

**Raphanus sp. control with turmeric essential oil formulations**Rafael D.B. Ducatti¹, Guilherme Capelesso², Siumar P. Tironi²¹Universidade Tecnológica Federal do Paraná – Pato Branco/PR, Brasil²Universidade Federal da Fronteira Sul – Bairro Fronteira Sul S/N, Chapecó/SC, Brasil

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The production of allelopathic compounds by plants is widely recognized as an important ecological mechanism and a tool for weed management in cultivated areas. In addressing this issue, the current study aimed to assess the effectiveness of turmeric (*Curcuma longa*) essential oil in inhibiting the germination of *Raphanus sp.* seeds. The essential oil was extracted from fresh turmeric rhizomes using a Cleveger model hydrodistiller (1). The obtained oil was dehydrated using anhydrous magnesium sulfate. The experimental design employed a completely randomized setup with four replications. The treatments were arranged in a 4x3 factorial, where the first factor consisted of essential oil doses (0, 5, 10, and 25 g L⁻¹), and the second factor involved different formulations (additives): no additive, emulsifier (tween 80) (2), and emulsifier + surfactant (mineral oil). The experimental units were plastic boxes of the "germbox" type, with 25 *Raphanus sp.* seeds placed on two sheets of germination paper. The seeds were moistened with essential oil solutions, equivalent to 2.5 times their weight, and then kept in a germination chamber at a temperature of 20 °C and a photoperiod of 12 hours. After 15 days of sowing, the percentage of germinated seeds was quantified, and the lengths of the aerial part and root system of the seedlings were measured. Ten seedlings were selected from each plot for these measurements. The data were subjected to analysis of variance, and the means were compared using the Tukey test ($p \leq 0.05$) (3). The results showed that both the studied factors, essential oil doses, and additives, significantly influenced the percentage of germination, with an interaction between them. Increasing doses of the essential oil led to a reduction in germination. Moreover, even without the application of essential oil (0 mL⁻¹ dose), the addition of emulsifiers and surfactants resulted in reduced germination. The length of the shoot and root system exhibited lower values as the doses of turmeric essential oil increased, hindering seedling growth at higher doses. This inhibition of seedling development can be attributed to allelochemicals present in turmeric oil, particularly sesquiterpenes, which are major allelochemicals found in this oil (4). Furthermore, the addition of emulsifier and surfactant tended to enhance the toxicity of the essential oil, leading to further reductions in shoot and root system length. In conclusion, turmeric essential oil negatively impacts the germination and development of *Raphanus sp.* seedlings, with more pronounced effects at higher doses. The addition of emulsifier and surfactant intensifies the toxic effects of turmeric essential oil.

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