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Strength through unity: The synergistic effect of anethole and estragole, two main components of the fennel essential oil in repelling stored-food insect pests

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Insects are amongst major pests of stored food causing up to 40% of food loss in granaries and store houses. In modern storage technologies insect pests are mainly controlled by chemical insecticides. However, the residual toxicity in food, the evolution of resistant insect strains and the workers' safety issue make the development of alternative control systems highly demanded. Essential oils (EOs) are promising natural products whose efficacy as insecticides and as repellents against stored food pests has been proved. Moreover, EOs due to their high biodegradability and low mammalian toxicity are well accepted by the people. *Foeniculum vulgare* EO is mainly composed by the two phenylpropanoids isomers (E)-anethole and estragole but depending on the origin at different proportions. Here, we evaluated the repellent efficacy of (E)-anethole, estragole and of two different fennel EOs against *Rhyzopertha dominica* and *Tribolium confusum*, two of the major worldwide stored food pests. The results showed a different activity of the two chemically different fennel EOs and that the combined action of (E)-anethole and estragole could results in synergistic or additive repellent effects depending to the insect species. The results shed light on the importance of essential oils for the development of low-cost eco-friendly insect pests' repellents for the food protection.

Biography

H H Bougherra Nehaoua is a PhD student in Processes Engineering at the University Abderrahmane Mira, Bejaia (Algeria) working at the research Laboratory of Organic Materials (LMO) of the same university. The topic that she is currently working on for her PhD thesis concerns the bioactivity of essential oils extracted from plants of the Algerian flora against insects of stored food. She also works at the Department of Agriculture, Food and Environment, University of Pisa within an Internships Framework. Her investigation fields are: Extraction and bio activities of essential oils from Mediterranean aromatic and medicinal plants and Enhancing essential oils activity by adding inert dust in order to establish formulated bio pesticide.

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