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Beneficial microbes: Exploring their beneficial role for upliftment of human welfare

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Microbes include a massive range of organisms including bacteria, fungi, viruses, algae, archaea and protozoa. Bacteria and fungi, have served humans since hundreds of years for food, drugs and other high value chemical products. Recent advances and progress made in the field of applied microbiology have contributed towards better understanding of the role of beneficial microbes and their activities. In this approach, a progressive study was performed in the discipline of biodegradation of polythene, microbial enzymes and pharmaceuticals. Microorganisms have been regarded as treasure of useful enzymes like proteases and amylases. Bacterial (*Brevibacillus borstelensis* R1) and fungal strains (*Aspergillus fumigatus* (MTCC 1399), *Aspergillus tubingensis* (MTCC 1398) with great potential of amylase production were isolated and identified from different regions of Andhra Pradesh, India. Similarly, *Bacillus cereus* strain S8 (MTCC 11901) was identified with efficient protease production potential. Molecular identification was done by 16s rRNA gene sequencing for bacteria and by ITS/5.8S rRNA and β -tubulin gene sequence for fungal strains. The novelty of these strains and enzymes lies in their growth kinetics, production dynamics, decolorization activity, biological synthesis of nanoparticles, thermostability, halotolerance and activity of enzymes at alkaline conditions, which are the pre-requisite features to meet demands of different industrial sectors like food, textile, pharmaceutical, leather and detergent industries. Due to these significant features Microbial Type Culture Collection and Gene Bank (MTCC), Chandigarh, India, assigned them with accession numbers. Production and optimization studies of Lovastatin, a hypolipidemic drug from *Penicillium funiculosum* were studied. The excellent biodegradation (40%) of low density polythene with two months of incubation and degradation of industrial toxic effluents with two days of incubation were achieved with isolated strain of *Achromobacter denitrificans* (MTCC 12203). Due to these promising properties, microbes can be explored in many fields and these approaches might helpful in the upliftment of human welfare.

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