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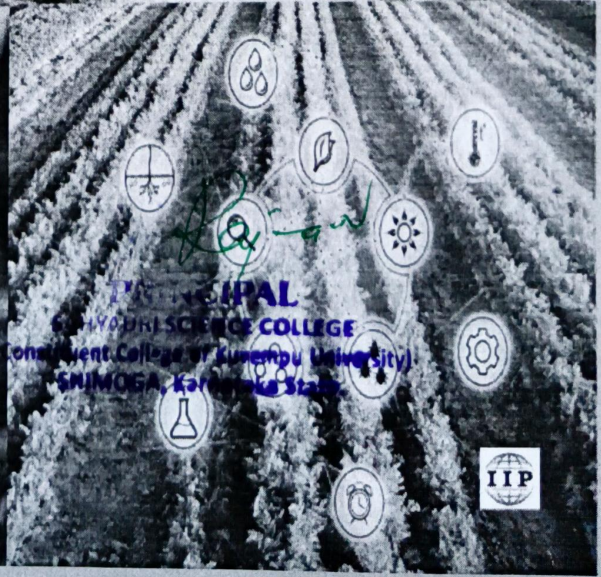
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# Recent Advances in, Microbial, Agricultural and Environmental Biotechnology

Volume I

Dr. Hanumanthappa Makari | Manjunatha K. S



2020-21

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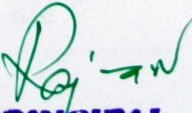
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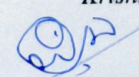
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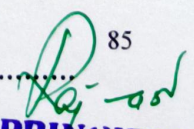
  
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## Contents

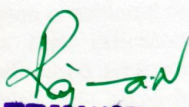
<b>Valorization of agro-residues for cellulase production by Solid State Fermentation.....</b> <i>Aithal S. C., Kakde P. R.</i>	1
<b>Endophytic Actinomycetes from Medicinal Plants: Over all Microscopic Prospective.....</b> <i>Waheeda Khanam, Shyam Kumar Vootla</i>	9
<b>Comparative Evaluation of Biochemical Composition of Raw and Cooked Extract of Calabrese Broccoli (Brassica Oleracea) .....</b> <i>Jamuna M</i>	22
<b>Antimicrobial Property of crude extracts and Bioactive from Macro Fungi of Ganoderma species .....</b> <i>Naveen Kumar K. J, Venkatesh</i>	31
<b>Pattern of development in Dictyostelium: A morphogenetic approach .....</b> <i>Poornima D</i>	40
<b>Biodegradation of Endosulfan by Mixed Bacterial Strains Isolated From Crop Fields Soil.....</b> <i>Girish, K.</i>	45
<b>Endophytes and Their Bioactive Compounds: A Potential Resource For Medicinal Applications.....</b> <i>Madhuri R Basutkar, Prabhurajeshwar</i>	52
<b>Effect of Pretreatment Methods for Bioethanol Production from Lignocellulosic Wastes .....</b> <i>Naveen Kumar K. J</i>	62
<input checked="" type="checkbox"/> <b>Alkali-Based Pretreatment Methods to Enhance Enzymatic Saccharification for Lignocellulosic Biomass Conversion for Bioethanol Production .....</b> <i>Naveen Kumar K. J, Pradeepa K</i>	71
<b>Fungal Enzymes for Second Generation Ethanol Production .....</b> <i>Seema J Patel</i>	78
<b>Biotechnological Production and Applications of Microbial Tyrosinases.....</b> <i>Krishnaveni R, Vandana R</i>	85

  
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<b>Biopesticides and Their Mode of Action against Insect Pests</b>	115
.....	
<i>Dr.Kavita Nagshetty, Dr.Madhuri. R.Basutkar</i>	
<b>Biosensor Technology: A Special Reference To Microbial Biosensor and Its Applications</b>	123
.....	
<i>Keerthi S, Chaya HC, Dr. Paramesha M.</i>	
<b>Molecular docking study of Flavonoid Isolates from Papaya (Carica papaya L.) Leaf and Seed as inhibitors against Dengue viral protease FOM</b>	143
.....	
<i>Mangala K J</i>	
<b>Identification of Acinetobacter Tandoii through 16S Rrna Sequence Analysis Isolated from Ginger Crops</b>	150
.....	
<i>Sowmya H. K.</i>	

  
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## Alkali-Based Pretreatment Methods to Enhance Enzymatic Saccharification for Lignocellulosic Biomass Conversion for Bioethanol Production

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### Abstract

Lignocelluloses have been the focus of much attention, because of their conversion to fermentable sugars for cellulosic ethanol production, both from the viewpoint of energy and the environment. Pretreatment plays a crucial role in biomass conversion, to overcome the chemical and structural difficulties, which have evolved in lignocelluloses, and to produce a cost-effective fermentable sugar via enzymatic saccharification. Among the developed pretreatment approaches, alkali-based pretreatment technology, which can utilize the equipment and chemical recovery system in the pulping industry, has been considered one of the most promising pretreatment methods, mainly because of its high efficiency in delignification and high final total sugar yields. The progress of alkali-based pretreatment technologies was better understanding the fundamental principles of alkali-based pretreatments. This is of vital importance for the process improvement and commercial production of alkali-based pretreatment for producing cellulosic ethanol.

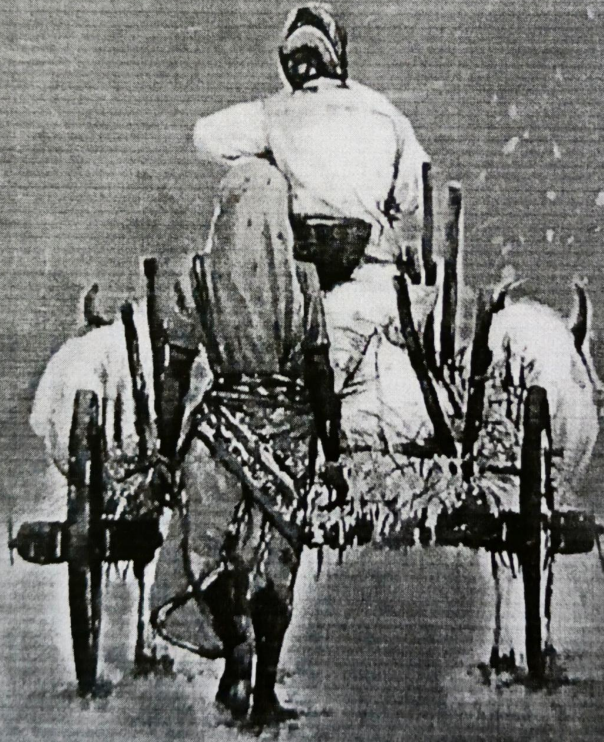
### I. Introduction

Energy is the life line of the global economy. Diminishing fossil fuel reserves, ever escalating fuel prices, increased concerned over environment pollution and most importantly quest for energy independence and energy security promoted the global research community to accelerate the need to look for renewable and environmentally sustainable energy resource [1]. Therefore there is an urgent need for introduction of alternative energy resources into biomass conversion system. Biofuels are only renewable carbon dioxide sources of energy. Lignocellulosics have been identified as a primary source of bioethanol [2]. Use of lignocellulosic biomass for the production of biofuels is unavoidable if liquid fossil fuels are to be replaced by renewable and sustainable alternatives. Among them, ethanol accounts for the majority of the biofuels worldwide [3]. Thus quest of generating renewable energy sources has shifted on plant biomass and its effective utilization through advances in technology development (Figure 1).

