

Preface

Biotechnology is a scientific discipline and an area of engineering on industrial manufacturing and practical applications of microorganisms and their products such as proteins, nucleic acids, polysaccharides, storage compounds, and low molecular weight metabolites. Food, Medical, Veterinary, Agricultural, and Environmental Biotechnologies differ in their areas of applications. A new biotechnological discipline, Construction Biotechnology, arose during the last decade.

Two major directions in Construction Biotechnology are (Fig. 1):

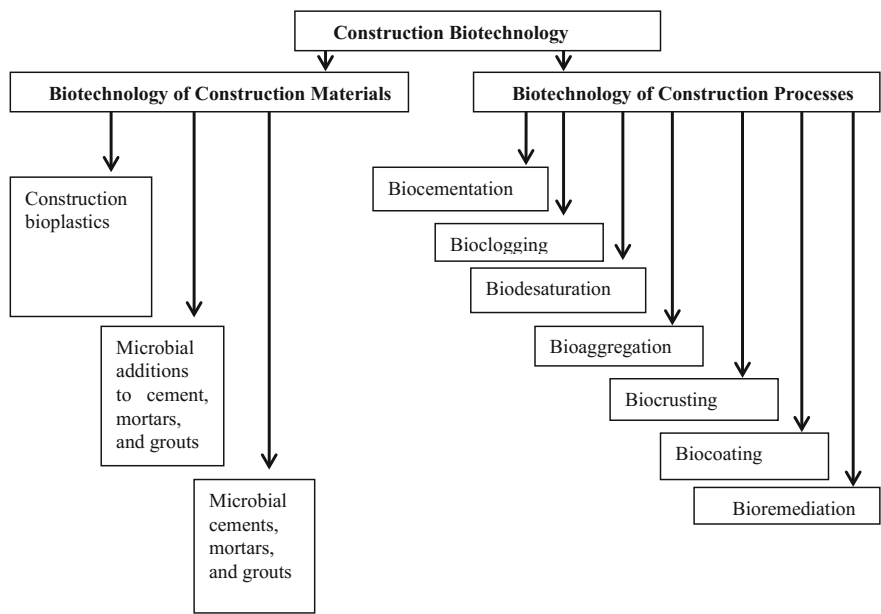


Fig. 1 Directions of construction biotechnology

(1) The industrial production of the construction materials, for example cement admixtures or bioplastic, by microorganisms and (2) *in situ* applications of microorganisms or their products in the construction process. The aim of this book is to show the current trends and new potential directions for the further development of Construction Biotechnology.

Construction Biotechnology is a new interdisciplinary area involving applications of environmental and industrial microbiology and biotechnology in civil engineering. The topics covered in this book are as follows: biotechnological production of new construction materials such as biotechnological admixtures to cement, construction biocomposites, construction bioplastics, self-healing concrete, as well as such construction-related processes as biocementation, biogrouting, bioclogging, biosealing, soil surface fixation, biocoating of construction material surface, biotechnologies of green building and green city, microbiology and biosafety of construction environment, prevention of biocorrosion, biodeterioration and biofouling in civil engineering. Biomediated precipitations of calcium, magnesium, and iron compounds as carbonates, phosphates, sulfides, and silicate minerals in soil or fractured rocks, as well as on surface of materials, for their clogging, strengthening or coating are considered from geotechnical, chemical, and microbiological points of view. Some basic microbiological knowledge that can be useful for civil engineers to perform construction biogeochemical processes is also given in the book. The design principles and considerations for different field implementations are discussed from practical point of view. The book can be used as a textbook for graduate and senior undergraduate students in biotechnology, civil engineering, and environmental engineering, as well as a reference book for the researchers and practitioners who are working in new interdisciplinary area of Construction Biotechnology.

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