Microalgal Nanobiotechnology and Its Applications—A Brief Overview

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1 Introduction

Nanotechnology is a branch of science that deals with the synthesis and application of nanosized materials. It is emerging as a fast growing field with many applications virtually in every aspect of life due to the production of nanomaterials. Nanoparticles are the building block of nanotechnology and are presently gaining importance as they possess very unique physicochemical properties. In nanotechnology, metallic and non-metallic nanoparticles are produced, but metallic nanoparticles are themost preferred due to their superior properties and functional versatility.Nanoparticles were previously produced only by physical and chemical methods like chemical reduction, electrochemical and photochemical reactions, attrition, and pyrolysis (Rodriguez-Sánchez et al. 2000; Balantrapu and Goia 2009; Chen et al. 2013). Basically, two approaches are adopted for the synthesis of nanoparticles, namely bottom-up and top-down approaches. The top-down approach involves removal of certain parts of bulk material using mechanical (physical) or chemical means, whereas in the bottom-up approach, the synthesis involves attachment of materials with a base substrate (Singh et al. 2010).

The common physical and chemical approaches used for nanoparticles synthesis have some major drawbacks which are the presence of toxic chemical contaminants from precursor chemicals, generation of harmful by-products, high production cost,

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