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Mutagenicity and carcinogenicity of 4 natural food flavor and preservative in food, cosmetic and sanitary industries

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ABSTRACT

The average maximum used levels of some essential oils in food products, such as beverages, ice cream, baked goods, gelatins and puddings, and chewing gums, range from 1.4 to 500 p.p.m. So by using a dose-dependent inhibitory effect (MIC) of 4 essential oils including, Clove oil**,** Cinnamon oil**,** Thymus vulgaris, Zataria multiflora, the genotoxicity and mutagenicity in the Ames Salmonella reversion assay was studied in 2 microbial test system, with and without S9 (microsomal mutagenesis assay) for 7 dilutions of each essential oils respectively.

Key words: Mutagenicity and carcinogenicity, natural food flavor, preservatives, cosmetic and sanitary industries.

INTRODUCTION

The large-scale use of certain food flavourings requires accumulation of toxicological data on these substances 4), particularly in cases where structural similarities with other known substances showing genotoxic or carcinogenic properties indicate that some restrictions on human consumption or exposure should be implementedthe case of the flavouring. Substance eugenol, as an analogue to safrole, a class 2B IARC carcinogen, could be harmful. In all these cases human exposure to them is widespread through consumption of food and beverages. This raises the possibility of adverse effects in human populations. Eugenol is present in a variety of essencial oils.

METHOD

Dose-dependent inhibitory effect (MIC) of 4 essential oils including, Clove oil**,** Cinnamon oil**,** Thymus vulgaris, Zataria multiflora, their genotoxicity and mutagenicity in the Ames Salmonella reversion assay were studied in 2 microbial test systems(2)ith and without S9 (microsomal mutagenesis assay) for 7 dilution of each essential oils, from 1.0 to 1000 p.p.m.

RESULTS

All 4 essential oils in all 7 tested dilutions were negative in the Ames Salmonella reversion assay without S9 (microsomal mutagenesis assay). However all 3 essential oils in each 7 tested dilution except for Clove oil were negative in the Ames Salmonella reversion assay with S9 (microsomal mutagenesis assay).

Clove oil has dose related response, and showed a positive result in 500 p.p.m. in the Ames Salmonella reversion assay with S9 (microsomal mutagenesis assay).

DISCUSSION

Safrole and eugenol at high level are known carcinogens in animals and methyleugenol is a suspected carcinogen compound.(1)ese phenylpropenes and some of carcinogens are not detectable by the Ames assay without S9. In contrast with improving the method which can screen for microsomal enzymes or also for intra and inter chromosomal recombination in logarithmic phase cultures, some negative compounds in the Ames assay without S9, can give positive results[3]. we also used the Ames test with S9 for promising.

Suggestion

These results confirm the promutagen character of clove oil in 500 p.p.m. Due to its widely use as a flavouring agent in various foodstuffs and also due to its application in cosmetics and perfumes too, so its risk assessment for carsinogenicity and mutagenicity should be noticed in further studies. This would be required by evaluating this effect in proper cell lines and in vivo tests.

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