

## The Effect of *Thymus Vulgaris* on The Conidia Structures of *Phyllosticta Citricarpa*, The Causative Agent of Citrus Black Spot

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### Abstract

**Introduction:** The antifungal resistance currently being reported in the treatment of citrus black spot (CBS), coupled with the toxic and carcinogenic effects of non-biodegradable synthetic fungicides on human and food systems is a major concern to citrus growers. Natural-based products, such as essential oils (EO's) may be used to solve this problem. EO's are gaining global attention from researchers as they are biodegradable, eco-friendly, economical, and safe. The EOs reported in various studies have shown to exhibit antifungal properties by targeting structures responsible for the life cycle of fungal organisms such as ascospores and conidia in different fresh produce. *P. citricarpa* depends on these structures for reproduction and dispersal.

**Purpose:** To investigate the effect of *Thymus vulgaris* essential oil against the conidia structure of *P.citricarpa*.

**Methods:** The effect of thyme oil on *P. citricarpa* conidia structures was evaluated by bio-assay preparation and MICs, the morphological changes that occurred on conidia structures were assessed using scanning electron microscopy (SEM) and transmission electron microscope (TEM).

**Results:** *Thymus vulgaris* was found to damage the conidia structures of this fungal pathogen, one of the critical reproductive structures of *P. citricarpa*.

**Significance:** It was evident in this study that thyme oil can target the conidia structures. Moreover, the results propose that the selected essential oil can be a natural-based alternative to conventional synthetic fungicides currently being used to control CBS.