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The fragrance chemical beta-caryophyllene-air oxidation and skin sensitization

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Abstract

Fragrances are common causes of allergic contact dermatitis. beta-Caryophyllene is a sesquiterpene that is used as a fragrance chemical. Analogous to the monoterpenes R-limonene and linalool, it can be expected to autoxidize when air exposed. The aim of the present study was to investigate the autoxidation of beta-caryophyllene and to evaluate the effect on the contact allergenic activity. beta-Caryophyllene started to oxidize immediately when air exposed and after 5 weeks almost 50% of the original compound was consumed. Caryophyllene oxide was found to be the major oxidation product. Hydroperoxides of beta-caryophyllene could not be detected in the oxidation mixture. Caryophyllene oxide was shown to be an allergen of moderate strength and beta-caryophyllene air exposed for 10 weeks showed a weak sensitizing capacity in the local lymph node assay. The study reveals that the allergenic activity of beta-caryophyllene is affected by autoxidation, but to a lesser extent when compared to R-limonene and linalool. The present findings support our results in clinical studies showing oxidized beta-caryophyllene to be a rather rare sensitizer compared to oxidized R-limonene and linalool.

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