Pre-treatment has been considered as the most expensive processing step in cellulosic ethanol processes, representing about 18% of the total cost [5-7]. Therefore, developing a cost-effective and efficient biomass pre-treatment technology is the most critical need for lignocellulosic biofuels. Pretreatment is required to increase the surface accessibility of carbohydrate polymers to the hydrolytic enzymes, which is a key step toward efficient utilization of biomass for ethanol or other advanced biofuels production. Pretreatment enables enzymes to attach to the carbohydrate polymers, and then hydrolyze these polysaccharides into fermentable sugars. The goal of pretreatment is to pre-extract hemicellulose, disrupt the lignin seal and liberate the cellulose from the plant cell wall matrix (Figure 2) [8]. Depending on the application and type of pretreatment catalyst, pretreatment techniques have generally been divided into three categories: physical, chemical, and biological pretreatment. Each

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# ಕನ್ನಡ ಸಾಹಿತ್ಯ ಕೃಷಿ ಸಂಸ್ಕೃತಿ : ಸಂಕಥನ



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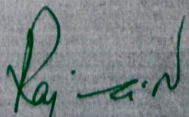
  
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1] ಕನ್ನಡ ಸಾಹಿತ್ಯ ಕೃಷಿ ಸಂಸ್ಕೃತಿ : ಸಂಕಥನ	1
2] ಶಿಷ್ಟ ಸಾಹಿತ್ಯ : ಕೃಷಿಯ ತಾತ್ವಿಕ ಸ್ವರೂಪ	8
3] ಮಧ್ಯಕಾಲೀನ ಸಾಹಿತ್ಯ: ಕೃಷಿಯ ಪರಿಕಲ್ಪನೆ	15
4] ರೈತ ಮಹಿಳಾ ಸಬಲೀಕರಣ : ಕೃಷಿ ಅನುಸಂಧಾನ	26
5] ವಚನ ಸಾಹಿತ್ಯ- ಕೃಷಿ ಪರಿಕರಗಳು	33
6] ಕೃಷಿ: ಪ್ರಾಚೀನ ಅವರ್ಚೀನ	40
7] ಅಪೈಜ್ಞಾನಿಕ ಭತ್ತದ ಬೇಸಾಯ: ಕಂದು ಅಕ್ಕಿಯ ಮಹತ್ವ	46
8] ಸಮಗ್ರ ಕೃಷಿ ಪದ್ಧತಿ: ಮಳೆಯ ಅನಿಶ್ಚಿತತೆ	52
9] ಕರ್ನಾಟಕದ ಕೃಷಿ: ರೈತ ಚಳುವಳಿ	57
10] ಕರ್ನಾಟಕದ ರೈತ ಚಳುವಳಿ-ಹೋರಾಟದ ಹೊಸ ರೂಪಗಳು	63
11] ಕೃಷಿ,ಸಹಕಾರ ಸಾಹಿತ್ಯ : ಅನುಸಂಧಾನ	72
12] ಭಾರತದ ಕೃಷಿ : ಗೋಮೂತ್ರದ ಮಹತ್ವದ	78
13] ಸಾಂಪ್ರದಾಯಿಕ ಕೃಷಿ: ಒಪ್ಪಂದ ಕೃಷಿ	85
14] ಕೋವಿಡ್ 19 : ರೈತರ ಬವಣೆ	89

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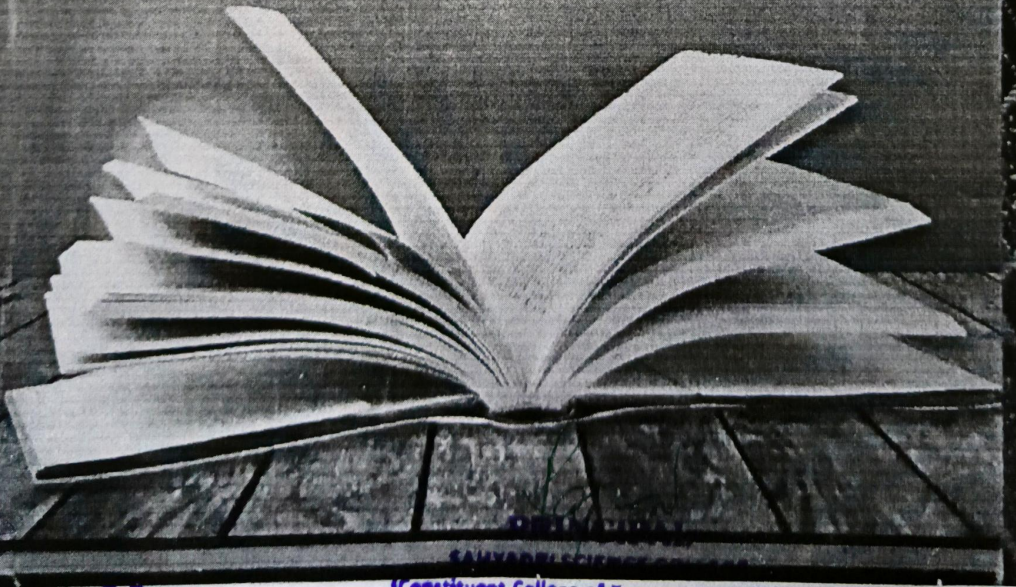
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
  
