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Isolation and evaluation of bacterial strains with antifungal activity against the phytopathogenic fungi

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To feed the ever-increasing population and sustainable agriculture, more-efficient control of plant diseases is essential. The use of naturally occurring bacterial antagonists that suppress pathogens has recently reemerged as a promising alternative to use of agrochemical for controlling fungal diseases. A total of 40 bacterial strains were isolated from stem and leaf of maize and rice and, soil to find effective bacterial strains with antifungal activity against major fungal diseases of rice and wheat. We evaluated bio-control potentiality of isolated bacterial strains against the major fungal pathogen of rice, wheat, and sugarcane viz. *Bipolaris oryzae*, *Pyricularia oryzae*, *Magnaporthe oryzae*, *Bipolaris sorokiniana* and *Colletotrichum falcatum* at the *in-vitro* condition. Out of forty, sixteen bacterial strains suppressed the tested fungal pathogens from 25% to 100% under *in vitro* plate assay. These strains were characterized by DNA fingerprinting which formed two major groups among sixteen strains. Out of sixteen seven strains were very close to *Bacillus* sp. A pot experiment was conducted at field conditions by artificial inoculation of wheat using fungal pathogen *Bipolaris sorokiniana* and selected bacterial strains were used as bio-control agents along with chemical fungicide (Bactroban). Inoculation experiment revealed that the strain GO-1 showed the highest bio-control potential against leaf blight of wheat caused by *Bipolaris sorokiniana*. It showed lower disease incidence (33%) and greater seed yield (4 g/plant) while control treatment had the incidence of the maximum disease (87%) and the lowest seed yield (2 g/plant). Sequencing of *16S rRNA* gene, screening for bio-control traits and plant growth promoting traits of selected strains are in progress.

Biography

M Harun-or Rashid is a Senior Scientific Officer of Biotechnology Division of Bangladesh Institute of Nuclear Agriculture (BINA), BAU Campus, Mymensingh-2202, Bangladesh. He did his DSc degree in 2013 from Heidelberg University, Germany and bachelors and Masters degree from Bangladesh Agricultural University, Bangladesh. He has been working on positive plant-microbe interaction for seventeen years at BINA since 1999. Currently, he is working on positive plant-microbe interactions and Agrobacterium-mediated gene transformation in rice and tomato. He supervised ten masters' students and two PhD students in Bangladesh. He has a collaborative research program with the University of California Davis, USA and National University of Malaysia, Malaysia. He published an about twenty-five research article in national and international journals and got 80 citations. He wrote a book chapter in a book published from the Springer International and several popular articles in National daily newspapers. He received Best scientist Award, Best Agricultural scientist gold medal award, European Union scholarship, IDB fellowship, and IAEA fellowship during his research career.

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