Rachna Pandey et al., Madridge J Food Technol. 2018
http://dx.doi.org/10.18689/2577-4182.a2.010

madridge CONFERENCES

2nd International Probiotics, Nutrition & Microbiome Conference

October 10-11, 2018 Amsterdam, Netherlands

Proteomic Characterization of Bioactive Peptide from Endophytic *Bacillus cereus*

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Bioactive peptides or antimicrobial peptides (AMPs) characterization has received great attention in the recent past due to their application as therapeutic agents and also as food preservatives without any toxic effects on host. At present, food preservation is a serious concern for almost all countries across the worldA serious challenge to antimicrobial therapies is the rapid increase in antibiotic resistant infections. Therefore, an urgent need to develop other biocontrol agents is the need of the hour. *Staphylococcus aureus* is a major bacterial pathogen that causes clinical infection and foodborne illnesses. Food preservatives are widely used to reduce the risk of food poisoning. With growing consumer demand for natural preservatives to replace chemical compounds, new antimicrobial products of various origins are being developed. Endophytes from enormous number of diverse plants and environmental conditions are potential source for isolation of bioactive compounds.While a wide range of biologically active compounds have been isolated from endophytic organisms, they still remain a relatively untapped source of novel natural product. Endophytic microbes seem to fit perfectly into this natural warehouse, only a small part of which we have been able to tap in so far.

In this study, a *Bacillus* strain showed antimicrobial activity characterized by Kirby Bauer method of well/disc diffusion and soft agar overlay assay. The bacterial supernatant showed zone of inhibition after 16hr of incubation at 37^0C against *Staphylococcus*. The culture supernatant was precipitated with ammoniumsulphate (80% saturation) and column chromatography was performed with Sephadex G-50 followed by DEAE column purification. The purified fraction was used for characterization by Sodium Dodecyl–Polyacrylamide Gel electrophoresis (SDS –PAGE). The protein band thus resolved was taken for analysis by mass spectrometry (MALDI-TOF). Peptide mass fingerprint Analysis with MALDI showed bioactivepeptide of low molecular weight.

Keywords: Antimicrobia lpeptides (AMPs), Endophytes, antibiotic resistance, bioactive compounds, probiotics

Biography:

Dr. Rachna Pandey is currently working as Assistant Professor at Dr. D. Y. Patil Biotechnology & Bioinformatics Institute, Pune, India. She earned her Bachelor of Science (B.Sc.) & Master of Science (M.Sc) at one of the premier institutes, Banaras Hindu University (BHU) India in 1993, and her Ph.D (Biotechnology) from the same University in 2001. In her thesis work she worked on Plant Growth Promoting Rhizobacteria Azospirillum sp. & it's Carbon Source Utilization. Her area of expertise has been Microbial Molecular Biology &Genomics. She worked as Research Associate (RA) in various Governments funded Projects in India.

After completing her PhD, in 2005 Dr. Rachna got Post Doctoral Fellowship from prestigious Department of Biotechnology (DBT) India and worked at National Chemical Laboratory (NCL) Pune. Where she worked on various aspects of carbon source utilization i.e catabolite repression (CR) & aspartic protease inhibitors (API).

In 2008, Dr. Rachna joined as an Associate Professor position at Assistant Professor at Dr. D. Y. Patil Biotechnology & Bioinformatics Institute, Pune, India, where she has been since that time. While at DYPBBI, she continued to work on Plant growth Promoting Rhizobacteria & also diversified towards the study of characterization & Bioprospecting of bacterial endophytes from medicinal & non medicinal and cereal plants. With constantly getting insight into bioprospecting of endophytes she characterized a bacterial endophyte with strong antimicrobial activity against different bacterial and fungal pathogens, addressing ever growing problem of antibiotic resistance among medically & agriculturally important bacterial & fungal pathogens. Recently,she is focusing her interest in characterization of unculturable bacterial diversity in some endemic plants. This work might help conserve plants which are on verge of extinction or are in rare or endangerd category. Dr. Pandey also work on Methylobacteriaum which play significant role mitigating methane levels emanating from deep water rice cultivation and coal bed mines. In her early years at DYPBBI she has characterized many PGPR strains including nonfluorescent Pseudomonas stutzeri an endophyte inhabiting Sunflower (Halianthusannus) roots.

Part of Dr. Pandey's motivation for moving to characterization of Antimicrobial Peptide (AMPs) was because she got interested in addressing the issue of crop spoilage and heavy toll of crops due to pathogenic infestations. Also, already having realized the detrimental effects of use of chemical pesticides & chemical fertilizers in environment & aquatic habitat. Use of these deleterious chemicals is also carcinogenic and associated with other health hazards. Not only its use but also its production causes global warming and &unsustainable burden of the fiscal system. Biodiversity has always been her preferred areaof study.With 3,80,000 plants reported so far, they are promising candidates for exploring endophytic microbial diversity. As endophytes are poorly investigated group of microorganisms that represents an abundant and dependable source of bioactive and chemically novel compounds with potential for exploitation in a wide variety of medical, agricultural & industrial areas.

Dr. Rachna has over 30 refereed publications in International & National Journals.