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## ಪರಿವಿಡಿ

1	ಕನ್ನಡ ರಾಜ್ಯೋತ್ಸವ ಅಗತ್ಯತೆ - ಚಿಂತನೆ	01
2	ಸೂರೋನ ವೈರಣ: ರೈತರು ಅನುಭವಿಸಿದ ಬವಣಿಗಳು	05
3	ಜಾತ್ಯಾತೀತ ಸ್ಥಿತಪ್ರಜ್ಞೆ ಹೋರಾಟಗಾರ ಪ್ರೊ ಹೊನ್ನು ಸಿದ್ಧಾರ್ಥ	11
4	ಭಾರತದ ಕೃಷಿ : ಗೋಮೂತ್ರದ ಮಹತ್ವ	16
5	ಸಾಂಪ್ರದಾಯಿಕ ಕೃಷಿ: ಒಪ್ಪಂದ ಕೃಷಿ	22
6	ದಲಿತ ಆತ್ಮಕತೆಗಳೂ ಅಂಬೇಡ್ಕರ್ ಚಿಂತನೆಗಳೂ	26
7	ಡಾ.ಮನುಬಳಿಗಾರರ ಸಾಹಿತ್ಯದಲ್ಲಿ ಸಂಸ್ಕೃತಿ ದರ್ಶನ	28
8	ಸಾಂಸ್ಕೃತಿಕ ನಾಯಕ ಮಂಟೀಸ್ವಾಮಿ: ಮಹಿಳಾವಾದಿ ಆಶಯ	44
9	ಅಲ್ಲಮಪ್ರಭು, ಸಂತಶಿಶುನಾಳ ಷರೀಫ: ಸಾರಿದ 'ಭಕ್ತಿ' ಮಾರ್ಗ	60
10	ಭರತೇಶ ವೈಭವ: ವೀರಶೈವ ತಾತ್ವಿಕ ನಿಲುವುಗಳು	68
11	ಕನಕದಾಸರ - ಸಾಮಾಜಿಕ ಚಿಂತನೆಗಳು	81
12	ಕನಕದಾಸರ ಕೀರ್ತನೆಗಳಲ್ಲಿ ವೈಚಾರಿಕ ಮನೋಧರ್ಮ	89
13	ಕರ್ನಾಟಕದ ಪ್ರಮುಖ ಪತ್ರಕರ್ತರು	100
14	ಥಾಡಿ ಬಂಜಾರರೂ ಕಥನ ಗೀತೆಗಳೂ	114
15	ಭರತೇಶ ವೈಭವ : ಜೈನ ತತ್ವದ ನಿಲುವುಗಳು	120
16	ನಾಗರಿಕ ಪ್ರಜೆಯ ಸಾಂವಿಧಾನಿಕ ಹಕ್ಕು	135
17	ಮರಾಠಿ ಆತ್ಮಕಥನಗಳು : ದಲಿತತ್ವದ ನಿರೂಪಣೆ	137
18	ಮಲೆನಾಡಿನಲ್ಲಿ ಮಹಾಸತಿ ಆಚರಣೆ	143
19	ಶಿಕ್ಷಣ: ಪ್ರಾಚೀನ ಕರ್ನಾಟಕ	148
20	ಜನಪದ ವಾದ್ಯವಾಗಿ 'ಹಲಗೆ'	163
	ಕೇಶ್ ಕಾದಂಬರಿಗಳ ವೈಶಿಷ್ಟ್ಯಗಳು	171

  
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20-21


4

### About the Book

Recent Advances and Applications in Modern Synthetic Chemistry is a book devoted to the latest advances in synthetic and organometallic challenging reactions in all fields of chemistry particularly in medicinal chemistry. It is highly suitable for a post-graduate of human beings. The screen presents comprehensive reviews written by eminent authorities on different synthetic approaches to selected target molecules and new methods developed worldwide upon the synthetic transformations on optimal product yields. Recent Advances in Modern Organic Synthesis is an essential reading for all organic chemists in academia, researchers, and the industry who wish to keep abreast of rapid and important developments in the field. The aim of this book is to provide an overview of the progress made in the past decade, paying particular attention to the field of synthetic organic chemistry.

This book covers a collection of topics that reflect the diversity of modern trends in chemistry. Each chapter has a brief summary of key points at the end. Further, a limited set of references to other publications that can be used as a source of further knowledge and expand your understanding is included at the end of each chapter. The text is presented in a series of sequential chapters, and an attempt has been made to move beyond the pillars of the subject and provide coverage of synthesis, physical methods, catalysis and some important biorganic and bioorganic applied aspects from all perspective fields. Although the material contained in this book is arranged in a comparative way, there is flexibility in the order of presentation.


### About the Editor



**Dr. Satish Babulal Jadhav** presently working as an Assistant professor in Department of Chemistry, R. B. Jadhav Arts, Science and Commerce College, Gevra, Dist. Raichur, Maharashtra. He completed his Ph. D. in 2017 in Organic Chemistry from Dr. Babasaheb Ambedkar Marathwada University, Aurangabad Maharashtra. He has 17 years of teaching experience in various U. G. and P. G. Colleges and 10 years of research experience in the area of Synthesis of heterocyclic molecules, Medicinal and Pharmaceutical Chemistry. Since 2019 he has been working as Head Regional Academic Councilor of KONGU-NEW Delhi. He published 37 research papers in various National and international journals with high impact factors and where 10 papers are in progress. He has 3 patents to his credit so far. He has completed one research project funded by Dr. Babasaheb Ambedkar Marathwada University, Aurangabad Maharashtra. He presented and presented research papers in more than 17 national and international conferences and workshops all over India. He has been a part of the editorial board members and peer reviewer in various national and international journals. He is an Unreserved Advisory Board Member of Science Education and also a member of several professional societies. He has bagged the "Best Researcher" award in 2019 by VD GOOD Professional Association, India. Recently he received the "Best Editor-2022" award of the Indian Journal of Pharmacy and Pharmology. He is a good mathematician and an excellent teacher for the students. He is honest, hardworking, cooperative, and sincere. He is always ready to accept challenges and responsibilities.


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9

# RECENT ADVANCES AND APPLICATIONS IN MODERN SYNTHETIC CHEMISTRY

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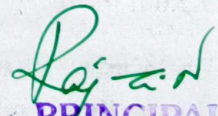


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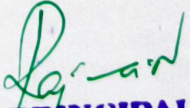
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ಅಧ್ಯಯನ ಗಳಿಯ ಡಾ.ಹಾ.ಮ.ನಾಗಾರ್ಜುನ ಸಂಪಾದಿಸಿದ "ವಚನಕಾರರ ಲೋಕವೃಕ್ಷ" ಎನ್ನುವ ಈ ಕೃತಿಗೆ ಒಂದು ವಿಶೇಷ ಮಹತ್ವವಿದೆ. ಗ್ರೀಕರ ತರ್ಕಮಾನದ ವಚನಕಾರರು ಮತ್ತು ವಚನಗಳನ್ನು ಕುರಿತು ಈಗಾಗಲೇ ಬಹಳಷ್ಟು ಬರಹಗಳು ಬಂದಿದ್ದರೂ ಯಾವುದೇ ಕಾಲಕ್ಕೂ ಇವೆಷ್ಟೋ ಸ್ವೀಕೃತವಾಗಿರಲಿಲ್ಲ. ಆ ಕೃತಿ ಅಧ್ಯಯನ ಯೋಗ್ಯವಾದದ್ದು ಈ ಕೃತಿಯಲ್ಲಿ ಕಂಡ ಸಾಡಿಸ ವಿವಿಧ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಾಲೇಜುಗಳ, ಅಧ್ಯಾಪಕರು, ಸಂಶೋಧಕರು ಬರೆದಿರುವ ಸುಮಾರು 50 ಲೇಖನಗಳು ಅವಲೋಕಿಸಿ ವಿಶೇಷವೆಂದರೆ ಅಲ್ಲಿನ ಎಲ್ಲಾ ಲೇಖನಗಳೂ ಕರ್ನಾಟಕ ವಚನಕಾರರು ಮತ್ತು ಅವರ ವಚನಗಳನ್ನು ಕೇಂದ್ರವಾಗಿಸಿಕೊಂಡು ರಚಿಸಲಾಗಿದೆ. ಆದರಲ್ಲೂ ಅಲ್ಲತ ವಚನಕಾರರು, ಕೆಲವರಾದ ವಚನಕಾರರು, ಮಹಿಳಾ ವಚನಕಾರರನ್ನು ದೃಷ್ಟಿ ಭೋಲೆಗಳನ್ನು ವರ್ತಮಾನದ ತರ್ಕಗಳಿಗೆ ಅಡ್ಡಬಿಡಿಸುವ ಬರೆದಂತವುಗಳು.

