

## Book Review

# **Biohydrogen Production: Fundamentals and Technology Advances, Debabrata Das, Namita Khanna, Chitralekha Nag Dasgupta, CRC Press (2014). Hardcover, 408 pp., b&w., \$199.95, ISBN 978-1466-517-998**

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The book by Prof. Debabrata Das, Dr. Namita Khanna and Dr. Chitralekha Nag Dasgupta on Biohydrogen Production: Fundamentals and Technology Advances is comprehensive and timely. The timely availability of this book published by CRC Press of Taylor and Francis Group shall have tangible benefit of inspiring young minds to take research, development and deployment possibilities in domains of biohydrogen production and develop sustainable technologies. The contents of the book have sufficient coverage to initiate industries to take up collaboration with academic and research institutes to build capacity and capabilities for realizable technologies. I am a believer in the concept of involving young colleagues to be the authors of the book, in the cutting edge and frontier domain of science and technology. **Prof. Debabrata Das**, has done well to ignite two young scholars to become a part of writing the book and giving them due visibility. Participation of young authors enables the book to be update in literature surveys, captures bold path creating directions for technology.

Coming to the contents; the Foreword by **Dr. T. Nejat Veziroglu**, President, International Association for Hydrogen Energy and stepwise treatment of the subject with building blocks is commendable. Starting with energy scenarios and demands to modelling and simulation, scale up challenges, economics, policy and environmental impact; coverage is comprehensive. Supply chain

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considerations and management need to be covered in the book, in realistic terms to harness large scale biohydrogen production.

Proportion of coverage of each topic is quite balanced to qualify as a text book. I would have liked to see the following to be covered with balanced approach.

A case has been made for biohydrogen production by pulling down other energy resources particularly nuclear energy. Nuclear energy has not been treated based on scientific facts and figures. Some of the aspects are discussed on a singular accident. A perspective in the books is much different as compared to analysis by experts and the results are available for authentic reporting by the authors of the book.

The experiences in nuclear energy demonstrate that this resource of energy has lowest carbon footprint, over the life cycle and is cost competitive technology. Post-Fukushima, the concern is separating myths and realities for communications to the policy makers and public. The focus of the industry and regulations is on severe accidents mitigation, avoiding release of radio active isotopes to environment in case of low probability high risk accidents and public acceptance on basis of the merits of energy security and sustainability. It is also true that nuclear energy is not for all the countries but it is also true that energy basket of each country is different and for some countries like China, France, India, Russia, Japan (in future) USA, etc nuclear energy shall be at the core of meeting large energy demands with low carbon foot print with improved safety and sustainability consideration. The purpose of this comment with elaboration, is to make a point that the text books should not favour digressive, dismissals and passionate advocacies.

Energy scenarios vary by different authors and agencies and are based on assumptions, and perspectives made by the authors. It could have been desirable to take the scenarios and assumptions by say International Energy Agency and a few other credible organisations; which are widely accepted. The focus should have been convergence and divergences on scenarios for biofuels and biohydrogen. The Chapter in the current form has a biased and unfounded approach.

I would have liked to see more emphasis on fundamentals throughout the book. The short exercises at the end of each chapter for students and researchers, to gauge their understanding and learning, shall be helpful in future editions.

I have liked the coverage on mathematical modelling and simulation. Emphasis on current uncertainties and future pathways for integrated modelling of processes would have been helpful. Challenges and recommendation for policies are not articulated in clear terms and with well thought out pathways. The suggestions are generic and thus do not serve the purpose.

In Chapter-2, on microbiology, I would have liked to see attractive and inspiring photographs of various bacteria and consortia. Schematics and photographs are key to holding the interest of the readers.

I would have liked to have clear conceptual and schematic illustration of various kinds of reactors. The current illustrations do not enable good understanding at mechanistic levels.

The coverage of processes, scaling up challenges is sufficient with details. Quantitative treatment of subject needs to be more intense to appreciate the results and challenges thus enabling the reader, with knowledge base, to build her/his own approaches. A large number of tables and their contents, in many Chapters of the book are impressive to comprehend the subject.

I wish to congratulate Prof. Debabrata Das, Dr. Namita Khanna and Dr. Chitralkha Nag Dasgupta for a valuable textbook including current research on the subject, which is evolving and thus difficult to deal in authoritative manner.

The critique appreciates which I do with delight. The improvements are mentioned for consideration to realize better book, when edition-2 is considered for the publication.

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