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Rheum rhabarbarum PLANT EXTRACTS FOR THE MITIGATION OF POWDERY MILDEW SEVERITY IN CUCUMBER: OPTIMIZATION, ANTIFUNGAL SCREENING AND GREENHOUSE VALIDATION

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The yield and quality of cucumber crops can be severely impacted by the powdery mildew disease caused by *Sphaerotheca fuliginea*. Plant-based biocontrol strategies are preferred to conventional fungicides due to increased fungicide resistance in pathogens and environmental safety.

The purpose of this study was to test different formulations of *Rheum rhabarburum* root extract on cucumber crops infected with *S. fuliginea*. Plant extracts were optimized using the central composite design (CCD) to ensure the highest total polyphenolic content and antioxidant capacity. The selected extracts were first tested in vitro for antifungal properties against *Fusarium oxysporum* f. sp. *lycopersici* prior to being used in formulations supplemented with fatty acid ethyl esters derived from natural oils for greenhouse disease mitigation evaluation. These formulations were

applied prophylactically onto the leaves of *Cucumis sativus* L plants before infestation with the pathogen.

Disease severity in treated plants was reduced by up to 83% relative to untreated control plants. Thus, optimized plant-based formulations can be of potential value as ecofriendly alternatives to conventional artificial fungicides for disease management in cucumber production.

Keywords: *Rheum rhabarbarum*, bioactive compounds, polyphenols, DPPH, antifungal activity.

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