The Drying of Laurel Leaves

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Laurel leaves are collected from *Laurus nobilis* L., which is an evergreen tree or shrub of the Lauraceae family and grows wild in Greece. In ancient Greece and Rome, its leaves and branchlets were used as garlands to be bestowed upon heroes on festive occasions. In modern times annually more than 250,000 kg of dried leaves (sweet bay) are marketed in U.S.A., U.S.S.R. and other countries as a flavoring material in culinary preparations like soups, fish, and ragouts.

In 1965, Pruidze found that the most ideal way of drying laurel leaves is with dry air at 65-70°C.[4] He reported that the oil content of the dried leaves is approximately 3% which is less than that found in fresh leaves. This author also found that the above conditions did not have any adverse effect on the chemical composition of the oil. Finally, Pruidze stated that the optimum moisture content for the storage of leaves is 12%.

According to Guenther, Kekelidze et al., Pruidze and Skrubis, the oil contains mainly 1,8-cineole as the major constituent. Smaller quantities of d-limonene, camphene, sabinene, myrcene, α- and β-pinene, α- and β-phellandrene, p-cymene, geraniol, methyl eugenol, linalool, eugenyl acetate are also found in the oil.[2-4,6]

Materials and Methods

Fresh laurel leaves were collected from the same tree in March when under the local conditions the physiological functions are very low. Samples of 80, 120 and 160 g were transferred into metallic frames where the corresponding heights of their layers were 5, 7.5 and 10 cm.

The samples were air (circulated) dried (fan dried) in an oven (Emerson Co., Model S142, Mass., U.S.A.) at 40, 50, 60 and 70 ±1°C. Each treatment was replicated three times. All samples were dried to a 12% moisture content by weight. The initial moisture content was estimated by the toluene distillation method that is recommended by the AOAC.[1]

The curves of figures 1-4 as well as their equations were calculated by the statistical method of linear correlation, using as X the moisture content and as Y the time elapsed for drying the leaves up to about 12% of moisture. The same method was used for the curve of figure 5 using as X the time elapsed and as Y the height of

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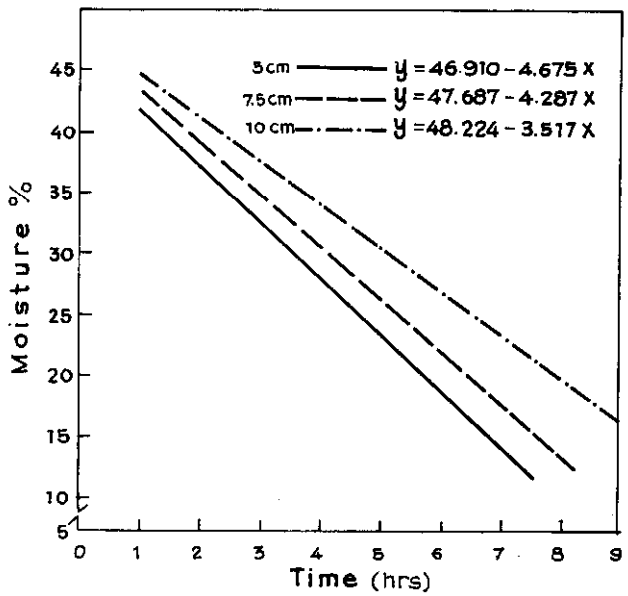

