Inhibitory activities of myristica fragrans essential oil on aflatoxigenic strains

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Abstrak

Aflatoxin B1 is a highly toxic and carcinogenic metabolite produced by aflatoxigenic strains that commonly contaminate food and agricultural commodities. This study evaluates the inhibitory effects of Myristica fragrans Houtt (nutmeg) essential oil extracted by hydrodistillation on the mycelial growth, sporulation, and aflatoxin B1 production of Aspergillus flavus IMI 242684 and Aspergillus parasiticus IMI 283883 by fumigation and contact application. An analysis of M. fragrans essential oil using the chromatography-mass spectrometry showed that its major components are safrole (42.50%), 4-terpineol (23.81%) and methyl eugenol (11.14%). At a concentration of 1000 ppm of essential oil, the mycelial growths of both Aspergillus strains were completely inhibited by vapor treatment but only reduced by about 70% by contact treatment. However, the sporulation and aflatoxin B1 production were completely inhibited by both contact and vapor treatments. Vapor treatment induced a higher level of inhibition than contact treatment. In conclusion, nutmeg essential oil is a potential biochemical agent that can help prevent contamination of stored foods and feeds.