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IN VITRO EVALUATION OF FIPEXIDE-, FOSMIDOMYCIN-, AND CHLORPROMAZINE-INDUCED PHYTOHORMONAL INTERACTIONS IN DIVERSE PLANT SPECIES

Matia Noor Raisa

Local supervisor: Prof. Dr. Stefaan Werbrouck

Associate professor

Faculty of Bioscience Engineering

Ghent University

Academic Promoter: Prof. Dr. S. (Sandy) Schmidt

Associate Professor

Faculty of Science and Engineering

University of Groningen

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SUMMARY

Pharmaceutical compounds are increasingly detected in the environment and may exert multifaceted effects on plant development by interfering with phytohormonal signaling pathways, thereby also contributing to potential environmental impacts. This study aimed to evaluate the effects of two psychoactive pharmaceuticals, fipexide (FPX) and chlorpromazine (CPZ), and an antimalarial medication, fosmidomycin (FMD), on plant development using in vitro systems as a controlled phenotypic screening platform. Experiments were conducted on *Arabidopsis thaliana* root explants, *Lobelia erinus* leaf explants, and *Nicotiana tabacum* leaf discs to assess responses related to callogenesis and organogenesis under various treatment conditions. The results revealed that plant responses were strongly dependent on species, explant type, and treatment composition. FPX exhibited the most consistent effects, particularly in tobacco, where quantitative increases in callus weight were observed, with the highest response at 15 μ M. CPZ demonstrated context-dependent effects, contributing to callus formation and shoot induction primarily in combination with cytokinin oxidation inhibitors (3TFM-2HE). In contrast, FMD showed limited direct effects on organogenesis but displayed conditional influences on callus formation and root morphology when combined with plant growth regulators. In this study, quantitative data were obtained mainly from tobacco explants, whereas observations in *Arabidopsis* and *Lobelia* were largely qualitative and based on morphological assessment and microscopic images. Due to limited biological replication, the findings were interpreted as descriptive trends rather than statistically validated outcomes.

Overall, this study demonstrates the potential of selected pharmaceutical compounds to modulate plant tissue culture responses and highlights their possible relevance for plant biotechnology and environmental studies under conditions of large-scale environmental exposure. However, the results should be regarded as preliminary, as this work represents a screening approach requiring further validation through increased replication and molecular-level analyses.