

JOINT EVENT

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5<sup>th</sup> International Conference on**Enzymology and Protein Chemistry**

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**Biocontrol efficacy of two *Bacillus* species against chilli pepper anthracnose causal agent *Colletotrichum truncatum*****H B P Sandani<sup>1</sup>, N P Ranathunge<sup>1</sup>, P L N Lakshman<sup>1</sup>, G Degrassi<sup>2</sup> and W M W Weerakoon<sup>3</sup>**<sup>1</sup>University of Ruhuna, Sri Lanka<sup>2</sup>CGEB Laboratory, Argentina<sup>3</sup>Field Crop Research Institute, Sri Lanka

Applicability of two *Bacillus* strains isolated from standard compost was assessed as a reliable alternative in the management of the anthracnose in chilli pepper. Out of twenty promising antagonistic bacterial isolates, two were genotypically characterized as *Bacillus* spp. based on 16S rRNA analysis. Selected two antagonistic *Bacillus* strains significantly suppressed the mycelial growth and the spore germination of chilli pepper anthracnose causal agent *Colletotrichum truncatum* ( $p < 0.05$ ). Malformation of the fungal hyphae was dominant in the area subjected to antagonism. One of the major antagonistic mechanisms extended towards the anthracnose pathogen *C. truncatum* by these two *Bacillus* strains was detected as antibiosis in the cellophane overlay technique. They produced antifungal peptides, lipopeptides and also minute amount of organic solvent soluble molecules as antifungal compounds against *C. truncatum*. These antifungal compounds showed minimum inhibitory concentrations of 3200 ppm and 2460 ppm on *C. truncatum* and also these metabolites are thermally stable up to 120°C while they could retain the antifungal properties more than 10 weeks under cold conditions and up to eight weeks at room temperature. One of the *Bacillus* strains produces a bacteriocin like small peptide inhibitory against *C. truncatum*. Induction of latent host defense mechanisms is another antagonistic mechanism employed by this *Bacillus* sp. upon *C. truncatum* infection in chilli pepper. The tested *Bacillus* sp. could enhance the expression of defense related PAL and PO enzymes in chilli pepper plants upon *C. truncatum* infection. Also these antagonistic *Bacillus* strains promote chilli pepper plants' growth through the production of significant amounts of Indole Acetic Acid (IAA) which is a growth hormone as an indirect mechanism against *C. truncatum*. They also showed a prominent swimming and swarming ability indicating their high potentiality in colonizing plant tissues paving the way for successful green house and field applications. These two strains effectively managed the seed borne infection of *C. truncatum* resulting healthy chilli pepper seedlings with good vigor. Also they effectively managed the fruit decay caused by *C. truncatum* at color breaking stage and green stage suggesting the suitability of *Bacillus* spp. as a potential candidate to be used in the development of a biocontrol agent against chilli pepper anthracnose causal agent *C. truncatum*.

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