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Trichoderma-MEDIATED PHENOLIC CONTENT ENHANCEMENT OF *Origanum vulgare* L.

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ABSTRACT – The use of medicinal plants constitutes an integral aspect of the Philippine primary healthcare system. The high cost of medicines in the country limits adherence and increases reliance on low-cost herbal medication such as *Origanum vulgare* L. (oregano). This plant is a common herb used by locals as traditional and alternative medicine owing to the antioxidant and antimicrobial properties of its phenolic components. In line with this, *Trichoderma* Microbial Inoculant (TMI), comprising three local strains (*T. ghanense, T. pseudokoningii,* and *T. harzianum),* was applied as a soil drench to oregano transplants to observe the responses in growth and phenolic content. Results showed that within 49 days of planting oregano cuttings, at $p < 0.05$, no significant differences in growth parameters were observed between the untreated and treated oregano. *Trichoderma* did not exert any observable adverse effects on the plant. However, a significant increase was observed in the total phenolic content, with the treated plants (0.04 mg Gallic Acid / g dried oregano leaf) exhibiting four times more phenols than the control (0.19 mg Gallic Acid / g dried oregano leaf). Qualitative assessment through thin-layer chromatography showed that carvacrol and thymol (the main phenolic compounds responsible for the antimicrobial and antioxidant properties of oregano) exhibited a slightly more intense band in the treated versus the untreated control. The findings show that *Trichoderma* triggers an enhanced defense response in oregano without adversely affecting its growth, indicating an uncoupling of the natural defense-growth trade-off in plants. This effect is crucial, as it demonstrates the potential of *Trichoderma* inoculation to enhance the medicinal value of plants by increasing bioactive, medically relevant defense metabolites, without adversely affecting the plant's growth. To our knowledge, this is the first study conducted in the Philippines to investigate the interaction between *Trichoderma* and *O. vulgare*.

Keywords: Origanum vulgare, oregano, Trichoderma, phenol, uncoupling of plant growth-defense trade-off

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