

Abstract

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Diploma Thesis Title: Investigation of the reactivity of the skin allergen limonene-1-hydroperoxide with amino acids and identification of adducts with LC/ESI-MS/MS.

Contact allergy and its clinical manifestation allergic contact dermatitis represent a serious problem in western countries. Thousands of chemicals have been proven to cause skin sensitization followed usually by an inflammation of the skin.

Limonene is a monoterpene used as a fragrance compound in household products and cosmetics. It is itself a non-allergenic compound. Nevertheless after an air exposure it creates oxidized products, which are potent allergens. The hydroperoxides fraction of the oxidation mixture has been shown to be strongly skin sensitizing. Two of the major compounds in the fraction are limonene-1-hydroperoxide and limonene-2-hydroperoxide.

During decades of research devoted to the contact allergy it was revealed, that the chemicals causing allergic contact dermatitis react with skin proteins, thus starting up a complicated cascade of immunological processes leading to the final skin irritation. The reaction between the chemical and the skin protein is usually based on electrophilic-nucleophilic interactions. The hydroperoxides are however believed to react via radical mechanism.

In several projects the reactivity of the limonene-hydroperoxides was examined. In amino acid-based assays adducts between limonene-2-hydroperoxide and particular amino acids were investigated and structures of adducts were determined.

In this project we follow the research on adducts with limonene-2-hydroperoxide, but focusing this time on limonene-1-hydroperoxide. The formation of adducts is examined and their structures are suggested and/or determined using LC/ESI-MS/MS.

The research on adduct formation with limonene hydroperoxides is crucial for understanding the mechanism of contact allergy towards this type of compounds and for evaluating their allergenic potential.