Edited Book

Natural Products *and* Herbal Strategies *in* COVID-19 *and* Mental Health Management

Editors

Perwez Alam
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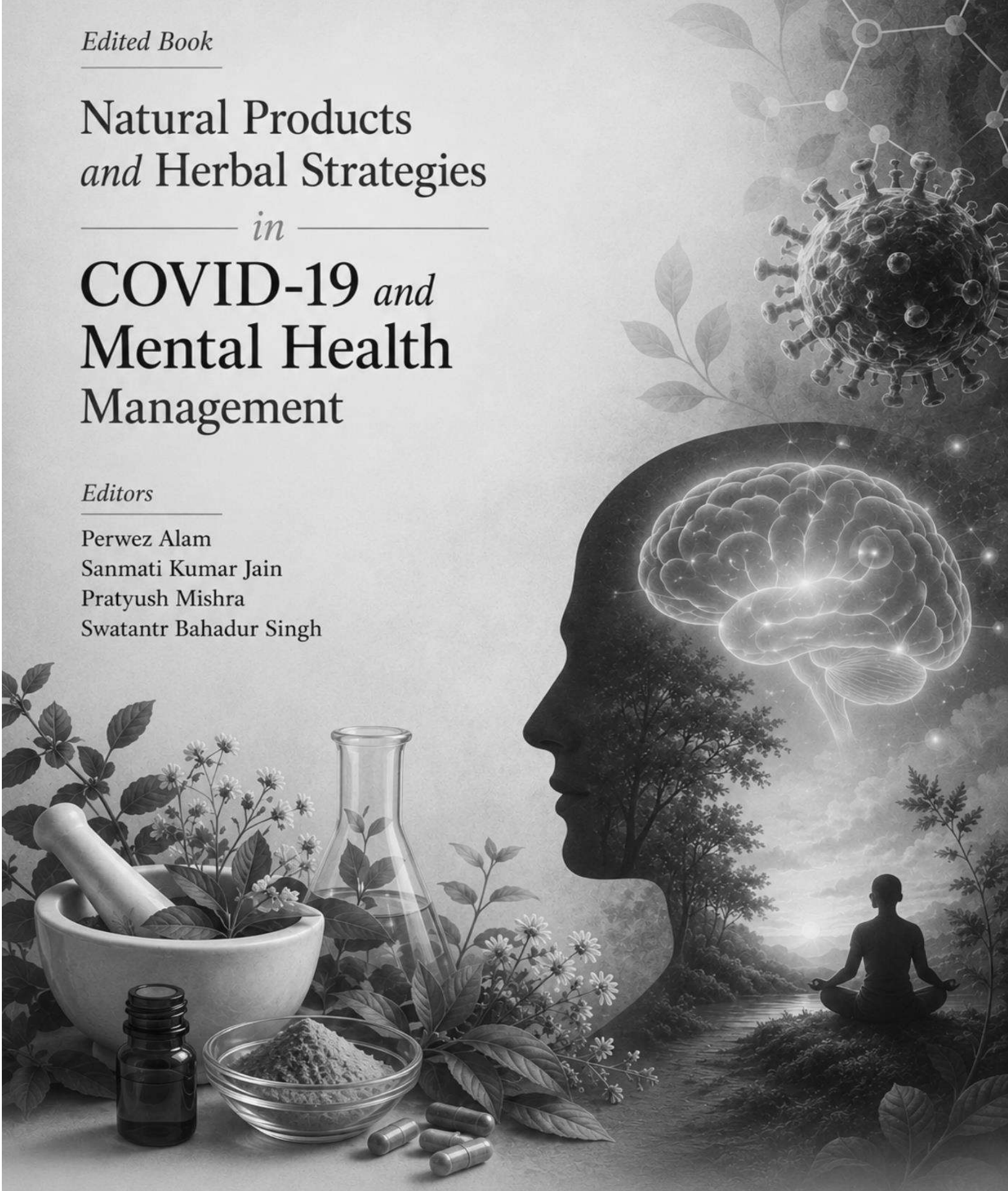

Published by
Mantra Publication
(An International Publication)