ಸಮೀಪದಲ್ಲಿರುವ ಮೂರ್ತಿಯಂತೆ, ಅನುಮಾನ, ದೌರ್ಬಲ್ಯ, ಅಜ್ಞಾನ, ಕೋಪ, ಶೋಷಣೆ, ಶಿಂಹದೇವ, ಮುಂಚಾವರಿಗಳ ವಿವಿಧ ಹಾಗೂ ಸಮಸಮೀಪದ ಪರವಾಗಿ ತಮ್ಮ ನಿಲಾವುಗಳನ್ನು ಅಭಿವ್ಯಕ್ತಿಸುವುದು, ಆ ಮೂಲಕ ತಮ್ಮ ಸಮಾಜ, ಕಾರ್ಯ ನಿರ್ವಹಿಸುವುದನ್ನು ಕಟ್ಟುವುದು ಅವರ ಉದ್ದೇಶವಾಗಿತ್ತು. ಇಂತಹ ಕ್ರಿಯಾಶೀಲ ವೈಚಾರಿಕ ಅಲೋಚನೆಗಳ ಮೂಲಕ ವರ್ತಮಾನದ ಬದುಕಿನ ಹಗ್ಗನ್ನು ಅಂತ್ಯದಲ್ಲಿ ತೋರಿಸುತ್ತಾ, ಪರಿವರ ಕಾಲಕಾಲಕ್ಕೂ ಸ್ವಚಿಂತನ ಮೂಲಕ ಬಹುಮುಂದೆಯಾಗುವ ಸಮಾಜದ ವ್ಯಾಧಿಗಳಿಂದ ಮುಕ್ತಗೊಳಿಸುವ ಉದ್ದೇಶ ಹೊಂದಿದ್ದರು.

ಈ ನಿಟ್ಟಿನಲ್ಲಿ ಇಲ್ಲಿನ ಪಲವಾರು ಲೇಖನಗಳು ರೂಪಗೊಂಡಿರುವುದು ಇಂದಿನ ಸಮಕಾಲೀನ ಪರಿವರದ ಅಲೋಚನೆಯ ದೃಷ್ಟಿಯಿಂದ ತೋರುತ್ತದೆ. ಇಂತಹ ಉತ್ತಮ ಲೇಖನಗಳನ್ನು ಒಂದೆಡೆ ಸೇರಿಸಿ ಆರೋಗ್ಯಕರ ಚರ್ಚೆಗೆ ಅವಕಾಶ ಮಾಡಿಕೊಟ್ಟಿರುವ ಡಾ. ಹಾ.ಮ.ನಾಗಾರ್ಜುನ ಅವರು ಅಧನಂದಾಜಾರರು.

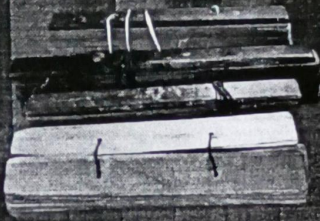
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21

# ವಚನಕಾರರ ಲೋಕವೃಕ್ಷ



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- 6
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ಪ್ರೊ. ಕೆ. ಒಂಕಾರಪ್ಪ 72
  13. ಫಿಜಿಯಾಳಯ್ಯ : ವ್ಯಕ್ತಿತ್ವ ಅಧ್ಯಯನ  
ಡಾ.ರಂಗಧೀರ 80
  14. ಅಯ್ಯಕ್ಕಿ ಲಕ್ಷ್ಮಣ  
ಸುಬೀಶ್ ಜಿ.ಎಸ್ 84
  15. ರಿಂಗಮುಖ ವಚನಗಳು : ಮಾನವೋಪದೇಶ ವಲಿ  
ಬಂದ್ರಶೇಖರಯ್ಯ ಹೆಚ್ ಎಂ 92
  16. ಉರಿರಿಂಗಬೆದ್ದಿ ವಚನಗಳಲ್ಲಿ ಲೋಕವೃದ್ಧಿ  
ಡಾ.ಹಾ.ಮ.ನಾಗಾರ್ಜುನ 96
  17. ಬಹುರೂಪಿ ವಚನಗಳಲ್ಲಿ ದಾಸೋಹ  
ಶಿವಯೋಗಿ ಹಂಚಿನಮನೆ 104
  18. ಅಮ್ಮಿಗೆ ರಾಯಮನ ವಚನಗಳಲ್ಲಿ ಕಾಯಕ  
ರವಿಕುಮಾರ 111
  19. ಸತ್ಯಕ್ಕನ ವಚನಗಳಲ್ಲಿ ವೈಚಾರಿಕತೆ  
ಗಣೇಶ್ ಕೆಂಚನಾಲ 121
  20. ಮಾದಾರ ದೂಳಯ್ಯ : ಸಮತಾ ತತ್ವ  
ರಾಮಜೋಗಿಹಳ್ಳಿ ಮುಕುಂದ ರೆಡ್ಡಿ 124
  21. ಶರಣೆ ಕಾಳವೈಯ ವಚನಗಳ ಸ್ವರೂಪ  
ಡಾ.ಸೋಮಣ್ಣ 132
  22. ಸೂಳೆ ಸಂಕವೈ ಮರುಟಿಮ-ಕಿರಂ ನಾಗರಾಜ್ ವಿಮರ್ಶೆ ಅಧ್ಯಯನ  
ಮುಸ್ತಾಫ.ಕೆ 141
  23. ವೈದಿಕ ಸಂಸ್ಕೃತಿಯ ವಿರೋಧದ ಗುಟ್ಟಿವೈ ಹಾವಿನಾಳ ಕಲ್ಲಯ್ಯ  
ಡಾ.ಮುಕ್ತಯ್ಯ ಎಸ್ 148
  24. ದಿಟ್ಟ ದಿಗಂಬರತ್ತದ ಇನ್ನೊಂದು ಹೆಸರು ಜೊಂತಾದೇವಿ  
ಡಾ.ರಾಜೇಂದ್ರ ಬುರಡಿಕ್ಕುಟ್ಟ 159
  25. ಶರಣ ಕರ್ಮಯೋಗಿ ಸಿದ್ಧರಾಮರ ಜೀವನ ಮಾರ್ಗ  
ಪ್ರೊ. ಮಹಾದೇವ ಜಿ.ಪಿ. 170
  26. ಸಿದ್ಧರಾಮನ ವಚನಗಳಲ್ಲಿ ಜಾತಿ ವಿಚಾರದ ನಲವುಗಳು  
ಡಾ.ಬಿ.ಪಿ. ಜಾನ್ ಜಾನ್ 174

