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Screening of potential bacterial antagonism in aqueous extracts of spent oyster mushroom substrate against *Colletotrichum gloeosporioides* causing anthracnose disease in papaya

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Anthracnose disease in papaya caused by the fungus *Colletotrichum gloeosporioides* is a major threat to commercial fruit production in Sri Lanka. The disease can cause severe losses at the post harvest stage, especially when the fruits are ready to be consumed. As a viable alternative to highly toxic synthetic pesticides and relatively inefficient physical control measures, bio control potential of antagonistic bacteria has to be widely investigated. The objective of the present study is to screen the presence of potential bacterial antagonists in spent oyster mushroom substrate against the papaya anthracnose pathogen under *in vitro* conditions. An aqueous suspension of four months old oyster mushroom cultivation media was prepared in sterile distilled water and the serially diluted suspension was plated on potato dextrose (PDA) media to isolate individual bacterial colonies. The isolated bacterial colonies were co-cultured on PDA plates with *C. gloeosporioides* fungi isolated from an infected papaya fruit. Seven days after culturing (DAC), the percent inhibition of radial growth (PIRG) relative to an untreated control fungal colony was recorded for each treatment. Out of 20 different isolates tested, inhibition of fungal mycelial growth was significant ($P < 0.05$) with 16 bacterial isolates of which, the maximum mean inhibition value of 74% shown by the isolate SMB 4. The overall trend of inhibition remained the same at 11 DAC; however the degree of inhibition increased in all the effective treatments where the isolate SMB 4 showed 84% mean inhibition. The average length of the inhibition zones between the fungus and the antagonistic bacterial colonies ranged from 0.60 -2.57 cm. The results indicate the suitability of spent oyster mushroom substrate as a potential source of antagonism against anthracnose disease in papaya.

Keywords: *Colletotrichum gloeosporioides*, papaya, bacterial antagonists, spent mushroom substrate