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# ANTIFUNGAL ACTIVITY OF *THYME* OIL AGAINST FOOD POISONING MOULDS

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ABSTRACT

The present study aim to evaluate the in-vitro antimicrobial activity of essential oil against food poisoning mold. Results showed that essential oils could inhibit the growth of mold and the thyme oil showed the strongest inhibition at lowest concentration respectively. Our results concluded that essential oil of thyme and its phenolic components could be used against fungi growing on packed food as an effective alternative to chemical fungicide.

Keywords: Essential oils, Antifungal activity, Thyme oil.

## INTRODUCTION

Fungi are significant destroyers of foodstuffs and grains during storage, rendering them unfit for human consumption by retarding their nutritive value by producing mycotoxins [1,2]. Mycotoxins are fungal metabolites that are present in a large part of the world food supply and bear potential threat to food safety [3]. *Aspergillus, Penicillium* and *Fusarium* are known to produce mycotoxins in foods that result to cause mycotoxicoses after ingestion [3,4].

The fungal spores are killed during baking and the airborne molds recontaminate the baked goods during the processing of bread such as cooling, slicing, wrapping and storage operations [5]. Mold spoilage accounts between 1 and 5% of product losses depending on the season, type of product being produced and the method of processing. The most common spoilage molds isolated from bakery goods belong to the genera *Rhizopus, Mucor, Penicillium, Aspergillus, Monilia, Endomyces, Cladosporium* and *Fusarium* [6]. EOs have several targets in the degradation of the cell wall, and weakening the membrane causing enhanced permeability, lead to the loss of intracellular components. Recent publications rank the essential oil of Thyme among the most potent against fungi. This activity has mainly been attributed to its components thymol and carvacrol [7,8].

## MATERIALS AND METHODS

### Extraction of essential oil

The components of half of the dried leaves were extracted for the essential oil as follows. Two hundred and fifty grams of the leaves were subjected for 3hrs to water distillation using a Clevenger apparatus [9]. The oil recovered was dried over anhydrous sodium sulphate and kept in the refrigerator at $4^0$C before use.

### Poisoned food technique

The antifungal activity of plant extracts was evaluated against food-associated fungi by using poisoned food technique. In poisoned food technique, fungi were inoculated on Potato dextrose agar (PDA) plates and incubated for $25^0$C for 3 to 7 days, to obtain toung, actively growing colonies of molds. Different concentrations of thyme oil (10 µl, 20 µl, 30 µl, 40 µl, 50 µl) mixed with 15ml of cooled ($45^0$C) molten PDA medium and allowed to solidify at room temperature for thirty minutes. A mycelial disc 6mm diameter, cut out from periphery of 3 to 7 day old cultures, was aseptically inoculated on to the agar plates containing the essential oil. The inoculated plates were incubated at $25^0$C and colony diameter was measured and recorded after 7 days.

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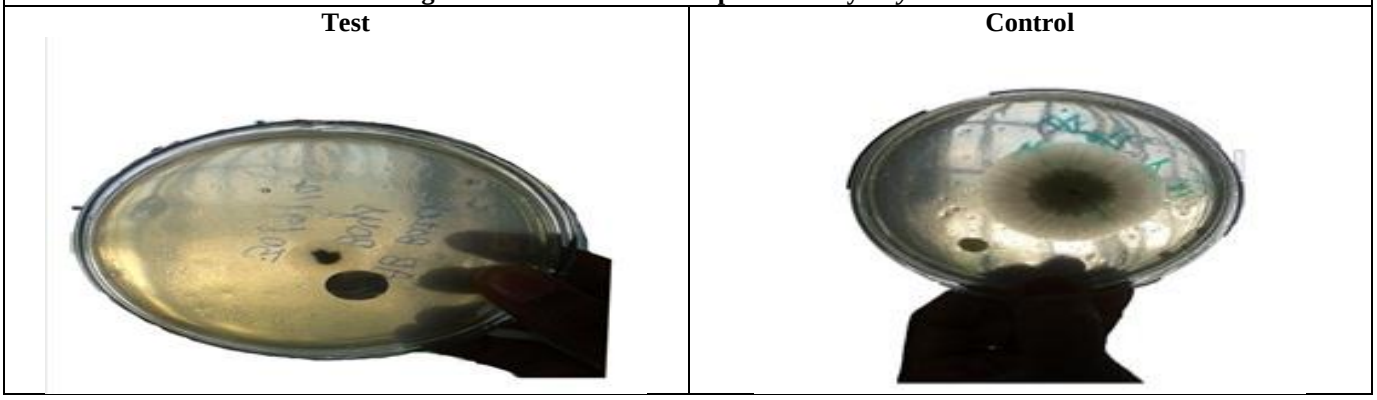
## RESULTS

The *in- vitro* antifungal property of essential oil against molds by radial growth technique shown in Figure 1.

## DISCUSSION AND CONCLUSION

Essential oils and their phyto-constituents have shown promising antifungal activity *in-vitro*, where they have been extensively studied against *Candida* spp., *Trichophyton* spp. and *Aspergillus* spp [11-20]. In another study Maryam Omidbeygi et al proved antifungal activity of thyme on *Aspergillus flavus* [21]. The action of essential oils and their phenolic components on the cell membrane has been widely studied. The essential oils of *Thymus spp*., especially *T. zygis* and *T. vulgaris* and their components, such as carvacrol, thymol and *p*-cymene, have displayed potent fungicidal activity against *Candida spp*., resulting mainly in extensive damage to the cell membrane[22]. The results obtained suggest that the mechanism of the antifungal action of the essential oil (containing thymol) involves a direct interaction with ergosterol, which leads to the disruption of the fungal membrane and loss of intracellular contents. Our results concluded that essential oil of *thyme* and its phenolic components could be used against fungi growing on packed food as an effective alternative to chemical fungicide.

**Figure 1. Zone of inhibition produced by *Thyme* oil**




**Conflicts of Interest:** Nil

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