Potential of using ginger essential oils-based nanotechnology to control tropical plant diseases

ABSTRACT

Essential oils (EOs) have gained a renewed interest in many disciplines such as plant disease control and medicine. This review discusses the components of ginger EOs, their mode of action, and their potential nanotechnology applications in controlling tropical plant diseases. Gas chromatography-mass spectroscopy (GC-MS), high-performance liquid chromatography, and headspace procedures are commonly used to detect and profile their chemical compositions EOs in ginger. The ginger EOs are composed of monoterpenes (transcaryophyllene, camphene, geranial, eucalyptol, and neral) and sesquiterpene hydrocarbons (α-zingiberene, ar-curcumene, β-bisabolene, and β-sesquiphellandrene). GC-MS analysis of the EOs revealed many compounds but few compounds were revealed using the headspace approach. The EOs have a wide range of activities against many phytopathogens. EOs mode of action affects both the pathogen cell's external envelope and internal structures. The problems associated with solubility and stability of EOs had prompted the use nanotechnology such as nanoemulsions. The use of nanoemulsion to increase efficiency and supply of EOs to control plant diseases control was discussed in this present paper. The findings of this review paper may accelerate the effective use of ginger EOs in controlling tropical plant diseases.

Keyword: Antimicrobial; Ginger essential oils; Nanotechnology; Topical plant diseases