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Extremophiles In Deep Sea Environments
The deep-sea is one of the most mysterious and unexplored extreme environments, holding great potential and interest for science. Despite extensive studies on deep-sea prokaryotes, the diversity of fungi, one of the most ecologically important groups of eukaryotic micro-organisms, remains largely unknown. However, the presence of fungi in these ecosystems is starting to be recognised.

Fungal diversity in deep-sea extreme environments
These ecosystems are therefore unique on Earth. Because of the extreme environment at the bottom of the oceans organisms find it difficult or impossible to move from one vent to another. This has...

Extremophiles - Adaptations, interdependence and ...
An extremophile (from Latin extremus meaning "extreme" and Greek phili â (φ ι λ í α) meaning "love") is an organism with optimal growth in environmental conditions considered extreme in that it is challenging for a carbon-based life form, such as all life on Earth, to survive.. These organisms are dominants in the evolutionary history of the planet. Dating back to more than 40 million years ...

Extremophile - Wikipedia
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Extremophiles in Deep-Sea Environments from Summerfield Books
Extremely high or low temperatures, extreme pressures, for example, are environments where extremophiles can exist. So are high levels of salt or other substances in water. Some extremophiles can even survive in the vacuum and radiation of outer space. The word ‘ extremophiles ’ contrasts with mesophiles or neutrophiles. Mesophiles grow best in moderate temperatures, i.e., between 68 ° F and 113 ° F (20 ° C and 45 ° C).

What are extremophiles? Definition and examples
In the field of Microbiology in particular, scientists have discovered novel "extremophiles", microorganisms capable of living in extreme environments such as highly acidic or alkaline conditions, at high salt concentration, with no oxygen, extreme temperatures (as low as -20 degrees C and as high as 300 degrees C), at high concentrations of heavy metals and in high pressure environments such as the deep-sea.

[Microbial diversity of deep-sea extremophiles ...
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Many organisms in deep-sea environments are extremophiles thriving in extreme conditions: high pressure, high or low temperature, or high concentrations of inorganic compounds. This book presents the microbiology of extremophiles living in the deep sea and describes the isolation, cultivation, and taxonomic identification of microorganisms retrieved from the Mariana Trench, the world's deepest point. Also explained are techniques for recovering pressure-loving bacteria, the barophiles (piezophiles), and for whole genome analysis of Bacillus halodurans C-125. Physiological analysis of the pressure effect in Saccharomyces cerevisiae and Escherichia coli is used to answer the question of how deep-sea organisms survive under high hydrostatic pressure. These research results are useful in both basic science and industrial applications. Readers discover a new microbial world in the ocean depths, with state-of-the-science information on extremophiles.

This text is devoted to a particular class of microbe & focuses on its ecology, systematics, physiological & molecular biology. Also included is a discussion of potentially exploitable biotechnological & industrial uses for extremophiles.

The data in this book are new or updated, and will serve also as Origin of Life and evolutionary studies. Endospores of bacteria have a long history of use as model organisms in astrobiology, including survival in extreme environments and interplanetary transfer of life. Numerous other bacteria as well as archaea, lichens, fungi, algae and tiny animals (tardigrades, or water bears) are now being investigated for their tolerance to extreme conditions in simulated or real space environments. Experimental results from exposure studies on the International Space Station and space probes for up to 1.5 years are presented and discussed. Suggestions for extaterrestrial energy sources are also indicated. Audience Researchers and graduate students in microbiology, biochemistry, molecular biology and astrobiology, as well as anyone interested in the search for extraterrestrial life and its technical preparations.

Many Microorganisms and some macro-organisms can live under extreme conditions. For example, high and low temperature, acidic and alkaline conditions, high salt areas, high pressure, toxic compounds, high level of ionizing radiation, anoxia and absence of light, etc. Many organisms inhabit environments characterized by more than one form of stress (Polyextremophiles). Among them are those who live in hypersaline and alkaline, hot and acidic, cold/hot and high hydrostatic pressure, etc. Polyextremophiles found in desert regions have to copy with intense UV irradiation and desiccation, high as well as low temperatures, and low availability of water and nutrients. This book provides novel results of application to polyextremophiles research ranging from nanotechnology to synthetic biology to the origin of life and beyond.

