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Extremophiles - A source of innovation for industrial and environmental applications

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Preface

Extremophiles – A source of innovation for industrial and environmental applications

In the near future, extremophiles are going to play an increasingly important role in various industries and in environmental biotechnology, as a source of new enzymes and processes that will occur without pretreatment of materials to less extreme conditions. These demands are due to economical pressures and environmental concerns. Recent research developments further highlight the tremendous potential of extremophilic microorganisms, opening the way to a whole range of new applications. Microorganisms from extreme environments are currently a source of a variety of high-value compounds such as antioxidants, biostabilizers, compatible solutes, biosurfactants, biopolymers, etc. Their unique enzymes are able to catalyse reactions under high and low temperature, pH, pressure and salinity conditions. Our increasing understanding of the biochemical properties of these unique enzymes will continue to enable researchers to develop more creative applications for industrial processes, consumer products, and environmental stewardship.

This special issue called for scientific contributions that present breakthroughs in conceptual, theoretical, methodological and applied aspects of extremophilic research. In particular, these contributions are intended to focus on industrial and environmental applications. The special issue consists of 15 review papers and 15 original research articles spanning the breadth of extremophilic research from industrial products and processes to environmental biotechnology. Specific topics that are discussed include biocatalytic synthesis of fine chemicals, bioanalytics, molecular biology, healthcare (new antimicrobials), food products, nanosensor synthesis, bioremediation, biosequestration and bioprospecting. These papers, are being published in two parts. Part 1 (issues 8–9) highlights bioprospecting and recent advances in the industrial and environ-

mental uses of extremophiles. Part 2 (issue 10) covers some of the novel enzymes and industrial compounds from extremophiles.

The tremendous diversity of extremophiles found in nature is still far from being fully exploited. Approaches derived from genomics and proteomics have presented new opportunities, and genetic systems are now also available for a number of extremophiles. Therefore, it is expected that novel applications will be further developed in the future from the highly diverse and versatile world of extremophiles. We hope that the compilation of ongoing research in this special issue will stimulate and inspire environmental scientists and engineers, who will, in turn, contribute the major breakthroughs needed to make an impact in this area.

It goes without saying that a project of this size could not have been successfully completed without the excellent cooperation and enormous effort on the part of the authors, many of whom have revised their manuscripts more than once; the reviewers, who provided rigorous and constructive critiques and helped the authors in producing the final versions of their manuscripts; the dedicated publications staff of Taylor & Francis; and the Editor-in-Chief of *Environmental Technology*, Professor Simon Parsons, for giving us an opportunity to publish this special issue. Finally, we hope the readers will share our joy and find this special issue very useful.

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