

Microorganisms as phytase producers

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Abstract

Replenishing of the stores of inorganic phosphate is among the most urgent environmental problems. In soil, phosphorus within inorganic compounds is mostly (over 80%) present as insoluble, phytic acid-based conglomerates. Phytates are strong chelating agents, binding the cations of bivalent metals, as well as peptides and low-molecular metabolites into resilient poorly degradable compounds. Their hydrolysis in nature is carried out by microbial phytases, which may potentially be used for an innovative microbial technology. The review deals with microbial degradation of the derivatives of phytic acid. Bacterial species capable of phytase synthesis for stepwise specific cleaving of phytates and their derivatives are discussed. Information analysis was carried out in order to search for the genes encoding phytases in bacterial genomes. Directional modification of the genes of bacterial phytases in order to develop new biotechnologies for agriculture and forage industry is considered. Application of microbial enzymes in agriculture and medicine is analyzed. Bacteria phytases are concluded to have a high practical potential. Microbiology is capable of providing the theoretical and experimental basis for development of the new biotechnology. © 2012 Pleiades Publishing, Ltd.

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