

## Chemical Composition and Antifungal Activity of Selected Essential Oils against Toxigenic Fungi Associated with Maize (*Zea mays* L.)

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**Abstract :** Essential oil is a bio-pesticide plant product used as an alternative to pesticides in managing plant pests, including fungal pathogens. Thus, the current study aims to investigate the chemical composition and antifungal activities of essential oils (EO) extracted from three aromatic plants i.e., *Thymus vulgaris*, *Coriandrum sativum*, and *Cymbopogon martini*. The leaf parts of those selected plants were collected from the Jimma area and their essential oil was extracted by hydro-distillation method in a Clevenger apparatus. The chemical composition of selected plant essential oil was analyzed by using Gas chromatography-mass spectrometry (GC/MS) and their inhibitory effects were tested in vitro on toxigenic fungi isolated from maize kernel. Chemical analysis results revealed the presence of 32 compounds in *C. sativum* with Hexanedioic acid, bis (2-ethylhexyl) ester (46.9%), 2-Decenal, (E)- (12.6), and linalool (8.3%) being the dominant ones. *T. vulgaris* essential oils constituted 25 compounds, of which thymol (34.4%), o-cymene (17.5%), and Gamma-Terpinene (16.8%) were the major components. Twenty-five compounds were detected in *C. martinii* of which geraniol (51.4%), Geranyl acetate (14.5%), and Trans -  $\beta$ -Ocimene (11.7%) were dominant. The EOs of the tested plants had very high antifungal activity (up to 100% efficacy) against *Aspergillus flavus*, *Aspergillus niger*, *Fusarium graminearum* and *Fusarium verticillioides* in vitro and on maize grains. The antifungal activities of these essential oils were dependent on the major components such as thymol, hexanedioic acid, bis (2-ethylhexyl) ester, and geraniol. The study affirmed the potential of these essential oils controlling as bio-fungicides to manage the effects of potentially toxigenic fungi associated with maize under post-harvest stages. This can reduce the consequences of the health impacts of the mold and toxigenic compounds produced in maize.

**Keywords :** bio-activity, bio-pesticides, maize, mycotoxin

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