Capsicum spp. and the antifungal potential of capsaicinoids as safeguards for agri-food production P95

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In recent years, cases of pathogenic fungi in agricultural crops and in animals, including humans, are growing (Paziani et al., 2020; Costa et al., 2022). Many of these pathogenic fungi are resistant to the commonly used antifungals. This scenario has created a need for new effective antifungals, particularly those based on eco-friendly approaches, such as plant secondary metabolites (e.g. capsaicinoids from *Capsicum* species) (Costa et al., 2022).

The American Phytopathological Society recognises a biofungicide as a naturally based biochemical product that must contain naturally-occurring substances (McGrath, 2004). The use of pepper pod extracts for the production of biofungicide has been proposed in the literature (Costa et al., 2022). As a natural compound, capsaicinoids and their analogues are much less dangerous than commercial synthetic fungicides.

Biofungicides present a low risk for environmental health. They could be applied in different stages of agricultural production without putting workers and the environment at health risk. In addition, since biofungicides are based on non-recalcitrant molecules, there is expected no risk of contaminating soil and groundwater. In this context, the use of natural compounds is directly related with the One Health approach, which tries to find a balance among people, animals and the environment's health (World Health Organization, 2023).

In fact, capsaicinoids compounds has been characterised as antifungal molecules. Capsaicinoids-based biofungicides could have the potential to improve food safety, nutritional value and overcome antimicrobial resistance, with less associated health risk. Beneficial characteristics of capsaicinoids include the demonstrated fungicidal and fungistatic activities of pure *Capsicum* extracts and purified capsaicinoids (Soumya and Nair, 2012; Costa et al., 2022). These molecules can be used to control the growth of pathogenic fungi in plant crops and as ecological alternatives for pest management. This work aims to review the use of pepper pod extracts, rich in capsaicinoid compounds, as a strategy for safeguarding of agrifood production. The advantages and limitations, for environmental health, of using capsaicinoids-based biofungicides will be presented and discussed in this work.