

Title In vitro studies of antifungal effects of citrus peel extracts and essential oil on *Alternaria alternata*, caused agent of orange fruits pre and post harvest black rot disease in north of Iran

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Abstract

Alternaria is a member of imperfect fungi, family *Dematiaceae*. It has different species induced severe disease on plant, toxic substance, carcinogenic and produce allergic and respiratory disorder. *Alternaria* fungi cause two different diseases on citrus in Mazandaran province, North of Iran: *Alternaria* brown spot of tangerine hybrids and *Alternaria* black rot of the Navel orange fruits. Black rot of fruit, a post harvest disease is caused by *A. alternata*, occurs through all citrus growing regions, but is rarely abundant enough to cause economic losses in Iran. Extraction from Thomson navel, page mandarin, and Minneola tangelo fruit peels was done by Succle Method, using water and methanol as the solvents and essential oil of citrus peel was done by Clevenger method using N-Hexan. An *Alternaria alternata* isolate, obtained from the infected Thomson navel fruit to black rot disease, was used in the all experiments. Injections of spore of *Alternaria alternata* in to undeveloped healthy fruit were down as determined progress in symptoms and under vitro and natural condition. After purification, the fungus was cultured on PDA medium; including water and methanol-base extraction, and the fungus growth was measured. Based on the results, water-base ts of the fruit peels could not inhibit the fungus growth. Methanol-base extracts of fungus Minneola tangelo and page mandarin fruit peels could not also inhibit the growth. But methanol-base extract of Thomson navel fruit peels could inhibit the fungus growth. Mycelia were not penetrate in to skin and segregate gland. Injection of spore in every stage induced infection both soft and dry rot. Essential oil of citrus peel (Thomson novel) inhibited mycelia growth rate, so affected vegetative growth (anti fungus). Essential oil of skin and undeveloped fruit of thamson navel could inhibit germination and formation of re on mycila growth in PDA.