ANTIFUNGAL ACTIVITY OF PLANT-BASED EXTRACTS AGAINST SELECTED POSTHARVEST PATHOGENS AND POTENTIAL APPLICATION AS A BANANA FRUIT COATING

S.M.S.H. Sandarathna[1], P.N. Yapa[2], W.A.G.E. Wijelath[1], M.M. Wijayasinghe[2] and D.W.M.M.M. Kumari[1]

[1]Department of Animal and Food Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka.
[2]Department of Biological Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale, Sri Lanka.

Natural antifungal agents receive higher-priority over synthetic fungicides due to their nontoxicity and safety. Current study evaluated antifungal activity of plant based extract and their application as a potential fruit coat for banana. Antifungal activity of ethanolic extract of vetiver root (*Chrysopogon zizanioides*), hot distilled water (80°C) extract of soursop (*Annona muricata*) leaves and mustard (*Brassica nigra*) roots, *Aloe vera* gel matrix, and papaya (*Carica papaya*) latex against *Colletotrichum musae, Botryodiplodia theobromae* and *Rhizopus stolonifer* was assessed by standard agar-well diffusion method. Different concentrations of plant extracts were used to determine the Minimum Inhibitory Concentration (MIC). Potential application of plant extracts as an antifungal agent was determined by coating banana fruits (*Kolikuttu*) with vetiver oil, melted bee wax, and 4 ml of *vetiver* oil and 2 g of bee wax in 1L mixture, followed by inoculating 50 μL of *Colletotrichum musae* spore suspension (200 spores) on the coated and uncoated (control) fruit surfaces. Disease severity was determined by length of the lesions. Vetiver oil had the highest ($p<0.05$) antifungal activity against *C. musae, B. theobromae,* and *R. stolonifer* which resulted in 25.72 ± 1.22, 19.33 ± 0.00, 27.00 ± 0.00 mm of inhibition zones respectively. Aloe vera and soursop showed antifungal activity (16.21 ± 0.59 and 16.64 ± 0.13mm inhibition zones respectively) against *C. musae* only. MIC for vetiver oil, Aloe vera, and soursop leaf extract were 100%, 25% and 0.1 gmL^{-1} respectively. Coating with vetiver oil and bee wax showed the least ($p<0.05$) length of lesion (9.12 ± 0.59 mm) on banana at 5 days after inoculation, followed by vetiver oil, bee wax and control (17.41 ± 0.57, 28.4 ± 0.39 and 30.16 ± 0.36 mm respectively). The study confirmed that vetiver oil is potent natural antifungal agent. The vetiver oil-bee wax coating provides promising protection against *C. musae*.

Keywords: Bee wax, Inhibition zone, Minimum Inhibitory Concentration (MIC), Natural antifungal agent, Vetiver oil