

Title Effects of several components of the biocidal formulation made from lemon peel on human diseases and as a biocid against fungi and bacteria

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Abstract

Previously a new environmentally friendly biocidal formulation prepared from the peel of citrus fruits was reported. This formulation prevented the development of decay of *Penicillium digitatum* inoculated lemon, citrus and other fruits. Thi formulation was demonstrated to control decay of citrus and other fruits in experiments done in packing houses. The active ingredients of this formulation comprised components of lemon's essential oil. The major advantage of this formulation was that all of its components could be considered a food additive. Thus the formulation could be utilized for various food products such as fresh cut produce, which other biocides could not due to their toxicity. Additional advantages of some of these components are in their newly established medical effects. Citral, 3,7-dimethyl-2,6octadien-1-al, a component of this formulation, which is also a key component of lemongrass (*Cymbopogon citratus*) and other herbal plants induced apoptosis in several hematopoietic cancer cell lines. This compound was found to kill cancer cells without affecting normal cells grown in cell culture. The dose needed for this anticancer effect is equal to that found in regular glass of tea prepared from one gram of lemon grass. Other effects of Citral as well as that of limonene will be discussed.