

1. Record Nr.	UNINA9910298593803321
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Titolo	High-solid and Multi-phase Bioprocess Engineering [[electronic resource]] : Theory and Practice // by Hongzhang Chen
Pubbl/distr/stampa	Singapore : , : Springer Singapore : , : Imprint : Springer, , 2018
ISBN	981-10-6352-4
Edizione	[1st ed. 2018.]
Descrizione fisica	1 online resource (xii, 359 pages) : illustrations
Collana	Green Chemistry and Sustainable Technology, , 2196-6982
Disciplina	660.63
Soggetti	Biochemical engineering Renewable energy resources Biology—Technique Microbiology Biochemical Engineering Renewable and Green Energy Biological Techniques Applied Microbiology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Physical-chemical Properties of Solid Substrates -- Intensify Bioreaction Accessibility and Feedstock Refinery Process -- Microbe and Multi-enzyme Systems of High-solid & Multi-phase Bioprocess -- Periodic Intensification Principles and Methods of High-solid & Multi-phase Bioprocess -- Design and Scale-up of High-solid & Multi-phase Bioprocess -- On-line Detection of High-solid & Multi-phase Bioprocess Parameters -- Industrial Application of High-solid & Multi-phase Bioprocess.
Sommario/riassunto	This book provides a comprehensive description of theories and applications of high-solid and multi-phase bioprocess engineering, which is considered as an important way to address the challenges of "high energy consumption, high pollution and high emissions" in bio-industry. It starts from specifying the solid-phase matrix properties that contribute to a series of "solid effects" on bioprocess, including mass transfer restrictions in porous media, water binding effects, rheological changes. Then it proposes the new principles of periodic

intensification which combines the normal force and physiologic characteristics of microorganism for the bioprocess optimization and scale-up. Further breakthroughs in key periodic intensification techniques such as periodic peristalsis and gas pressure pulsation are described in detail which provide an industrialization platform and lay the foundation for high-solid and multi-phase bioprocess engineering. This book offers an excellent reference and guide for scientists and engineers engaged in the research on both the theoretical and practical aspects of high-solid and multi-phase bioprocess.
