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# Bioresources and Bioprocess in Biotechnology

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Sabu Abdulhameed • N.S. Pradeep  
Shiburaj Sugathan  
Editors

# Bioresources and Bioprocess in Biotechnology

Volume 1: Status and Strategies for  
Exploration

 Springer

*Editors*

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*Dedicated to Prof. M. S. Swaminathan for his  
pioneering scientific innovations to fill granaries  
and hunger-struck stomachs*



*Prof. M. S. Swaminathan*

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## Foreword



It is a legal obligation for the parties to the Convention on Biological Diversity to evolve effective strategies and action plan for the conservation, enhancement and sustainable utilization of biodiversity, especially taking into consideration of benefitting such efforts to the livelihood means and services to local communities. Conservation and documentation of “high-value” wild plant diversity, particularly rare, endemic and threatened (RET) plant species, medicinal plants of ethnobotanical applications and agrobiodiversity and multiplicity of habitats and landscapes which provide are the significant areas of biodiversity action.

In addition to the CBD obligations, the national and state governments also have to work towards achieving the commitments under six other biodiversity-related conventions such as (i) CITES, (ii) CMS, (iii) the Treaty, (iv) the Ramsar Convention, (v) the Convention on World Cultural and Natural Heritage and (vi) the International Plant Protection Convention. In order to address the complete spectrum of biodiversity management, effective coordination and cooperation from all the concerned institutions and policy makers is required. Besides these conventions, the 2030 Sustainable Development Goals and the Paris Climate Action also have implications on the biodiversity management of any state.

So, it is important for any democratically elected government to formulate appropriate policies and practices that help the utilization of biodiversity and ecosystem services for developing in a sustainable and inclusive manner. The first and foremost action in this regard is to work towards achieving the Aichi Biodiversity Target Number 1, which aims to achieve the goal that “all people become aware of the values of biodiversity”. Awareness level of the importance and implications of

biodiversity and ecosystem services among the public as well as policy makers and the practitioners is very important for safeguarding and protecting in optimum and in a balanced way. The power of knowledge will help these actors to go for effective lobbying, advocacy and actions in biodiversity management.

The book entitled “Bioresources and Bioprocess in Biotechnology (Volume I: Status and Strategies for Exploration)” edited by Dr. Sabu A., Dr. N.S. Pradeep and Dr. Shiburaj S. is aimed towards this direction. The book chapters are contributed by eminent researchers in the broader area of sustainable biodiversity management. The volume comprises literature on the current status of biodiversity; biodiversity education; documentation, conservation and preservation; biodiversity law; and many other important topics related to biodiversity and its sustainable utilization.

Because of the importance of the topics covered, I think this volume will have wider acceptance and open up avenues for scientists to engage in consistent dialogue with the policy makers at different levels – state, local, national and global. It can also lead to a new alliance between scientific, governmental and commercial forces and find effective ways for lobbying, advocacy and innovative actions in sustainable biodiversity management.

In my opinion, the primary audience who will benefit from this book would be the research and teaching professionals, practitioners, policy makers, farmers/fishers and farmer/fisher representatives like NGO professionals, who work in the area of sustainable agricultural and rural development. This kind of a publication will be highly useful for those planners and practitioners in the area of biodiversity for climate adaptation.

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September 29, 2016

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## Preface

The evolution in diversity of life on earth is capable of transforming the world. Biodiversity and biological data thereof is increasingly being analyzed and integrated to enhance and revolutionize the researches and expand the knowledge of biodiversity. Biological diversity is the variety of the world's organisms, including their genetic diversity. All life on earth is part of one great, interdependent system. It interacts with and depends on the nonliving components of the planet such as atmosphere, oceans, freshwaters, rocks, and soils. Humanity depends totally on this community of life, the biosphere of which human populations are an integral part.

Bioresources are important components for progress and economic activities of any nation. But bioresources management and utilization for human welfare are very important for the optimum utilization of the bioresources. It includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity. Application of the knowledge of biodiversity and bioresources in an economic and sustainable manner will add value to human lives. Biotechnology is a technique that can be applied to study genetic diversity in crop plants, domesticated animals, industrially important microbes, bio-waste recycling, propagation and mass multiplication of threatened genetic resources, large-scale production of therapeutically important substances, genetic transformation, cryopreservation, DNA banking, etc. It involves manipulation of genetic information of a particular bioresource and the application, production, maintenance, conservation, security, and various other aspects of components of biodiversity.

Despite some conservation success especially at local scales, and increasing public and government interest, biodiversity continues to decline and is being lost as on today more rapidly than at any time in the past several million years. The current losses to biodiversity can be attributed to direct causes including habitat loss and fragmentation, invasion of introduced species, overexploitation of living resources, and modern agriculture and forestry practices.

Sustainable management of the ecosystems and the rich life within them remains one of the key natural resource management challenges. The conservation and sustainable use of biological diversity are of critical importance for meeting the need of

food, fodder, fiber, health, water, and other needs of the growing world population for which purpose of, access to, and sharing of both genetic resources and technologies are essential. Here we are trying to document together the various aspects of biodiversity with a view to make it available for the judicious utilization by mankind.

Kerala, India

Sabu Abdulhameed  
N.S. Pradeep  
Shiburaj Sugathan



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