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## ಉರಿಲಿಂಗಪದ್ಧಿ ವಚನಗಳಲ್ಲಿ ಲೋಕದೃಷ್ಟಿ

ಡಾ.ಪಾ.ಪು.ನಾಗಾರ್ಜುನ

ಸಾಹಿತ್ಯ ಸಂಸ್ಕೃತಿ, ಚಳುವಳಿಯ ದೃಷ್ಟಿಯಿಂದ ಹನ್ನೆರಡನೆಯ ಶತಮಾನ ಕನ್ನಡದಲ್ಲಿ ಗಮನಾರ್ಹವಾದ ಕಾಲಘಟ್ಟವೆನಿಸಿರುವ ಸಾಹಿತ್ಯ ರೂಪುಗೊಳ್ಳಲು ಸಂಸ್ಕೃತಿ ಸಾಹಿತ್ಯದ ಪರಿಧಿಗಳು ಸಿದ್ಧ ಮಾಡಿರಬೇಕೆಂದು ಸುತ್ತುತ್ತಾ ಏಕಶತಮಾನದ ಸಂಸ್ಕೃತಿ ಕಾಪಾಡಿಕೊಂಡಿದ್ದವು. ಇದರ ಪರಿಣಾಮಗಳು ರಾಜನ ಅಧೀನತೆ ಸ್ವತಂತ್ರತೆ ಸಾಮಾಜಿಕ ಅಸ್ವಸ್ಥತೆಗಳ ಸಂಗ್ರಹ ರೂಪವಾಗಿದ್ದಿತು. ಈ ಹಿಂದಿನ ಸಾಹಿತ್ಯಿಕ ಕಟ್ಟಳೆಗಳನ್ನು ಸಾಂಸ್ಕೃತಿಕ ಭಿನ್ನತೆಗಳನ್ನು ಚಳುವಳಿಯ ಸ್ವರೂಪಗಳನ್ನು ಬದಲಾಯಿಸಲು ಪ್ರೇರಕವಾದ ಸಮಾಜ ಶಕ್ತಿಗಳಾಗಿ ವಚನಕಾರರು ಪ್ರಗತಿಪರ ಸಮಾಜ ನಿರ್ಮಾಣದ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ನಿಜವಾದ ಬದ್ಧತೆಗಳನ್ನು ಒಳಗೊಡಿಸಿಕೊಂಡ ಸಮೂಹವು ನಿರ್ಮಾಣವಾಯಿತು. ಇದರ ಪರಿಣಾಮಗಳು ರಾಜನ ಅಧೀನತೆ ಸ್ವತಂತ್ರತೆ, ಸಾಮಾಜಿಕ ಅಸ್ವಸ್ಥತೆಗಳ ಸಂಗ್ರಹರೂಪವಾಗಿದ್ದಿತು. ಈ ಸಂದರ್ಭದಲ್ಲಿನ ಮತ ಧರ್ಮಗಳ ತಮ್ಮ ತತ್ವಾತ್ಮದರ್ಶನಗಳನ್ನು ಸಾಹಿತ್ಯದ ಮುಖೇನ ಪ್ರಕಟಪಡಿಸುತ್ತಿದ್ದವು. ವಚನಗಳು ಸಾರ್ವತ್ರಿಕ ಮೌಲ್ಯಗಳನ್ನು ಹೊಂದಿದ್ದು, ಈ ಕಾಲದಲ್ಲಿ ಧಾರ್ಮಿಕ ಮೇಲಾಟಗಳ ಅತಿರೇಕತೆಯು ಸಮಾಜದ ಸ್ಥಿರತೆಯನ್ನು ಹಾಳುಗಡುವುತ್ತು ಈ ಕಾರಣದಿಂದ ಶರಣರು ತಮ್ಮ ವಚನಗಳಲ್ಲಿ ಆದರ್ಶ ಚಿಂತನೆಗಳನ್ನು ವಚನಗಳಲ್ಲಿ ಕೇಂದ್ರೀಕರಿಸಿಕೊಂಡರು. ವಚನಗಳೆಲ್ಲವೂ ಜನಮುಖಿಯಾದ ನಿಲುವುಗಳನ್ನು ಹೊಂದಿದ್ದು, ರಾಜಕೀಯ ವ್ಯವಸ್ಥೆಯನ್ನು ಧಾರ್ಮಿಕ ಸವಾಲುಗಳನ್ನು

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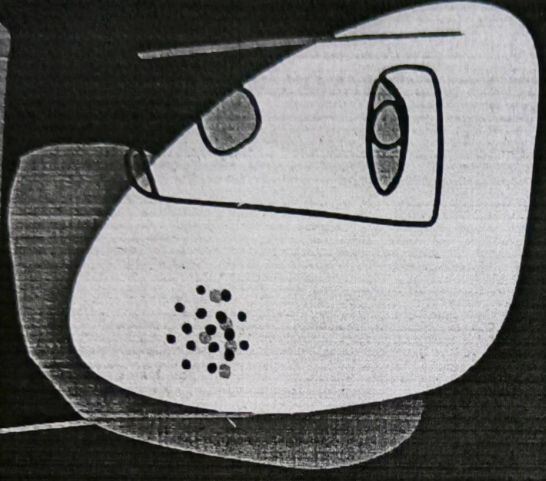
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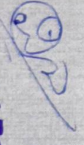
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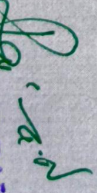
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ನಡವುತ್ತಿದ್ದಾಗ 'ಸಾಹಿತ್ಯ ಅವಲೋಕನ' ಎಂಬ ಬಗ್ಗುಗಿಯ ತಿನಿಸುಗಳ ಬುತ್ತಿಹಿಕ್ಕಾಗ ಸಂಶೋಧಕ ಅಥವಾ ಓದುಗನಿಗೆ ಆಗುವ ಆನಂದಕ್ಕೆ ಪರಿವೇ ಇರುವುದಿಲ್ಲ. ಇಂತಹ ತಿನಿಸುಗಳ ಬುತ್ತಿಯನ್ನು ನಮಗೆ ಸಿಗುವಂತಹ ಪ್ರಯತ್ನವನ್ನು ಚಿಂತಾನಶೀಲವಾಗಿ ವಿವೇಚಿಸಿ ಒಗ್ಗೂಡಿಸಿರುವುದು ಗಮನಾರ್ಹವಾಗಿದೆ.

