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SULPHUR NANOPARTICLES: A PROMISING SOLUTION TO POSTHARVEST ANTHRACNOSE DISEASE OF MANGO

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Mango is a worldwide popular fruit for its excellent delicacy and high nutritive value. At postharvest stage, the fruit suffers considerable loss due to anthracnose disease caused by Colletotrichum gloeosporioides. In this study, we propose a nanotechnology based solution for controlling the fungal disease without compromising the fruit quality. Sulphur is the choice of nano-element for its potential fungitoxicity and non-toxicity for human consumption at low doses. Chemically synthesized sulphur nanoparticles (SNP) were characterized by XRD analysis and electron microscopy. *In vitro*, the synthesized SNP showed >50% fungal growth retardation and ~70% fungal spore germination inhibition at 1 µM concentration. The nanoparticle induced morphological deformities of fungal mycelia were recorded under scanning electron microscope (SEM). In vivo, SNP (1µM) was employed to control the fungal infection on the fruit body. A popular mango cultivar in India namely Golap Khas was used for this purpose. SNP treated fruits were stored for 7 days at room temperature and compared to untreated and spore inoculated fruits. Disease severity of each group of fruits was calculated at regular intervals during the storage period. At 7th day of storage, SNP treated fruits developed no symptom of fungal infection while untreated and spore inoculated fruits were severely affected. Pathogenesis related enzymes like peroxidase, polyphenol oxidase, phenylalanine ammonia lyase and β-1, 3-glucanase activity and total polyphenol and flavonoid contents in all stored fruits were measured for better understanding the SNP induced infection control. However, in all cases, biochemical activities of SNP treated fruits were much higher than the untreated fruits which may be attributed as SNP induced biochemical boost of the fruit body resulting better immunity against fungal pathogens. This is the very first initiative to exploit SNP in postharvest management which can be extended to control fungal infection in many more fruits and vegetables.

Biography

Khushi Mukherjee has earned her PhD from University of Calcutta, India in the year 2012 and has completed his Postdoctoral research from National Institute of Technology, Rourkela, India in 2015. Presently, she is serving as UGC sponsored Postdoctoral Fellow in University of Calcutta, India. Her research area comprises nanotechnology based fungicide formulation facilitating better control over the pre- and postharvest disease causing fungal pathogens. She has published a number of research papers in reputed journals and presented her work in many national and international seminars and conferences.

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