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Effect of Natural Products Against Growth of Three Allergenic and Toxigenic Molds

Brittany Loadholt

Georgia Southern University, bl01985@georgiasouthern.edu

Teyaijah Givens

Georgia Southern University, tg02130@georgiasouthern.edu

Nosa Lloyd Nwaonumah

Georgia Southern University, nn00400@georgiasouthern.edu

Bushra Shah

Georgia Southern University, bs06779@georgiasouthern.edu

Atin Adhikari

Georgia Southern University, aadhikari@georgiasouthern.edu

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Introduction

- Dampness and fungal exposures in buildings are widespread, with estimates ranging from 18% to 50% of buildings being affected. Of the 21.8 million people reported to have asthma in the USA, approximately 4.6 million cases are attributable to dampness and mold exposure in the home.
- Several fungal genera from damp environments were reported to be associated with allergy and/or asthma and some species can release mycotoxins in the environment.

Purpose

In this study, we have evaluated three plant based products - tea tree oil, grape fruit seed extracts, and natural vinegar - against growth of three specific allergenic and toxic mold species (*Aspergillus versicolor*, *Penicillium brevicompactum*, and *Stachybotrys chartarum*).

Methods

- Spore solutions (10^5 - 10^7 spores/mL) of these three mold species were prepared from pure cultures and 200 μ L of solutions were spread over malt extract agar plates.
- Three 20 μ L drops of different dilutions of three above-mentioned natural products were applied on agar plate surfaces immediately after spore solution inoculation.

- Inhibition zones on agar plates were examined after the incubation of plates for 96 hours at $30 \pm 2^\circ\text{C}$

Results

- We found that up to 10 times dilutions of grape fruit seed extracts developed 18-50 mm zones of inhibition for all mold species, up to two times dilutions of tea tree oil completely inhibited all three species but 5X dilution was effective for *S. chartarum*. Natural vinegar, on the other hand, inhibited *S. chartarum* and *P. brevicompactum* only and the inhibition zones for mold growth on agar surfaces were 18-28 mm.

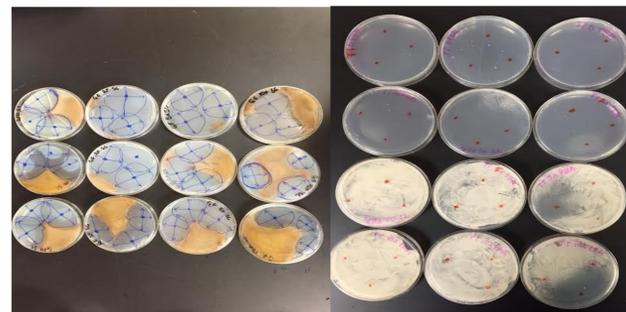


Figure 1: The effect of grapefruit seed extract on *S. chartarum*.

Figure 2: The effect of tea tree oil on *P. brevicompactum*

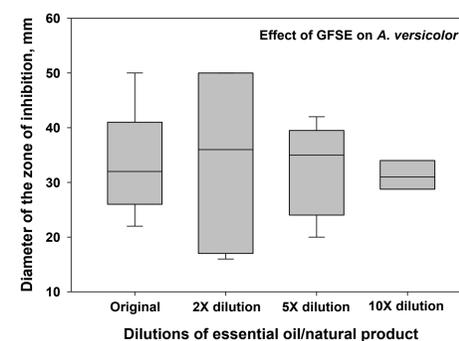


Figure 3: Box plot showing the effect of grapefruit seed extract on *A. versicolor*

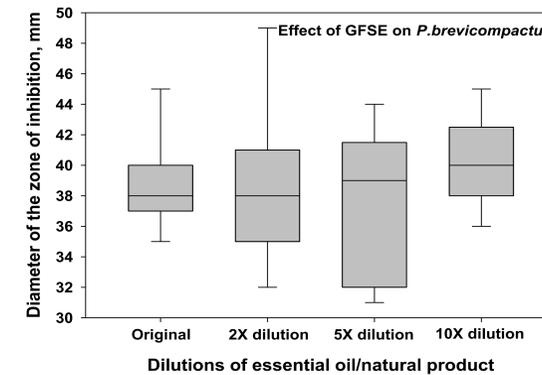


Figure 4: Box plot showing the effect of grapefruit seed extract on *P. brevicompactum*

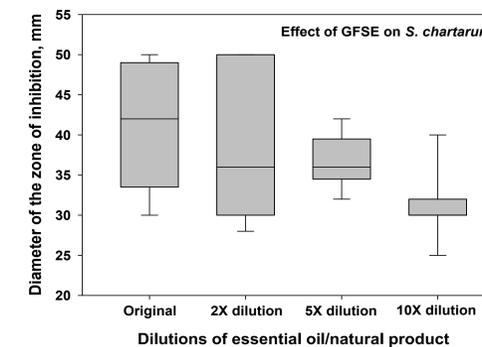


Figure 5: Box plot showing the effect of grapefruit seed extract on *S. chartarum*

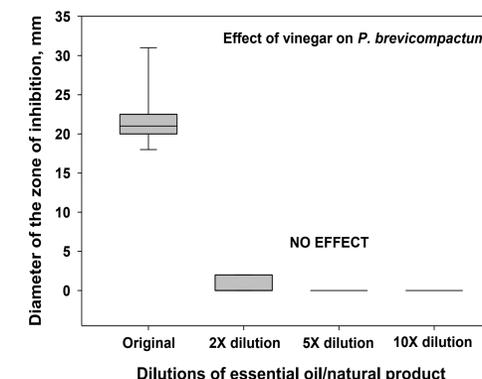


Figure 6: Box plot showing the effect of effect of vinegar on *P. brevicompactum*

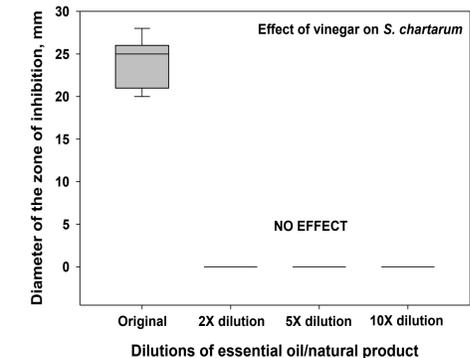


Figure 7: Box plot showing the effect of effect of vinegar on *S. chartarum*

Conclusion

- Our study concluded that diluted tea tree oil and grape fruit seed extract and original vinegar can be used for inactivation of mold growth on surfaces.
- These inhibitory effects are species specific and further studies are required to understand the mechanisms.

Acknowledgements

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