Biotechnological potential of industrial residues as substrates for bionematicide development

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The sustainable growth of bio-pesticide industry depends on the cheap and readily available nutrient inputs into fermentation media as substrates. The utilization of by-products of bio-fuel industries such as non-edible oil cakes and biogas slurry (BGS) is nowadays very much preferred to enhance the commercial feasibility of bioprocess technology. In present study, a novel process was designed to produce the dust formulation of biocontrol fungal agent Paecilomyces lilacinus 6029 using nitrogen rich Karanja deoiled cake as major substrate against root-knot nematodes Meloidogyne incognita through solid-state fermentation. In order to achieve optimal fungal growth and pathogenicity, the cake was further combined with carbon rich BGS (sundried) in a certain proportion. The results indicated that among the four combinations of Karanja cake/BGS tested, 40/60 ratio gave maximum spores (9.3×10^8 spores/g) and pathogenicity (94% egg mass hatching inhibition). The remarkable increment in nematicidal efficacy of P. lilacinus cultured on Karanja deoiled cake and BGS might have been due to enhanced production of various nematicidal metabolites such as serine protease, leucinostatins and low molecular weight fatty acids as seen in our studies. We believe that the present study would provide an impetus to future research in this area to enhance the utilization of industrial residues as sources of nitrogen and carbon for economic viability of the bioprocesses industry.

Biography
Abhishek Sharma is currently working as a Research Associate under Professor Satyawati Sharma at Centre for Rural Development and Technology, IIT Delhi. He has a Master’s degree in Microbiology from HNB Garhwal University, MPhil (Biotechnology) from Alagappa University and PhD (Environmental Microbiology) from IIT Delhi. He has over ten years experience in teaching and research. His research interests lie in utilization of biomass and agro industrial wastes through biotechnological means for the production of bio-fertilizers, compost, bio-ethanol, bio-pesticides, secondary metabolites and enzymes. He has one patent and more than 15 publications in peer-reviewed journals, conference proceedings and books to his credit.
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