

Abstract ID: 041

IN VIVO AND IN VITRO POTENTIAL OF *Moringa oleifera* LEAF EXTRACT TO RETARD POST-HARVEST DECAY OF TOMATO

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Abstract

Tomato (*Solanum lycopersicum*) is among the world's eight most valuable agricultural commodities, according to the Food and Agriculture Organization of the United Nations (FAO). However, postharvest losses of tomatoes caused by fungi are a major problem. Chemical fungicides have been widely used to control phytopathogenic fungi in tomatoes, despite their potential risks to human health and the environment. This issue can be addressed sustainably through the development of safer, eco-friendly alternatives such as plant-based biocontrol agents. This study aimed to investigate the antifungal activity of the ethanolic leaf extract of *Moringa oleifera* against three fungal species, *Aspergillus flavus*, *A. niger* and *A. fumigatus* isolated from contaminated tomatoes. The fungal isolates were cultured on potato dextrose agar (PDA) and identified through the microscope at the Biology Laboratory, South Eastern University of Sri Lanka. *M. oleifera* extracts were prepared using the maceration method. The antifungal activity was evaluated *in vitro* using the disk diffusion method to determine the minimum inhibitory concentration (MIC) antimicrobial susceptibility. Results revealed that ethanolic leaf extract of *Moringa oleifera* exhibited the maximum zone of inhibition, measuring 9.73 ± 0.08 mm against *A. niger* and the second-highest inhibition zone value against *A. flavus* which is 8.44 ± 0.01 mm and lowest inhibition zone against *A. fumigatus* is 6.87 ± 0.05 mm. The minimum inhibitory concentrations of the extract were determined as 8.09 mg/ml for *Aspergillus niger* and *Aspergillus flavus*, and 16.18 mg/ml for *Aspergillus fumigatus*. Treated and untreated (control) tomatoes were observed *in vivo* over seven days to determine the disease severity on the fruit surface. Untreated tomatoes were severely damaged by *A. niger*, showing deep fissures likely resulting from rapid enzymatic degradation and tissue acidification. *A. flavus* induced localized epidermal breakdown, whereas *A. fumigatus* displayed lower natural virulence in healthy fruit tissues. *M. oleifera* extract was more effective against *A. flavus* and *A. niger* compared to *A. fumigatus* indicating difference in fungal virulence and infection behaviour.

Keywords: *Moringa oleifera*, *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus fumigatus*, Minimum Inhibitory Concentration (MIC), Antimicrobial Susceptibility Testing (AST), Tomato