Effectiveness of antagonistic yeasts and essential oils in the control of postharvest diseases of fruit

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Postharvest decays are a major challenge during storage of fruit. Essential oils (EOs) and biocontrol agents (BCAs) could be promising alternatives to synthetic fungicides to reduce postharvest decay. The research aimed to find alternative solutions to fungicides to control postharvest pathogens of fruit crops, including strawberries and nectarines. *Metschnikowia pulcherrima* and *Aureobasidium pullulans* were identified as effective BCAs for controlling postharvest rots of strawberry, significantly reducing rot incidence and severity without compromising fruit quality. Microbiome analysis revealed insights into the fungal community shift in response to treatments. A similar approach was employed to control brown rot in nectarines, with yeasts such as *M. pulcherrima* and *A. pullulans* exhibiting efficacy comparable to chemical treatments. These BCAs did not adversely affect fruit quality and demonstrated promising potential for disease management. Additionally, the study explored the use of EOs as an alternative to synthetic fungicides for controlling storage rots in nectarines. Basil, fennel, and lemon EOs showed significant inhibition activity, reducing rot without compromising fruit quality. Microbiome analysis highlighted modifications in fungal genera abundance. While treatments effectively reduced *Monilinia* spp., basil EO appeared to favour the presence of *Penicillium* spp. These findings contribute to the development of sustainable strategies for postharvest disease management of fruit.