ಅಭ್ಯುಪ್ಪಣೆಗಳು

ಸಾಹಿತ್ಯ ಅವಲೋಕನ ಸಂಪಾದನಾ ಗ್ರಂಥಪುಟ ಸಂಖ್ಯೆ 3

ಸಾಹಿತ್ಯ ಅವಲೋಕನ ಸಂಪಾದನಾ ಗ್ರಂಥಪುಟ ಸಂಖ್ಯೆ 6

ಸಾಹಿತ್ಯ ಅವಲೋಕನ ಸಂಪಾದನಾ ಗ್ರಂಥಪುಟ ಸಂಖ್ಯೆ 15

ಸಾಹಿತ್ಯ ಅವಲೋಕನ ಸಂಪಾದನಾ ಗ್ರಂಥಪುಟ ಸಂಖ್ಯೆ 323

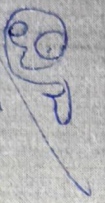


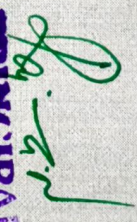
ಎಂ.ಕೆ.ಇಂದಿರಾವರ ಕಾದಂಬರಿಗಳ ಮುಖ್ಯ ನೆಲೆಗಳು

ಡಾ. ಶಿವಣ್ಣ. ಕೆ. ಸಿ

ಉಪನ್ಯಾಸಕರು, ಕನ್ನಡ ವಿಭಾಗ, ಸೆಕ್ಯೂಲರ್ ವಿಜ್ಞಾನ ಕಾಲೇಜು, ಶಿವಮೊಗ್ಗ.

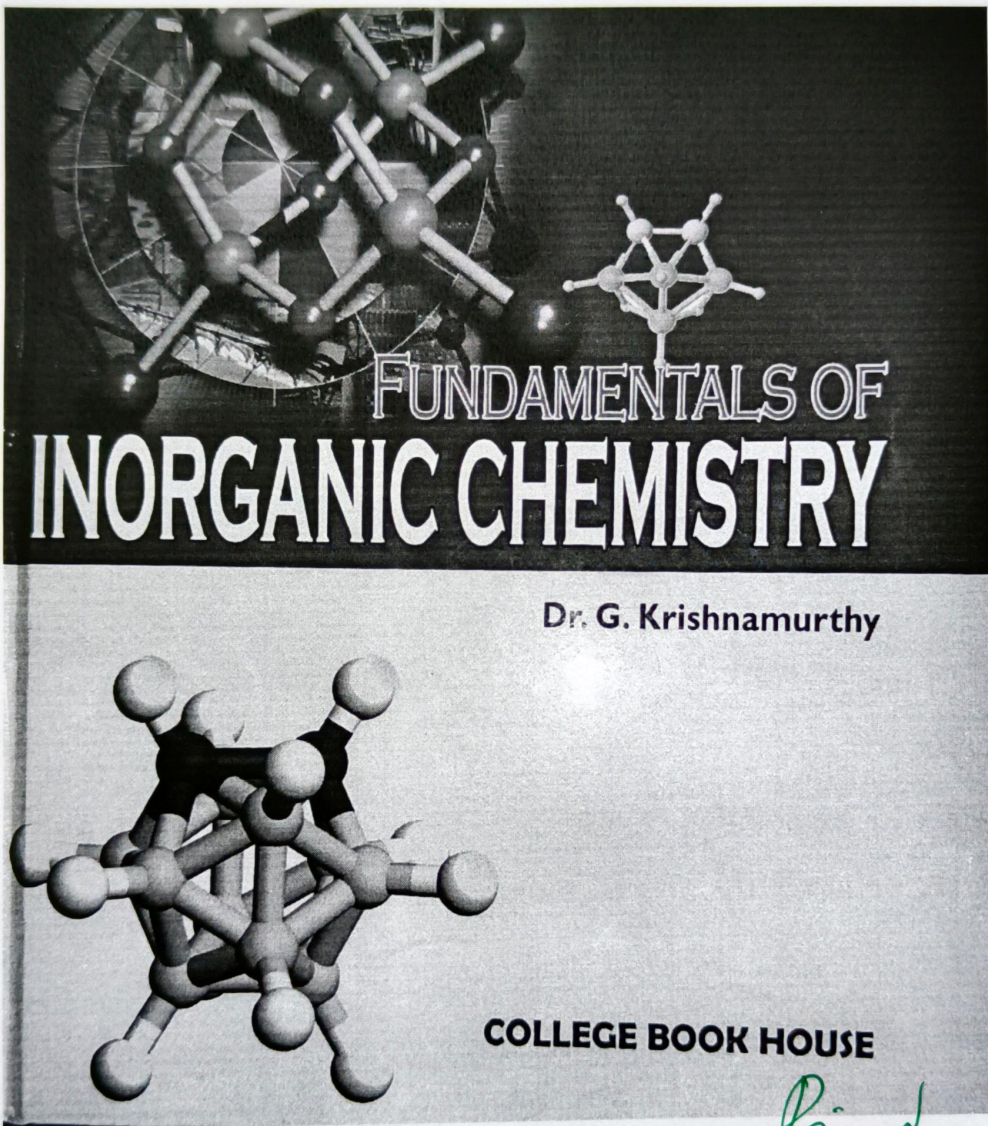
ಸಾಹಿತ್ಯದ ಅಂತಿಮ ಉದ್ದೇಶ ಸಾಹಿತ್ಯವಲ್ಲ. ಮಹಿಳಾ ಸಾಹಿತ್ಯದ ಸಂವಹನದ ಪ್ರಶ್ನೆಯು ಕೂಡಾ ಈ ಕಾರಣದಿಂದಲೇ ಕೇವಲ ಸಂವಹನದ ಪ್ರಶ್ನೆಯಾಗಿರದೆ ಆದು ಸಾಮಾಜಿಕ ಸಂಬಂಧಗಳ ವ್ಯಕ್ತರೂಪ. ಸಾಮಾಜಿಕ ಸಂಬಂಧಗಳು ಜಮೀನುದಾರಿ ಪದ್ಧತಿ ಮತ್ತು ಬಂಡವಾಳವಾದಿ ಪ್ರಕ್ರಿಯೆಯಲ್ಲಿ ಬೇರೆ ಬೇರೆ ಧರ ಇರುತ್ತವೆ. ಆಧುನಿಕ ಲೇಖಕಿಯರ ಬರವಣಿಗೆಗಳು ಬಂಡವಾಳಶಾಹಿ ಜಗತ್ತಿನ ಜೊತೆಗೆ ಒಪ್ಪಂದ ಮತ್ತು ವಿರೋಧ ಎರಡನ್ನೂ ಸ್ಥಾಪಿಸಿವೆ. ಬಂಡವಾಳಶಾಹಿ ಜಗತ್ತಿನ ಜೊತೆಗೆ ಒಪ್ಪಂದ ಮಾಡಿಕೊಂಡ ಲೇಖಕಿಯರು ಮೂಲತಃ ಮಾರುಕಟ್ಟೆಗೆ ಬೇಕಾದ ಕೃತಿಗಳನ್ನು ರಚಿಸಿದರು. ಈ ಮಾದರಿಯ ಬರಹಗಳಿಗೆ ವಾಸ್ತವದ ಸಂಪರ್ಕವಿಲ್ಲ. ಭ್ರಮಾತ್ಮಕವಾದ ಕೇವಲ ಕನಸುಗಳನ್ನೇ ಹೊಸೆಯುವ ಈ ಮಾದರಿಯ ಬರಹಗಳಿಗೆ ಯಾವುದೇ ಸಾಮಾಜಿಕ ಕಳಕಳಿಯು ಇದ್ದಂತಿಲ್ಲ. ಈ ಮಾದರಿಯ ಬರಹಗಳಿಗೆ ನಿರ್ದಿಷ್ಟವಾದ ವಿನ್ಯಾಸಗಳಿವೆ. ಒಂದೋ ಬಡತನದಲ್ಲಿರುವ ಹುಡುಗಿ ಮತ್ತು ಶ್ರೀಮಂತ ವರ್ಗದ ಹುಡುಗ - ಇವರ ನಡುವೆ ಪ್ರಣಯ ಅಥವಾ ಶ್ರೀಮಂತ ಮನನನದ ಹುಡುಗ ಮತ್ತು ಬಡತನದ ಹುಡುಗಿ ಇವರ ನಡುವೆ ಪ್ರಣಯ. ಈ ತರಹದ ವಿನ್ಯಾಸದಲ್ಲಿ ರೂಪುಗೊಳ್ಳುವ ಕಾದಂಬರಿಗಳು ಹೊಸದೊಂದು ಕಾಲ್ಪನಿಕ ಜಗತ್ತನ್ನು ನಮ್ಮ ಮುಂದೆ ಇಡುತ್ತವೆ. ಕಾಲ್ಪನಿಕ ಕಾಲ್ಪನಿಕ ಹಾಗೂ ಸುಂದರ ಜಗತ್ತಿನಲ್ಲಿ ಬೇರೆ ಯಾವ ಸಮಸ್ಯೆಗಳೂ ಇಲ್ಲ. ಮಾರುಕಟ್ಟೆಗೆ ಬೇಕಾದ ರಂಜನೆಯ ಸಾಮಗ್ರಿಯನ್ನು ಇದು ಒದಗಿಸುವುದರಿಂದ ಇದಕ್ಕೆ "ಮಾರುಕಟ್ಟೆಯ" ಪೌಲ್ಟಿವಿದೆ. ಸಾಯಿಸುತೆ, ಸಿಎನ್.ಮುಕ್ತಾ ಮುಂತಾದವರ ಕಾದಂಬರಿಗಳು ಈ ಬಗೆಯವು. ಇವಕ್ಕೆ ವಿಶಾಲವಾದ ವ್ಯಾಪ್ತಿಯಿಲ್ಲ. ಆದರೆ, ಈ ಮಾದರಿಯ ಕಾದಂಬರಿಗಳನ್ನು ಇನ್ನೆಷ್ಟು ಜನವರ್ಗವಿದೆ. ಮಾರುಕಟ್ಟೆ


