1. Record Nr. UNINA9910161648003321

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Titolo	Enzymes from Extreme Environments
Pubbl/distr/stampa	Frontiers Media SA, 2016
Descrizione fisica	1 online resource (103 p.)
Collana	Frontiers Research Topics
Soggetti	Biotechnology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia

Sommario/riassunto

Enzymes are nature's biocatalysts empowered with high catalytic power and remarkable substrate specificity. Enzymes perform a wide range of functions throughout nature, and guide the biochemistry of life with great precision. The majority of enzymes perform under conditions considered normal for mesophilic, neutrophilic, terrestrial microorganisms. However, the Earth's biosphere contains several regions that are extreme in comparison, such as hypersaline lakes and pools, hydrothermal vents, cold oceans, dry deserts and areas exposed to intensive radiation. These areas are inhabited by a large number of extremophilic microorganisms which produce enzymes capable of functioning in unusual conditions. There is an increasing biotechnological and industrial demand for enzymes stable and functioning in harsh conditions, and over the past decade screening for, isolation and production of enzymes with unique and extreme properties has become one of the foremost areas of biotechnology research. The development of advanced molecular biology tools has facilitated the quest for production of enzymes with optimized and extreme features. These tools include large-scale screening for potential genes using metagenomics, engineering of enzymes using computational techniques and site-directed mutagenesis and molecular evolution techniques. The goal of this Research Topic is to present reports on latest advances in enzymes from all types of extreme environments. Contributions dealing with isolation of enzymes from

extremophilic microorganisms or directly from natural environments, screening for and expression of enzymes with extreme properties using metagenomic approaches are welcome. In addition, contributions dealing with all forms of biocatalyst production and improvement are welcome, such as fermentation technology, protein engineering, directed evolution, rational design, and immobilization techniques.