Book Title

Natural Products and Herbal Strategies in Covid- 19 and Mental Health Management

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Mantra Publication

Published, marketed, and distributed by:
Mantra Publication
An International Publisher
www.mantrapublicationservices.com
editorbooks@mantrapublicationservices.com
Whatsapp: +91 9236371090

P-ISBN: 978-81-686599-2-6

E-ISBN: 978-81-686599-4-0

DOI: *https://doi.org/* 10.5281/zenodo.20377328

Citation:

Alam, P., Jain, S. K., Mishra, P., & Singh, S. B. (2026). *Natural products and herbal strategies in COVID-19 and mental health management*. Mantra Publication. https://doi.org/10.5281/zenodo.20377328

Preface

The COVID-19 pandemic has reshaped global healthcare systems and highlighted the urgent need for safe, effective, and multi-target therapeutic strategies. Beyond its acute respiratory manifestations, COVID-19 has revealed complex systemic involvement, including cardiovascular, metabolic, neurological, and profound neuropsychiatric complications. In particular, the emergence of post-COVID syndrome or Long COVID has brought attention to persistent conditions such as anxiety, depression, cognitive impairment, chronic fatigue, and sleep disturbances, which continue to affect millions of individuals worldwide.

Conventional pharmacotherapy, while essential in acute management, often falls short in addressing the multifactorial and interconnected pathophysiological mechanisms underlying these long-term complications. These include chronic inflammation, oxidative stress, immune dysregulation, endothelial dysfunction, mitochondrial impairment, and neurochemical imbalance. This therapeutic gap has renewed global interest in natural products and herbal medicines as complementary and integrative approaches in disease management.

Natural products derived from medicinal plants have long been a cornerstone of traditional healing systems such as Ayurveda, Unani, Traditional Chinese Medicine, and other ethnomedical practices. Modern scientific research now increasingly validates their pharmacological potential, particularly their antiviral, anti-inflammatory, immunomodulatory, antioxidant, and neuroprotective properties. These multi-target actions make herbal agents especially suitable for complex diseases like COVID-19 and associated mental health disorders.

This edited book, *Natural Products and Herbal Strategies in COVID-19 and Mental Health Management*, brings together current scientific evidence, mechanistic insights, and translational perspectives on the role of medicinal plants and natural compounds in managing viral infections and neuropsychiatric complications. It explores phytochemicals, pharmacological mechanisms, clinical evidence, and emerging technologies such as nanoformulations, systems pharmacology, and evidence-based herbal drug development.

The objective of this volume is to bridge the gap between traditional knowledge and modern biomedical science, providing researchers, academicians, healthcare professionals, and students with a comprehensive resource on herbal strategies for COVID-19 and mental health management. It also aims to encourage further research and innovation in integrative medicine for future global health challenges.

We hope this book will serve as a valuable reference and inspire new directions in phytopharmacology and integrative therapeutic research.

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Acknowledgements

We express our sincere gratitude to all contributing authors for their valuable scholarly contributions, scientific insights, and dedicated efforts in shaping this edited volume, *Natural Products and Herbal Strategies in COVID-19 and Mental Health Management*. Their commitment to advancing research in natural products, pharmacology, neuropharmacology, and mental health has significantly enriched the scientific depth, interdisciplinary scope, and academic quality of this book. Each chapter reflects rigorous effort in compiling evidence-based information, mechanistic understanding, and translational perspectives relevant to post-pandemic healthcare.

We sincerely thank the reviewers and subject experts for their careful evaluation, critical appraisal, and constructive suggestions. Their thoughtful comments have greatly improved the scientific rigor, clarity, coherence, and overall presentation of the chapters included in this volume. Their expert guidance ensured that the content aligns with current advances in biomedical sciences and meets high academic and publishing standards.

We extend our heartfelt appreciation to our respective academic and research institutions for providing continuous support, infrastructure, and an intellectually stimulating environment that made the completion of this work possible. The encouragement for research activities, academic freedom, and availability of laboratory and library resources played a crucial role in the successful development of this edited book.

We also acknowledge the valuable support of colleagues, faculty members, research collaborators, and laboratory staff, whose cooperation, technical assistance, and academic discussions have contributed directly and indirectly to the preparation of this volume. Their collaborative spirit and shared scientific engagement have strengthened the conceptual foundation of this work.

