Composition of essential oil of Moroccan *Dysphania ambrosioides* and antimicrobial activity against phytopathogenic fungi and bacteria

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Abstract

This study aimed to find natural antimicrobial products from *Dysphania ambrosioides* growing in Morocco against plant diseases. The essential oil (EO) of *D. ambrosioides* was isolated by the hydrodistillation method and its chemical composition was analyzed by gas chromatography–mass spectrometry (GC-MS). The efficacy of the EO and its major constituent ascaridole was evaluated for controlling the in vitro growth of several fungal and bacterial phytopathogens. GC-MS analysis of the hydrodistilled oil revealed that oxygenated monoterpenoids (59.1%) and monoterpene hydrocarbons (32.8%) represent the main classes of volatile compounds. Ascaridole (34%), α-terpinene (13.3%), p-cymene (18.2%), thymol (6.4%) and carvacrol (6.1%) were the predominant components, indicating that Moroccan *D. ambrosioides* essential oil belongs to the ascaridole chemotype. The essential oil and purified ascaridole (As) exhibited great potential for antibacterial activity against *Pseudomonas syringae* pv. *syringae Pseudomonas syringae* pv. *tabaci* and *Erwina amylovora* and only moderate activity against *Agrobacterium tumefaciens*. EO was able to inhibit drastically radial growth and sporulation of the fungal phytopathogens. When used at 500 µg mL^{-1} inhibition of radial growth of the fungi *Fusarium oxysporum* fsp *melonis*, *Fusarium culmorum* and *Verticillium dahilae* ranged from 78% and 90%, while it was extremely reduced with purified ascaridiole. These results suggest that EO from *D. ambrosioides* may be used as new antiphytopathogenic agents to protect crops from bacterial and fungal diseases and that the main antifungal activity rely on constituents other than ascaridole.

Keywords: antimicrobial activity, ascaridole, *Dysphania ambrosioides*, Essential oil, phytopathogens.