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ROSACEAE

AROMATIC HYDROCARBONS: EXAMINATION OF PEACH FRUIT AND FOLIAGE VOLATILES

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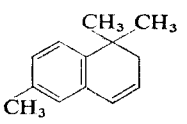
Abstract—Peach fruit volatiles obtained by steam distillation contained 1,2-dihydro-1,1,6-trimethylnaphthalene while foliage volatiles also contained this compound in addition to 1,2,3,4-tetrahydro-1,1,6-trimethylnaphthalene (ionene) and two $C_{14}H_{22}$ hydrocarbons. Other compounds isolated from foliage were hexanal, *trans*-2-hexenal, *trans*-3-hexen-1-ol, benzaldehyde, nonanal, methyl salicylate and eugenol.

INTRODUCTION

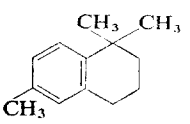
SEVERAL recent papers[1–3] on the composition of food volatiles have revealed the presence of a number of aromatic hydrocarbons including methylnaphthalenes and dimethylnaphthalenes. Pippen *et al.*[4] have suggested that these hydrocarbons are produced from carotenoids during the cooking process and result in a characteristic "naphthalene" aroma. In a previous paper[5] we reported a new naphthalene derivative, 1,2-dihydro-1,1,6-trimethylnaphthalene, as a component of strawberry volatiles. As part of an investigation of the occurrence of hydrocarbons in cooked foods we have examined peach fruit and foliage volatiles.

RESULTS AND DISCUSSION

We now wish to report 1,2-dihydro-1,1,6-trimethylnaphthalene (I) and a similar hydrocarbon 1,2,3,4-tetrahydro-1,1,6-trimethylnaphthalene (ionene, II) in peach foliage volatiles. The identification of ionene was confirmed by comparison of the mass spectra, i.r. and GLC retention data of ionene synthesized in our laboratory and that isolated from peach foliage. In the case of peach fruit volatiles 1,2-dihydro-1,1,6-trimethylnaphthalene was shown to be present by mass spectral, u.v. and GLC data; however, the presence of ionene was not established although a very small peak with the correct retention time for ionene



(I)



(II)

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was apparent. Mass spectra also indicated that two $C_{14}H_{22}$ (MW 190) aromatic hydrocarbons were present in foliage volatiles; these are being studied further.

Other compounds which were isolated from peach foliage and identified by mass spectral data were hexanal, *trans*-2-hexenal, *trans*-3-hexen-1-ol, benzaldehyde, nonanal, methyl salicylate and eugenol. I.r. spectra were used to make *trans* assignments.

Crosby[6] has pointed out the need for elucidating the structure and distribution of food components. One approach in the case of aromatic hydrocarbons may be examination of foliage as well as fruit volatiles since the foliage frequently yields a less complex mixture.

EXPERIMENTAL

Preparation of Volatiles

Red Haven peach fruit and foliage harvested August 1968 was frozen and stored at −23° until used. Thawed fruit was skinned and ground in a Waring blender, diluted with water and steam distilled in an open water recycling apparatus for three hours. Foliage was distilled overnight in the same manner as described for strawberry foliage.[7]

Gas–Liquid Chromatography

Gas chromatograms were obtained with a Beckman GC-2A instrument equipped with a thermal conductivity detector and isothermal temperature regulation. Stainless steel columns (6 ft × 0·25 in.) were packed with 60–80 mesh silanized Chromosorb W coated with either (a) 20% Apiezon L or (b) 10% DEGS.

Preparative GLC was carried out on aluminum columns (3·5 ft × 0·375 in.) packed with 60–80 mesh silanized Chromosorb W coated with either (a) 20% Apiezon L or (b) 20% Carbowax 20 M. The Apiezon L and DEGS columns were run at 130° while the Carbowax column was operated at both 100 and 130°. Compounds were collected as they eluted from the column in 2 mm i.d. glass U-tubes cooled in a dry ice-acetone trap.

Synthesis

1,2,3,4-Tetrahydro-1,1,6-trimethylnaphthalene (ionene) was prepared by treatment of α-ionone with I_2 according to the method of Bogert and Fourman.[8] Ionene was purified by GLC and yielded the following major mass spectral *m/e* peaks with relative intensity for each peak noted in parentheses: 159 (100), 174 (20), 160 (15), 131 (8), 128 (8), 129 (7), 144 (5), 105 (5), 91 (4), and 77 (3).

Spectra

Mass spectra were run on a Hitachi RMU-6E double focusing mass spectrometer with an ionizing energy of 70 eV. Source and oven temperature did not exceed 200°. I.r. spectra were run uncompensated in CCl_4 using a Beckman IR 8 equipped with a mirror beam condenser and 1 μl NaCl cell. U.v. spectra were recorded on a Perkin–Elmer Model 202 spectrophotometer.

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