**P3.3-005**

## IN VITRO INHIBITION OF FUNGI CAUSING POSTHARVEST GRAY AND BLUE MOLDS ON FRESH HORTICULTURAL PRODUCE BY AGRICULTURAL BY-PRODUCT EXTRACTS

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**Text**

*Botrytis cinerea* (BC) and *Penicillium expansum* (PE), the causal agents of gray and blue molds on several fresh fruits and vegetables, are among the most important postharvest pathogens worldwide. Agricultural by-products can be rich in bioactive compounds, many with antifungal properties. They could be a sustainable alternative to chemical pesticides used to control postharvest fungal diseases. The extraction of value-added compounds from agricultural by-products contributes to circular economy and the EU Green Deal as well. Almond skin (AMS) and avocado seed (AVS) extracts were obtained using ultrasound-assisted extraction and their total phenolic content and total antioxidant capacity were determined. The capacity of extracts to inhibit BC and PE was investigated using a microtiter assay. AVS showed the highest inhibition capacity, with 99% inhibition of both BC and PE, while AMS inhibited BC and PE by 65 and 99%, respectively. The results suggest that the presence of phenols and antioxidants in the extracts may be responsible for the antifungal activity and that these by-product extracts have potential as novel eco-friendly antifungal agents for the management of postharvest diseases. Further in vivo studies are needed to validate these findings.

**P3.3-006**

## GROWTH INHIBITION OF COLLETOTRICHUM MUSAE USING PLANT ESSENTIAL OILS ENCAPSULATED IN METAL ORGANIC FRAMEWORKS NANOPOROUS MATERIALS

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**Text**

Being highly perishable, ‘Cavendish’ banana fruits are affected by economically important postharvest diseases, like crown rot and anthracnose, which are caused by *Colletotrichum musae*. Fungicide treatment is considered as an effective management strategy however, its repeated applications pose risk to consumers’ health, environment, and even fungal population. The use of plant essential oils (EOs), like thymol and limonene, are extensively studied as an alternative control method due to its antimicrobial properties. In this proof-of-concept study, thymol and limonene were encapsulated in metal organic frameworks (MOFs) nanoporous materials (ZIF-8 and UiO-66) for sustained release that shall limit fungal diseases. An optimized protocol was developed to achieve a high encapsulation efficiency of EOs in

MOFs (EO@MOFs). *In vitro* assays using several concentrations of EO@MOFs were conducted at 14°C and under controlled atmosphere (CA) storage to determine the inhibition capacity against *C. musae*. Encapsulated thymol reduced the growth of *C. musae* better than limonene. Higher concentration of EO@MOFs favorably slowed down the growth of *C. musae* for 11 days at 14°C and CA storage. The data suggest that volatile plant EOs when released from MOFs have the potential to slow down the growth of *C. musae* and may have some utility in banana postharvest disease control.

**P3.3-007**

## POTENTIAL OF ANTAGONISTIC YEASTS, BOTANICALS AND CHEMICALS FOR THE MANAGEMENT OF GREEN MOULD ROT OF KINNOW MANDARIN CAUSED BY PENICILLIUM DIGITATUM

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**Text**

Post-harvest green mould rot caused by *Penicillium digitatum* is a serious disease in Kinnow mandarin in the northern parts of India. Disease incidence of the post-harvest green mould rot ranged between 14 -27.5 % during 2021-22. Potential of antagonistic yeasts, botanicals and GRAS (Generally Regarded as Safe) chemicals was evaluated against the pathogen first under in vitro conditions and then the effective ones were evaluated for the management of the disease. Different strains of *Saccharomyces cerevisiae* yeast inhibited the mycelial growth of the pathogen by 48.1- 66.6 per cent. Among botanicals, aqueous extracts of *Roylea elegans* (84.81%) was found to be most effective in inhibiting the mycelial growth of the pathogen. In GRAS chemicals, Salicylic acid (0.25 %), resulted in complete inhibition of mycelial growth of the pathogen. Fruit dip with Salicylic acid (0.25 %) was found to be the most effective with complete reduction in disease severity. Fruit dip in yeast isolate *S. cerevisiae* (R) and aqueous extract of *R. elegans* reduced the disease severity by 98.7 and 80.0 %, respectively. However, fruits kept in impregnated wraps with salicylic acid (0.25 %) and aqueous extract of *R. elegans* (10%) reduced the disease severity by 50.0 and 33.3 %, respectively. Yeast treated fruits significantly improved the quality of Kinnow fruits over botanicals and GRAS chemicals with increased levels of titratable acidity, reducing sugar, total solid sugars and ascorbic acid.

**P3.3-008**

## HOT WATER TREATMENT IMPROVES PEACH FRUIT COLD RESISTANCE THROUGH PPHSFA4C-MEDIATED HSF-HSP AND ROS PATHWAYS

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**Text**