  
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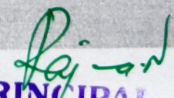
  
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**FUNDAMENTALS OF INORGANIC CHEMISTRY -**

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Coordinator, Dept. of P.G. Studies in Chemistry, Sahyadri Science College, Shivamogga

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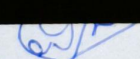
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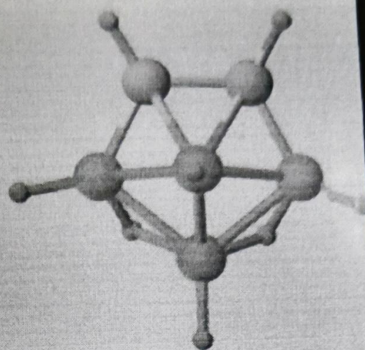
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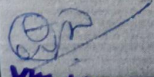
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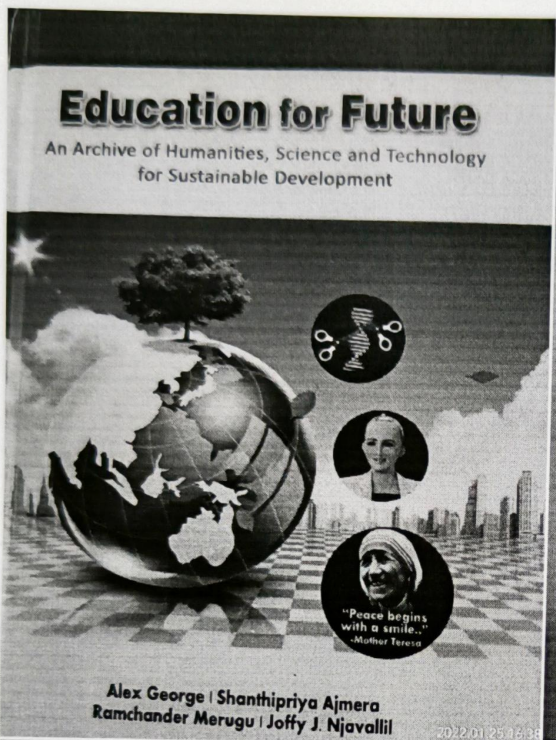
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**CONTENTS**

Foreword		
Preface		
<b>HUMANITIES</b>		
1. Education for Future: Concerns and Contexts	Dr T.C. Thankachan	27
2. Impact of Covid-19 on the Future Education	Mary Sebastian	43
3. Blend of Skill, Technology and Eco-Trends for a Peaceful Coexistence	Thomas T. Chittettu	49
4. The Hidden Well Springs	Marykutty P.V.	61
5. The Threat of the 'No-Nos' in Life	Dr Thomas Moolayil	65
6. Ethics for Future Generations	Dr Theyamma Joseph	71
7. The Gurukula Education and It's Relevance Today	Dr Joseph Olikkalkoonal	83
8. What Schools Should Teach for Tomorrow's Citizenship	Dr Savita Sharma	93
9. Teaching the Next Generation: The Changing Mindset	Dr Santo Jose	103
10. Redefining Future Learning: Fostering 21 <sup>st</sup> Century Skills among the Learners	Jijo Varghese Dr M.N. Moilamoolunn Allan Musthafa	111
11. Psychological Influence of Social Media Use	Dr Viju Muringassery	123
12. Horegally Teachers for Depressed Students	Kavitha Jacob	129
13. Transformation of Pedagogical Skills for 21 <sup>st</sup> Century	Dr Sushant Mchan	135
14. Importance of 'Emotional Intelligence' in Digital Era	Sr Lizy K.M.	141
15. Bridging the Communication Gap for a Better Tomorrow	Divya M.K.	149
16. Importance of Physical Education in Schools	Prakash D'Souza	155
17. Life Skills Practice for Equipping Next Generation	Dr Sharfa Noutina K.P.	163
18. The Future of Professional Education	Ashima Bharathan P.K.	177