We also acknowledge the support of libraries, academic databases, and open-access scientific platforms, which have provided invaluable access to up-to-date research articles, clinical studies, and review literature. These resources have been essential in ensuring that the content of this volume is evidence-based and scientifically relevant.

We express our special gratitude to **Mantra Publication and Research Solutions** for their professional assistance, publication expertise, and consistent cooperation throughout the editorial and production process. Their dedicated efforts in manuscript handling, formatting, coordination with authors, and timely execution of publication tasks have been instrumental in bringing this edited volume to completion. Their commitment to academic publishing excellence is sincerely appreciated.

Finally, we express our deepest gratitude to our families and well-wishers for their unwavering encouragement, patience, and emotional support throughout the preparation of this edited book. Their constant motivation, understanding, and belief in our academic endeavors have been a continuous source of strength and inspiration.

Editors

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Chapter 3: Management of COVID-19–Associated Respiratory and Psychological Symptoms Using Ocimum sanctum and Adhatoda vasica

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Abstract

The coronavirus disease 2019 (COVID-19) pandemic created an unprecedented global healthcare crisis characterized not only by acute respiratory illness but also by persistent psychological and neurological complications. In addition to pulmonary manifestations such as cough, bronchitis, dyspnea, and acute respiratory distress syndrome, COVID-19 has been strongly associated with anxiety, depression, stress, insomnia, fatigue, and long-COVID-related neuroimmune dysfunction. These multifactorial complications highlighted the limitations of conventional therapeutic approaches and increased interest in complementary and integrative medicine strategies utilizing medicinal plants with multitarget pharmacological activities. Among the medicinal herbs investigated for supportive COVID-19 management, Ocimum sanctum (Tulsi) and Adhatoda vasica (Vasaka) have attracted considerable scientific attention because of their antiviral, bronchodilatory, immunomodulatory, antioxidant, anti-inflammatory, adaptogenic, and neuroprotective properties. This chapter comprehensively explores the ethnopharmacology, phytochemistry, traditional therapeutic applications, and pharmacological mechanisms of *Ocimum sanctum* and *Adhatoda vasica* in the management of COVID-19-associated respiratory and psychological symptoms. Tulsi contains several bioactive phytoconstituents including eugenol, ursolic acid, rosmarinic acid, and flavonoids that contribute to immunomodulatory, antioxidant, adaptogenic, and anxiolytic effects. Similarly, Vasaka is rich in quinazoline alkaloids such as vasicine and vasicinone, which possess bronchodilatory, expectorant, anti-inflammatory, and respiratory protective activities. Experimental evidence indicates that these medicinal plants may modulate inflammatory cytokines, reduce oxidative stress, improve pulmonary function, regulate neuroimmune interactions, and alleviate stress-associated disorders. The chapter further discusses the potential antiviral and respiratory protective mechanisms of these herbs against SARS-CoV-2 infection, including regulation of inflammatory cascades, reduction of pulmonary oxidative injury, and support of respiratory recovery during long-COVID syndrome. Their neuroprotective and psychological benefits, including anxiolytic, adaptogenic, and anti-stress effects mediated through modulation of the hypothalamic–pituitary–adrenal axis and neurotransmitter systems, are also critically analyzed. In addition, the chapter highlights available in vitro, in vivo, preclinical, and clinical evidence supporting their therapeutic relevance in respiratory infections, immune dysfunction, and psychological disorders. Emerging therapeutic perspectives including nanoformulations, advanced herbal delivery systems, network pharmacology, artificial intelligence-assisted phytodrug discovery, and integrative polyherbal approaches are also explored. Despite promising pharmacological evidence, the chapter emphasizes the necessity for phytochemical standardization, biomarker-based quality control, and large-scale randomized clinical trials to establish definitive safety and efficacy profiles. Overall, *Ocimum sanctum* and *Adhatoda vasica* represent valuable medicinal plants with significant therapeutic potential for the supportive management of COVID-19-associated respiratory and psychological complications. Their multitarget pharmacological actions highlight the importance of integrating traditional medicinal knowledge with modern biomedical research for future pandemic preparedness and holistic healthcare strategies.

Keywords

COVID-19; SARS-CoV-2; Ocimum sanctum; Adhatoda vasica; Tulsi; Vasaka; antiviral activity; bronchodilator

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