This book is a printed edition of the Special Issue "Extremophiles and Extreme Environments" that was published in Life

From deep ocean trenches and the geographical poles to outer space, organisms can be found living in remarkably extreme conditions. This book provides a captivating account of these systems and their extraordinary inhabitants, 'extremophiles'. A diverse, multidisciplinary group of experts discuss responses and adaptations to change; biodiversity, bioenergetic processes, and biotic and abiotic interactions; polar environments; and life and habitability, including searching for biosignatures in the extraterrestrial environment. The editors emphasize that understanding these systems is important for increasing our knowledge and utilizing their potential, but this remains an understudied area. Given the threat to these environments and their biota caused by climate change and human impact, this timely book also addresses the urgency to document these systems. It will help graduate students and researchers in conservation, marine biology, evolutionary biology, environmental change and astrobiology better understand how life exists in these environments and their susceptibility or resilience to change.

Koki Horikoshi — discoverer of the alkaliphiles, microbes that thrive in alkaline environments — describes in his autobiography how the research on extremophiles started and developed. He is a pioneer in the study of these microorganisms that thrive in extreme conditions, and in his book he opens a new vista of the microbial world, pushing the field to expand from the surface of the Earth to the subsurface, to the deep sea and outer space. All major developments in extremophiles research are covered, stretching back to the historical use of microbes in mixed fermentation, indigo dyeing and the pasteurisation of sake. Events in Horikoshi ' s life provide many valuable insights into the life of a budding scientist, inspired by the Renaissance culture of Florence that led him to the discovery of the alkaliphiles. Our daily lives have been greatly affected by Horikoshi ' s research, such as the extensive screening he conducted for enzymes produced by alkaliphiles, now applied in many industries from biological laundry detergents to pharmaceutics. The book also reflects on numerous milestone events and people who contributed to the establishment of this field, including colleagues from all over the world. This book is a good read for all microbiologists, encouraging readers to reach out to new worlds and discoveries. It will be treasured by all those interested in a life of a real pioneer.

Vents and seeps are the epitome of life in extreme environments, but there is much more to these systems than just black smokers or hydrocarbon seeps. Many other ecosystems are characterized by moving fluids and this book provides an overview of the different habitats, their specific conditions as well as the technical challenges that have to be met when studying them. The book provides the current state of the art and will be a valuable resource for everybody that has an interest in such environments.

Highly recommended by CHOICE, Oct 2018 Extremophiles are nature ' s ultimate survivors, thriving in environments ranging from the frozen Antarctic to abyssal hot hydrothermal vents. Their lifeforms span bacteria to fishes, and are categorized as halophiles from hypersaline environments, acidophiles from acidic waters, psychrophiles from cold habitats, and thermophiles from warm waters. Extremophiles: From Biology to Biotechnology comprehensively covers the basic biology, physiology, habitats, secondary metabolites for bioprospecting, and biotechnology of these extreme survivors. The chapters focus on the novel genetic and biochemical traits that lend these organisms to biotechnological applications. Couples studies of marine extremophile biology/genomics and extremophile culture for biotechnological applications with the latest advances in bio-prospecting and bio-product development Includes practical experiments that a laboratory can use to replicate extreme habitats for research purposes Presents latest advances in extremophile genomics to give the reader a better understanding of the regulatory mechanisms of extremophiles Offers insights into the production of commercially important extremozymes, carotenoids, bioactive compounds and secondary metabolites of medicinal value. This unique guide serves as a resource for biotechnologists who wish to explore extremophiles for their commercial potential, as well as a valuable reference for teaching undergraduate, graduate and postgraduate students.

The Extremophiles Handbook brings together the rapidly growing and often scattered information on microbial life in the whole range of extreme environments. This book will be a useful reference for finding clues to the origin of life and for exploring the biotechnology potential of these fascinating organisms.