79. Silver Nanoparticles and their Medical Applications	Dr P. Shivakumar Singh A. Divya	677
80. Biopreservation of Food using Bacteriocins	Dr Prashakar Walmik Dr S. Sreedevi Ms.P.T. Sravani	689
81. Mental Health and its Preservation for Better Future	Amal Thomas Sunil Thomas	703
82. Glaucoma- A Silent Blinding Disease	Divya Ajmeera Dr Sarangapani Munda Susmitha Kolluri Dr Shanthipriya Ajmera	711
83. Happiness in the World of Technology	Mansi Chhbra	723
84. Evolving to Become Digital Learners	Jessy John Joemol John	727
85. The Coming Era of Artificial Intelligence	Josilin James Anju Sojan	735
86. Human Resource Management in the 21 <sup>st</sup> Century	Rani Jos Maria	741
87. Hydrothermal Synthesis of Surfactant Free Zirconia Nano Phosphor Using Svyzignium Cumini: Photo Luminescent Study and Dentistry Applications	G. Deepthi Reddy Dr M. Noorjahan Dr A. Rurajmalia	751
88. Informatics: The Future	Joslin Maria Jose	759
<b>TECHNOLOGY</b>		
89. Artificial Intelligence in Future Education	Dinoy Mathew Anu P. Mathew	767
90. Amalgamation of Educational Robotics in School Education	Dr Manju Joseph	773
91. Repercussions of Technological Advancement in the Future	Sreeresh D. Andrews Thomas	785
92. SWAYAM, NPTEL & SWAYAM PRABHA for Future	Jenipher Carlos Hosanna	795
93. Online Pedagogy: The Road Ahead	Hanzala Awais	811
94. Redefining the Need of Blended Learning	Vincetha Thomas	817
95. Awaiting New Horizons in Education	Shareef N.M.	823
96. Role of Artificial Intelligence in Future Education	Arunkumar P.M.	831

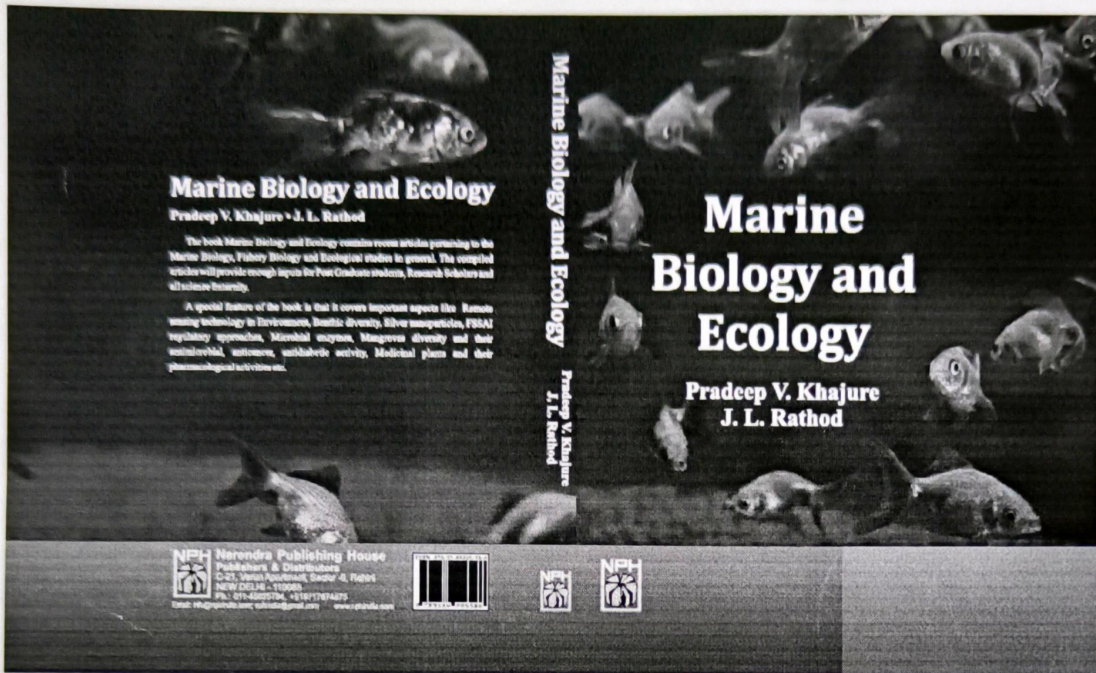
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20-21

9



Contents

*Preface* vii  
*About the Authors* ix  
*List of Contributors* xi

1. Environmental Assessment and Management through Multispectral Remote Sensing Techniques 1  
*Kavita Sharma and Neerav Sharma*

2. Distribution of Benthic Macro Polychaetes of Karwar Coast, West Coast of India 11  
*Pradya D. Bandekar, Shivakumar B. Haragi and Shreekant G.R.*

3. Industrial and Therapeutic Applications of Microbial Enzymes 31  
*Ravi M., Dattu Singh, Ravi Ranjan Kumar and Kumari Rajani*

4. Richness and Distribution of Sub Tidal Benthic Diversity in Near Shore Waters off Udupi, Karnataka, India 49  
*Shivanagouda N. Saanagouda and U.G. Bhat*

5. Silver Nanoparticles and Their in-vitro Applications 57  
*P. Shivakumar Singh, Chandrashekar and Prabhakar Walmit*

6. Fungal Regulatory Approaches of Steroid Glycosides 73  
*Vijayakumar M H*

7. Relative Condition Factor of *Gorres Filamentosus* (Silver Biddy) from Sharavati Estuary, Central West Coast of India. 87  
*Renuka Gokhate and Niranjana Hegde*

8. Cytotoxic Activity of Phenolic Compound Isolated from *Pandanus Odoratissimus* Against Breast Cancer Cell Lines 95  
*Abhay Kumar Kamble*

9. Systematics of True-Mangroves of Goa Coast, Central West Coast of India. 111  
*Cajy Silva and U.G. Bhat*

10. Potential Antidiabetic Activity of *Rhizophora Mucronata*: An Ocean Plant 151  
*Shardor Ambarish and Rajkumar Mea*

11. Assessment of Environment Using Non-physical and Classification Techniques 165  
*Kavita Sharma and Neerav Sharma*

12. Microwave Assisted Synthesis, Characterization and Biological Studies of Soma Schiff Base and Its Silver Complexes 175  
*Md. Nadim Afsan, Vijayakumar Durg, Kashinath, G. Kanaje and Basavaraj. A. Kalaji*

13. Diversity and Habitat Preference of Brachyuran Crabs of Karwar Coast, Karnataka, West Coast of India 189  
*Pradya D. Bandekar and V. S. Kakati*

14. Antioxidant Activity with total Phenolic Content and Phytochemical Screening of Medicinal Plants 203  
*P. Shivakumar Singh, M. Suresh Kumar and Prabhakar Walmit*

15. Studies on Phytochemical Screening, Antimicrobial and Antidiabetic Effect of *Coccinia indica* Leaves in Albino Mice 213  
*Md. Atique Hussain and Tufel Khan*

16. Biodiversity Conservation through Urban forests: A Case Study from Chennai, India 233  
*Stephen, P. Shivakumar Singh, Raghavendra Nayak*

17. Hypersensitivity Activity of *Achyranthes Aspera* 239  
*Abhaykumar Kamble*

18. Antimicrobial Activity of Microbial Diversity Associated with The *Chaetobacter Crucians* Isolated from The Marine Environment of Karwar, Karnataka 279  
*Pradeep V. Khajure and J.L. Rathod*

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