4</sup>, Alak Kumar Ghosh<sup>2</sup>

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### Abstract

Downstream processing (DSP) involves multistaged unit operations after upstream processes that improve the quality of the final product in terms of concentration and purity. One of the most important objectives of the DSP, in addition to maximizing product recovery, is to reduce the cost of production. However, the specific choices of DSP and cost-effective production are largely dependent upon the nature of the product (intra-/extracellular, physicochemical properties), choice of feedstocks, selection of fermentation processes (submerged, solid state), free cells/immobilized cells fermentation, and types of catalysts (types of microorganisms, enzymes) used. The present book chapter presents a broad literature review of works over the past two decades on the valorization of carbon-neutral material for the production of biofuels to further direct the investigation toward the application of membrane separation systems for sustainable and economical production.

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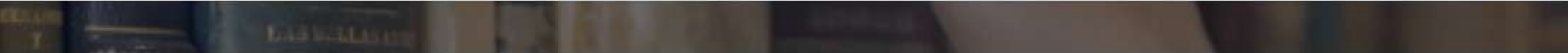
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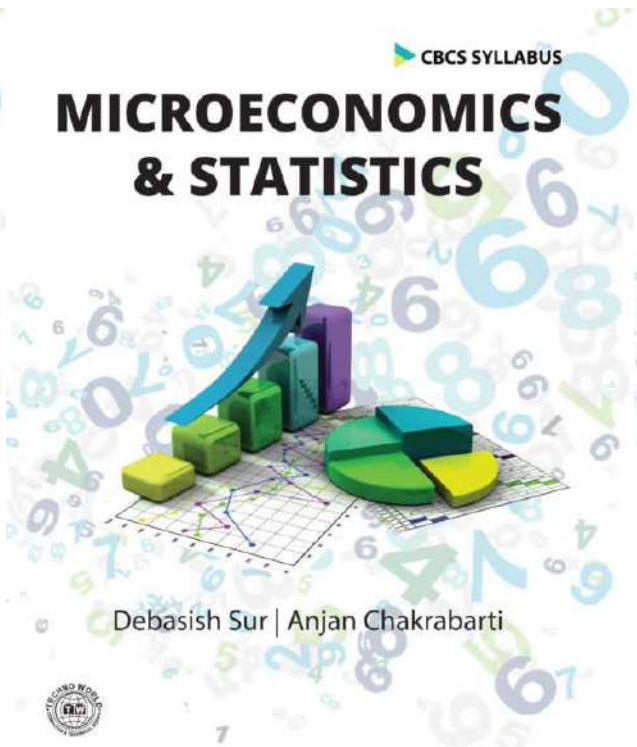
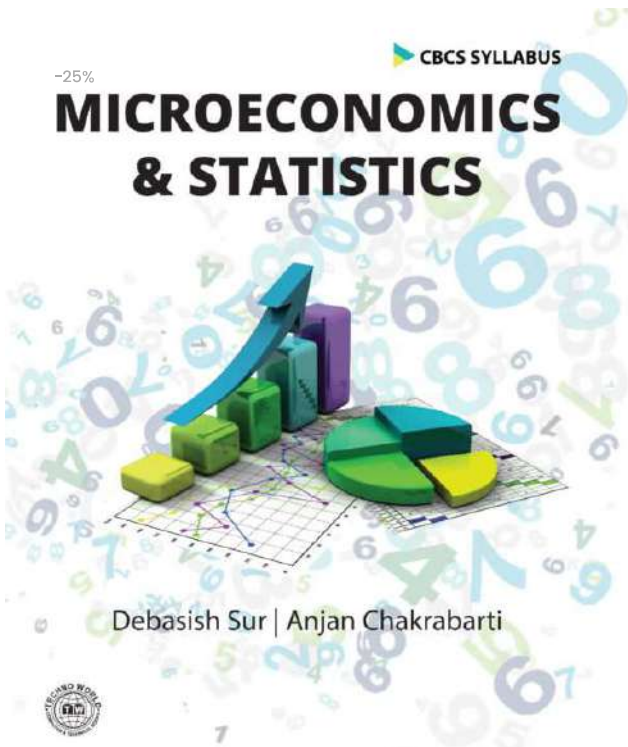
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In the present era, there is a visible trend of transition of the economy from the managerial capitalism to finance capitalism, which increases the role of finance in the economic development of a country. The concept of financial development deals with the access, depth, efficiency, and stability of the financial institution and the market of a country. On the other hand, the financial integration is the degree of the financial openness of a country. There are de facto (gross stock of foreign assets and liabilities as a ratio of GDP, cross border capital flows) and de jure (capital account restrictions) measures of the financial integration. An efficient financial system increases the savings rate, which enhances capital accumulation in the economy. This process will channelize the fund from the household to the financial system. The economic liberalization induces the household to utilize their global market fund and enhance the marginal productivity of the capital. A deeper financial integration is expected to increase the public access in the domestic financial market as well as in the global market. Financial integration has some indirect effect on the economic growth through expansion and development of the financial system. In this context, this study examines the state of financial development and the financial integration across emerging countries in Asia. An attempt also was made to investigate whether the developed financial system promotes the financial integration or the financial integration induces the authority to develop the financial system. This study is based on the selected Asian countries over the period 2001–2016. Empirical evidence also support a significant positive association between the indicators of financial development and financial integration. It also indicates an empirical relationship from the financial development to the financial integration, and vice versa.

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The present study has two objectives. First, one is to clarify the terms, "co-movement" and "co-integration" in the context of stock market indices. Second, to investigate empirically, whether an emerging stock market index represented by Nifty has moved together with DJI and N225 during the study period and whether they are co-integrated or not. This chapter tries to search out an answer for co-movement and co-integration staying within the theoretical framework through an extensive review of the literature. Moreover, the present study is unique because it tries to focus mostly on the pros and cons of financial integration and trade liberalization and the contributing factors responsible for trade and financial integrations leading to co-movement and co-integration among the countries considered in this study. India is taken as a proxy for an emerging economy. Furthermore, this chapter considers America and Japan as proxies for the developed countries around the globe and a significant country among the APAC nations, respectively. The empirical results reveal that not only three indices are highly correlated but they also possess a co-integrating relationship. This establishes the fact that neither is there any scope of international diversification in the short run nor in the long run. However, the Granger causality test results point out the fact that Nifty granger causes DJI and N225 during the study period.

## Keywords

Correlation

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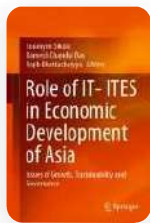


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# Trend of IT Enabled Banking Correspondence Services and Its Determinants: Evidences from South Asian Countries

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[Amar Nath Das](#) & [Arindam Laha](#) 

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In an effort to promote financial inclusion, a paradigm shift in financial sector has been taken place through outsourcing of banking services and formalization of people finance through mobile platform. In particular, banks outsource basic customer contact activities to third party banking correspondent (BC) as a complementary access channel to branches. Mobile money services have been emerged as a digital instrument provided by non-bank electronic money issuers solely or sometimes in agreement with bank as a means of indirect access point to formal financial services. Under the circumstances, the study tries to examine a cross country evidences on the progress of BC models among



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