Linalool-Epoxides in the Essential Oils from Freshly Plucked Tea-Leaves and Black Tea

Sir:

In the previous work²⁾ on the flavor of tea, twenty two components contained in the essential oil of tea-leaves were tentatively identified by gas chromatographic examination, but two rather large peaks remained unknown. This paper deals with these two unknowns.

The neutral fraction of the essential oil obtained from freshly plucked tea-leaves (Yabukita, variety for green tea; Benihomare, variety for black tea) and black tea made from the first crops of Benihomare were gas chromatographed on a 4 mm×2 m column containing 23% PEG-6000 on Shimalite W. The operation was conducted at 150°C with a helium flow rate of 35 ml/min and also at 100°C, 80 ml/min. Peaks A and B in Fig. 1 are those of the unknowns. Compounds corresponding to two peaks were trapped under the condition of 100°C, 80 ml/min and subjected to elemental analyses and infrared examinations.

Anal. Found: Peak A C, 70.02; H, 10.66; Peak B C, 69.65; H, 10.54. Calcd. for $C_{10}H_{18}O_2$: C, 70.53; H, 10.66%.

Gas chromatographic data: Relative retention times (linalool=1.00) of peaks A and B were 0.77 and 0.86 at 150°C and 0.60 and 0.70 at 100°C. These data were entirely identical with those of two linalool epoxides which were obtained by oxidation of linalool with monoperphthalic acid followed by gas chromatographic fractionation.

Infrared spectra of the peaks A and B and synthesized epoxides (presented as A_0 and B_0) are shown in Fig. 2. The spectra of peaks A

FIG. 1. Gas Chromatograms of the Neutral Fraction of the Essential Oil from Fresh Tea-leaves and Black Tea (150°C, 35 ml/min.)

(1) Fresh tea leaves (Yabukita)	Peak A: Linalool-epoxide I
(2) Fresh tea leaves (Benihomare)	B: Linalool-epoxide II
(3) Black tea	C: Linalool
	D: <i>cis</i> -3-Hexen-1-ol

1) T. Yamanishi, T. Kiribuchi, M. Sakai, N. Fujita, Y. Ikeda and K. Sasa, This Journal 27, 193 (1963).

FIG. 2. Infrared Spectra of Compounds Corresponding to Peaks A, B and Authentic Linalool-epoxides A_0 , B_0 .

and B were identical with those of A_0 and B_0 respectively.

Recently, Felix et al.²⁾ and Klein et al.³⁾ reported the four isomers of linalool oxides having the following structures I, II, III and IV. A_0 and B_0 or peaks A and B were identified as I

2) D. Felix, A. Melera, J. Seibl and E. sz. Kovats, *Helv.* **46**, 1515 (1963).

3) E. Klein, H. Farnow and W. Rojahn, *Tetrahedron Letters* No. **17**, 1107 (1963).

and II respectively by comparison of the chromatographic data and the infrared spectra with those of I, II, III and IV reported by above mentioned authors.

Both A_0 and B_0 have an earthy and somewhat Japanese parsley like odor and are closely similar each other. The relative quantities of A_0 and B_0 to linalool were determined by calculating the relative areas under the peaks A

B and C and the following results were obtained.

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	A ₀	B ₀	Linalool
Yabukita	0.24	0.58	1.00
Benihomare	0.31	0.62	1.00
Black tea	0.43	1.32	1.00

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