

Sustainable strategies to improve resilience to fungal diseases in berry crops

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Abstract (266 words)

Diseases caused by fungi result in 20-30% losses throughout the fruit and vegetables supply chain. Current methods of diseases control mainly rely on synthetic fungicides, but their overuse leads to serious concerns on the environment and human health. This highlights the importance of establishing sustainable and natural-based alternatives to these synthetic products. However, more studies are still required to deeply understand the impact of these alternatives on plant performance, crop productivity and product quality. Two ongoing projects at GreenUPorto Research Centre (“Botrytis-XTalk” and “BFree”), focusing on the sustainable control of grey mould disease, will be presented and their main results will be discussed. The tested natural-based solutions mostly rely on improving plant defence mechanisms’ against the necrotrophic fungus *Botrytis cinerea* through the application of elicitors, namely: (i) plant hormones – salicylic acid, jasmonic acid, methyl salicylate, and methyl jasmonate (Botrytis-XTalk) or (iii) microbiological control agents. Several experiments have been performed in strawberry plants, as a highly susceptible crop to grey mould disease, grown in a semi-hydroponic system in a greenhouse. Promising results have shown that application of plant hormones during the cultivation cycle can significantly reduce disease occurrence in strawberry fruits by stimulating plant oxidative response. Moreover, we have identified endophytic yeasts with an antagonistic effect against *B. cinerea* and their foliar application prevented the incidence of grey mould disease, with no impact on plant photosynthetic rate nor on fruit quality (e.g. firmness, soluble solids content, etc.). Our ongoing experiments aim to understand the mechanisms underlying the observed responses for commercial exploitation of these natural fungicides, which will be a step towards increased sustainability on agricultural systems.