Suresh Deka, Biol Med (Aligarh) 2016, 8:6(Suppl)
http://dx.doi.org/10.4172/0974-8369.C1.002

Application of biosurfactant for general welfare of economically important crops with special reference to management of phytopathogenic fungi

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The human population in the globe is increasing day by day. However, the land for the agriculture is decreasing with the increasing human population. To meet the growing demands for food, agricultural production has become a matter of great concern for all the countries. For increasing the agricultural product, agrochemicals have been used tremendously. Widespread use of these agrochemicals cause great harm to the soil health and make the soil unproductive in the long run. To overcome the problems, research is going on to search non-hazardous alternatives against the agrochemicals. Biosurfactant is a surface active microbial metabolite and belongs to various classes including glycolipids, lipopeptides, fatty acids, phospholipids, neutral lipids and lipopolysaccharides. The unique properties of biosurfactant have recently attracted the attention of industries to become a possible replacement to the synthetic chemical pesticides. Biosurfactant has aspecial advantage over the chemicals being used as they are less toxic, highly biodegradable and exhibit better environmental compatibility. Keeping this in mind, a study was undertaken to explore the prospective application of biosurfactant isolated from native bacterial strains as an antifungal agent against some plant pathogenic fungi. For that, a range of bacteria were isolated from hydrocarbon contaminated soil and screened for the ability to produce biosurfactant. The efficacy of the produced biosurfactants was tested in vitro as well as in planta against some important fungal plant pathogens. Results revealed that the biosurfactant produced by the bacterium *Pseudomonas aeruginosa* strain JS29 could efficiently control the plant pathogen *Colletotrichum capsici*, the causal organism of anthracnose diseases of chili and *Alternaria solani*, the causal organism of early blight in Tomato; *P. aeruginosa* strain DS9 could control *Fusarium* sacchari, the causal organism of Pokkah boeng disease of sugarcane and *Colletotrichum falcatum*, the causal organism of red rot of sugarcane and *P. aeruginosa* strain SS14 could control *Fusarium oxysporum* f. sp. *pisi*,causal organism of Fusarium wilt of pea and *Fusarium verticillioides*, causal organism of stalk and ear rot of maize. The biosurfactants were identified as rhamnolipids. The rhamnolipids produced by the bacterial strains could be used to control the causal organisms of the diseases efficiently, which could lead to the development of an alternative, ecofriendly, cost effective and viable bio-pesticide against these plant pathogenic fungi.

Biography

Suresh Deka has completed his PhD in Microbial Ecology from Guwahati University in 1991 and has more than 25 years of research experience in the fields of hydrocarbon degradation, bioremediation, biosurfactant and plant diseases control. He is currently working as a Professor in the Institute of Advanced Study in Science and Technology (IASST), India. He has more than 100 publications/presentations, filed 4 patents and produced 7 PhD. He was awarded overseas Associateship by the Department of Biotechnology, Government of India during the year 2006-2007 and carried out Research on Biosurfactant in University of Ulster. He has completed several research projects funded by different central governmental agencies as Principal Investigator.

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