

TITLE: ANTIFUNGAL ACTIVITY OF CURCUMIN NANOPARTICLES

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ABSTRACT:

Natural preservatives in foods are on high demand due to the increasing concern of consumers on healthy, natural products. Curcumin is a yellow coloring spice obtained from turmeric (*Zingiberaceae* family) presenting a wide array of biological activity. Moreover, its antimicrobial activity may be very relevant for the food industry. Fungal contamination is a great concern in the industry due to economic losses and also due to the damage to consumers health. The objective of this study was to evaluate the antifungal activity of curcumin nanocrystals by minimum inhibitory concentration (MIC) against fungi isolated from deteriorated bread: *Penicillium panemum*, *Penicillium citrinum* and *Cladosporium oxysporum*. Molecular identification of fungi was based on sequencing of the ITS1-5.8S-ITS2 region. The genomic DNA of the fungi were extracted using the Power Soil DNA Isolation kit (MoBio Laboratories, Inc.) in which fungi were grown in potato dextrose broth and about 200 mg of mycelium was used for extraction. For the MIC determination, the broth microdilution method was used according to the Institute of Clinical and Laboratory Standards (M27-A3), with minor modifications for natural products. Curcumin nanocrystals were prepared by dissolving curcumin in dichloromethane and then added dropwise in boiling water at boiling under sonication (Fisher Scientific, 120W, 1/8" probe); after that the solution was frozen and lyophilized. Nanocrystals were characterized by Infrared Spectroscopy, Differential Scanning Calorimetry, X-Ray Diffraction and Transmission Electron Microscopy demonstrating the formation of the nanostructures. Curcumin nanocrystals were able to inhibit the growth of all fungi tested in a dose-dependent behavior. For *Penicillium panemum*, MIC was 2.5% while for *Penicillium citrinum* and *Cladosporium oxysporum* were 10%. Results obtained in the present work show the antifungal potential of curcumin nanocrystals against the fungi tested. Therefore curcumin nanocrystals action for food preservation is worth investigating.

Keywords: curcumin, nanocrystals, fungi, foods

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