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In vitro growth and sporulation inhibition of the phytopathogenic fungus *Cylindrocladium* sp. by oregano and peppermint essential oils

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INTRODUCTION & AIM

The genus *Cylindrocladium* includes phytopathogenic species that affect many crops around the world (Lombard et al., 2010). In Argentina, it has been found causing the black spot of yerba mate (YM) (*Ilex paraguariensis*), producing defoliation and large crop yield losses. *I. paraguaiensis*, a small tree native from South America, has economic and social importance since its leaves and branches are used to prepare a popular infusion called “mate”. In search of natural strategies to control the black YM spot, the objective of this work was to evaluate the use of peppermint (*Mentha* x *piperita*), oregano (*Origanum vulgare* ssp. *hirtum*) and marigold (*Tagetes minuta*) essential oils for *Cylindrocladium* sp. control.

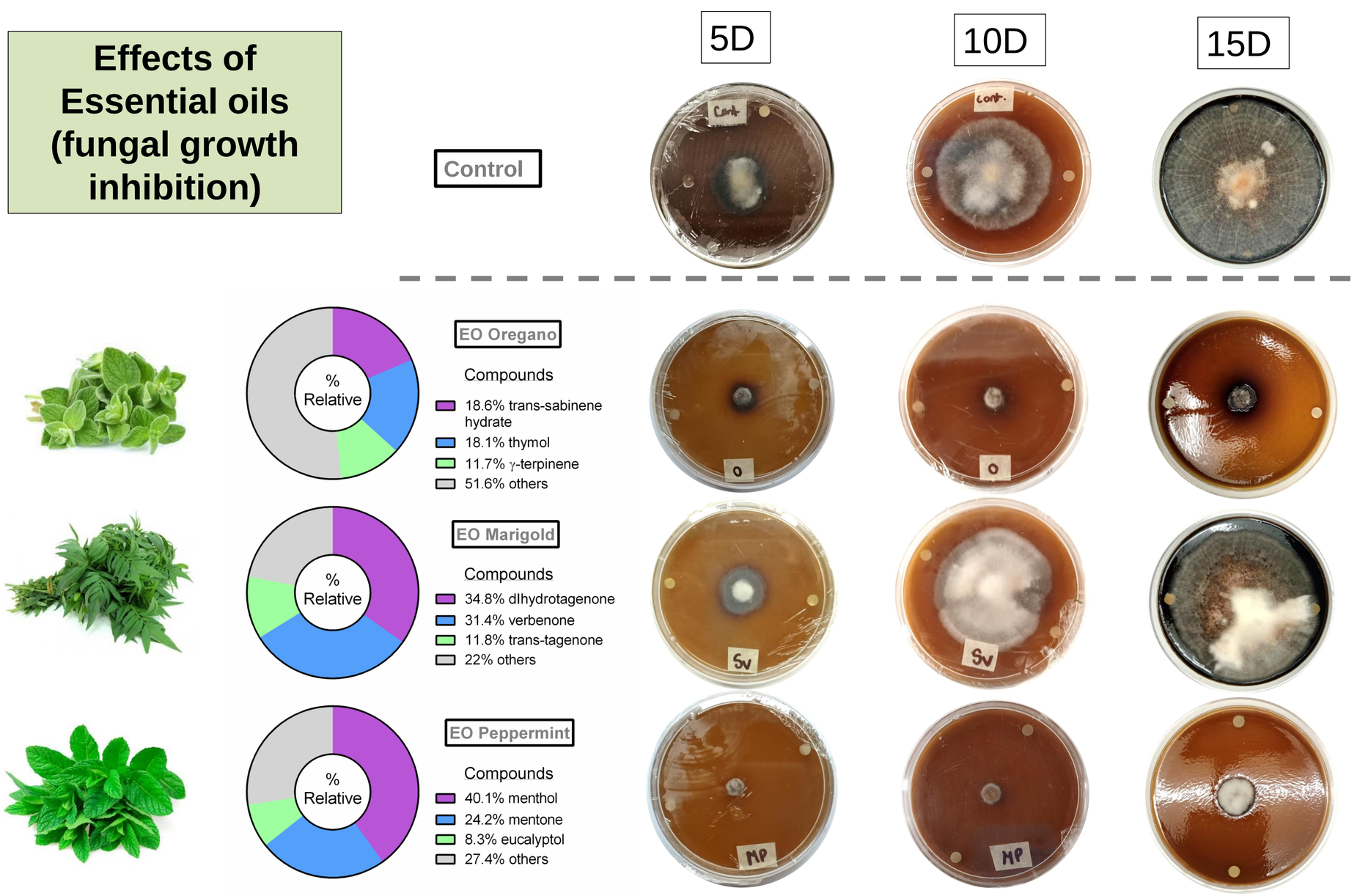
METHOD

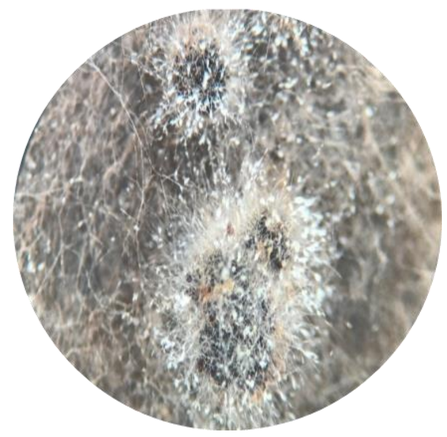
The essential oils (EOs) were characterized by GC-MS following Prieto et al. (2024). *Cylindrocladum* sp. 14 days culture grown in YM agar medium was used as inoculum; a 4 mm disc was placed in the center of the petri dish. For each EO treatment, two EO-embedded paper discs were placed near the edge of the petri dish. Discs with sterile water were used as control. The fungus colony diameter was measured at days 5, 7, 10 and 15. Conidia production was analyzed on day 15. The assays were made in three replicates and the results analyzed using Kruskal Wallis test.

RESULTS & DISCUSSION

OEO and PEO inhibited fungal growth, showing significant differences with control from day 5 to 10. However, at day 15 only OEO showed statistical differences ($p=0.0188$), suggesting that PEO could reduce the inhibition effectiveness along the days. MEO showed no fungal growth inhibition. Conidia production resulted in 7.27×10^6 conidia in control while no conidia were observed in OEO and PEO treatments.

Effects of Essential oils (fungal growth inhibition)





Conidia (dissecting microscope)

Conidias and conidiophore (optical microscope 40x)

CONCLUSION

These results demonstrate the effectiveness of OEO and PEO as natural control agents against *Cy*.

FUTURE WORK / REFERENCES

Lombard L, Crous PW, Wingfield BD, Wingfield MJ. Species concepts in Calonectria (Cylindrocladium). Stud Mycol. 2010;66:1-13. https://doi.org/10.3114/sim2010.66.01

Prieto, M. C., Grosso, N. R., Camiletti, O. F., y Galdeano, E. (2024). Combined application effect of citrus essential oils against the phytobacterium Streptomyces scabiei. European Journal of Plant Pathology. https://doi.org/10.1007/s10658-024-02844-x