

**Antifungal activity of emulsions of thyme and oregano oils against toxigenic fungi  
*Fusarium verticillioides* and *Aspergillus flavus***

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**Sessão do trabalho:** Fungos e micotoxinas

**Abstract:**

The search for new environmentally friendly strategies in food preservation is considered a recurrent topic in food science. In this context, the use of essential oils (OEs) as natural preservatives has shown promising applications for controlling microbial contamination. However, due to difficulties related to OEs stability and solubility, new forms of applications are being sought, such as the use of emulsions. The objective of this work was to evaluate the antimicrobial activity of emulsions of oregano (EOR), thyme (EOT) and oregano: thyme (1:1, v/v) (EORT) essential oils against *F. verticillioides* and *A. flavus*, important toxigenic fungi. Emulsions (Tween 80 and OEs) were prepared at 2 and 0.5 %. A 100 µl of the OEs were added to YESA medium and spread until dry, afterwards, 10 µl of the fungal suspension ( $1 \times 10^5$ ) was inoculated in the center of the plate and incubated at 25°C for 6 days. Optical microscopy and droplet size analyses were performed to characterize the emulsions of EOR, EOT and EORT. The 0.5% concentrations showed monomodal distribution. The order of droplet sizes was as follow: EORTO>EOT>EOR, varying the size ratio between 1 and 10 µm. As for the 2% emulsions, the droplet size followed the order of : EOR>EOT= EORT, where EOR showed bimodal formation, ranging from 1 to 90 µm, and the others between 1 and 10 µm. EOT and EORT at the 2% concentration exhibited better performance against *F. verticillioides*, retarding the growth of the fungus for 3 days. However, none of the tested concentrations were able to retard the growth of *A. flavus*. These results indicate that the application of the essential oil emulsion of thyme and oregano: thyme, is a viable alternative for controlling *F. verticillioides*. Further analysis with different concentrations and emulsifiers should be performed to better elucidate the antimicrobial activity against these fungi.

**Keyword:** essential oils, antifungal activity, droplet size.

