PROSPECTS OF ANTAGONISTS ON THE FRUCTOSPHERE OF BANANA IN CONTROLLING ITS POSTHARVEST PATHOGENS

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Despite the agronomic and commercial potential of growing a wide range of banana varieties in Sri Lanka, its market value is severely reduced by diseases at the postharvest stage. The objective of the present study was to determine the pathogens commonly associated with postharvest diseases of local banana varieties together with the possibility of using epiphytic antagonists on the peel (fructosphere) of banana in controlling diseases at the postharvest stage.

Natural postharvest disease development was observed on different varieties of dessert and cooking type banana fruits collected from four districts of Sri Lanka and pathogenicity was confirmed. *In vitro* and *in vivo* antagonism of the microorganisms on the fruit peel of banana against postharvest pathogens was determined. Thirty two bacterial isolates showing more than 50% *in vitro* growth inhibition of *Colletotrichum musae* were screened for *in vivo* antagonism. The most effective antagonists in controlling the three postharvest diseases *in vivo* were identified. Among them, *Burkholderia spinosa* was used to investigate its broad spectrum ability in controlling postharvest pathogens of other fruits. Presence of *B. spinosa* on edible parts of the treated fruits was also investigated.

Anthracnose, crown rot and blossom end rot were the common postharvest diseases of local banana varieties. Anthracnose was caused by the fungus *C. musae*. Blossom end rot was mainly caused by *Botryodiplodia* spp. and *C. musae*. Crown rot was mostly caused by *Botryodiplodia* spp. and occasionally by different isolates of *C. musae, Aspergillus* spp, and *Aspergillus niger*.

Among 64 morphologically-different bacterial isolates, 44 showed 50-100% *in vitro* growth inhibition of *C. musae*. Furthermore, 31 different fungal isolates inhibited the growth of *C. musae* by 62 to 100%. Antagonistic treatments showed a significant variation in controlling all three postharvest diseases ($p< 0.0001$). There was no significant difference between addition or non-addition of Tween 20 to the bacterial suspension in controlling the diseases. The three postharvest diseases of banana were best controlled by *Microbacterium terregens, Burkholderia spinosa, Acinetobacter calcoaceticus genospecies 1* and *Rhodococcus rhodochrous*. *B. spinosa* showed 70% colony growth inhibition of *C. gloeosporioides* and *Theilaviopsis paradoxa*. The antagonist also inhibited 45% colony growth of *Botryodiplodia theobromae*. *B. spinosa* colonies were observed only on the outer surface of the banana skin and stem parts of pineapple. No bacterial colonies were found inside the banana skin or the flesh of banana and pineapple. The findings showed that the fruit peel of banana is a rich source of microbial antagonists of postharvest pathogens of banana and other fruits. This study also revealed some of the desirable features of *B. spinosa* for development as commercial applications.

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