

Detection and management of mycotoxigenic fungi in nuts and dry fruits

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Abstract

Mycotoxins are the toxic secondary metabolites produced by fungi including mushrooms, molds, and yeasts. They are found in many food and food-products, dry-fruits and nuts. These are responsible for infection in animals, plants and human beings (mycotoxicoses). Ingestion of contaminated food and food-products is the main reason for mycotoxicoses. Therefore, to avoid harmful effects of mycotoxins, there is a pressing need for early detection and management of toxigenic fungi. The present study is focused on the detection and management of toxigenic fungi isolated from different dry fruits and nuts. We have recovered about 28-isolate from almonds, date palms, betel nuts (red and white), cashews, etc. These isolates have been identified on the basis of morphological and cultural characteristics and later confirmed from ITS-rDNA sequence comparison using BLAST program with available sequences in database (NCBI). These fungi include *Aspergillus*, *Fusarium*, *Curvularia*, *Cladosporium*, *Phoma*, etc. Different essential oils including cinnamomum (*Cinnamomum verum*), clove (*Syzygium aromaticum*), carom seeds (ajowan) (*Trachyspermum copticum*), eucalyptus (*Eucalyptus globulus*), coriander (*Coriandrum sativum*), mustard (*Brassica juncea*), etc. have been screened for their antifungal activity. We also evaluated antifungal efficacy of biogenic silver nanoparticles against above mentioned toxigenic fungi. The essential oils of clove, cinnamomum, coriander, and silver nanoparticles showed remarkable activity against mycotoxigenic fungi. Clove oil demonstrated the maximum activity against all the isolates followed by cinnamomum and eucalyptus while, the minimum activity was shown by carom seeds oil. Antifungal activity of silver nanoparticles was also found to be significant at about of 15 µg/ml concentration. Therefore, it can be concluded that use of essential oils and silver nanoparticles would be eco-friendly and a safe alternative for the management of mycotoxigenic fungi present in food, food-products and dry fruits and nuts.