Figure 1. Drying curves at 40 ± 1°C

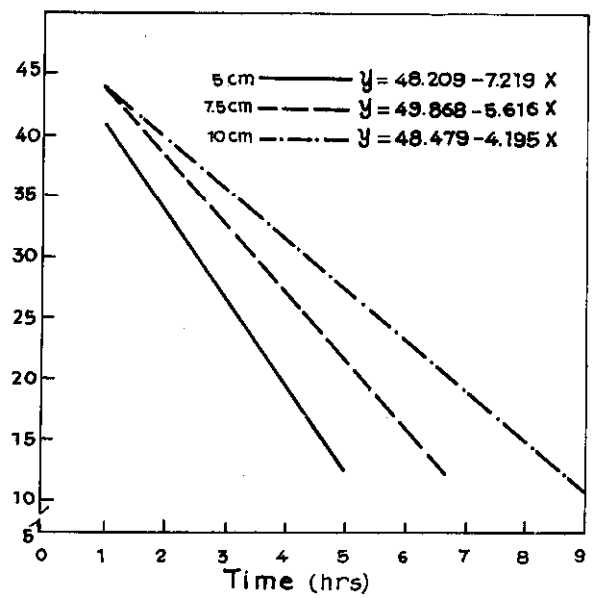

Figure 2. Drying curves at 50 ± 1°C

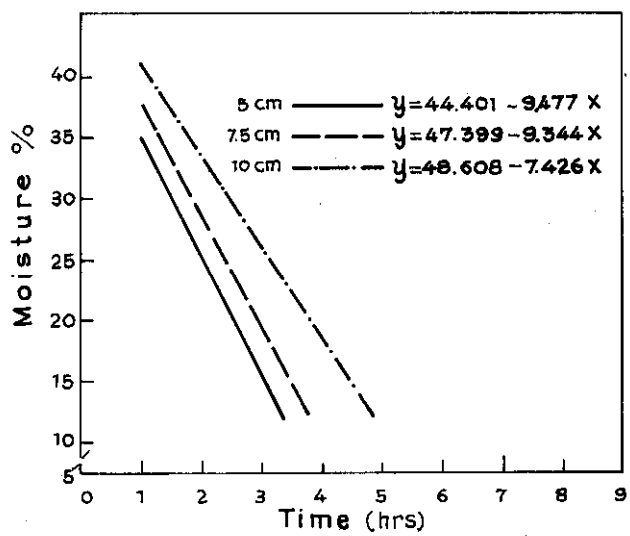

Figure 3. Drying curves at 60 ± 1°C

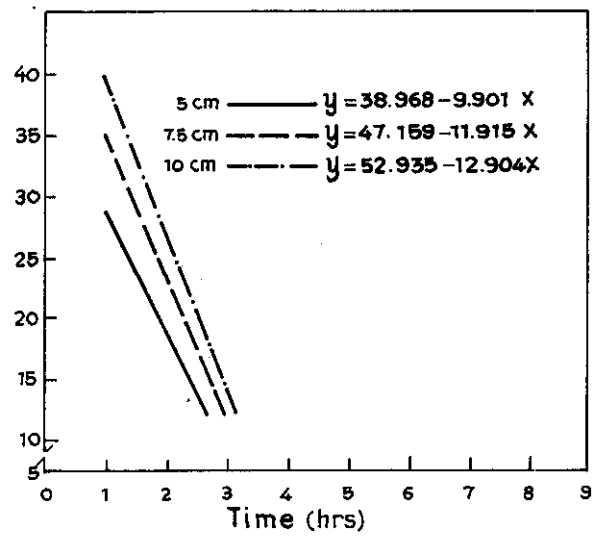

Figure 4. Drying curves at 70 ± 1°C

layer of leaves.[7]

Samples of 100 and 50 g of fresh and dried leaves respectively were subjected to distillation with 300 ml of water for 90 minutes in a Clevenger apparatus. A colourless oil with a characteristic aroma was produced. The given yield of the oil is the mean of two distilled samples. The oil was dried over anhydrous magnesium sulphate for 24 hours and was kept at 3°C until analysis.

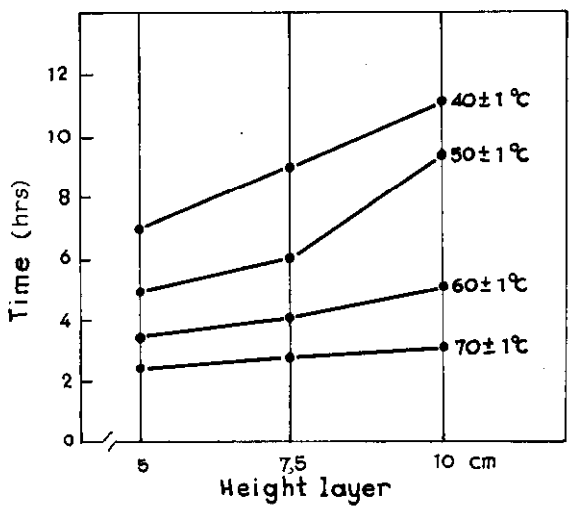

Figure 5. Time of drying vs. heights of layer at different temperatures

The gas-liquid chromatographic equipment used to analyse the oil was a 609 flame ionization and programming temperature model (F and M Company, U.S.A.). Two ¼ inch o.d. copper columns, 6 ft length, one of a stationary phase of LAC-728 (diethylene glycol succinate) and the other of Carbowax 20 M, on chromosorb P (60-80 mesh) were used.

Some of the constituents of the oil were identified with known substances (standards) by peak enrichment and by comparing the retention times of the known compounds with that of an unknown on both columns. Although this method is somewhat tentative, it is often used when no other instrumental facilities are available (i.e., M.S. etc.). The conditions of the analysis are as follows:

sample size 1 μl; temperature: injection port 230°C, detector 210°C, programmed 95°C to 205°C, rate 6.4°C/min; carrier gas (hydrogen) flow rate 95 ml/min; attenator 2; range 1.000; chart speed 15 in/h

Results and Discussion

Time required for drying. The drying curves as well as their equations for the different treatments (temperature and heights of layer) are shown in figures 1-4. The time elapsed in relation to the heights of layer at different temperatures can be seen in figure 5. These curves show that as the temperature of drying the leaves is increased the time is decreased. Also the time required for drying is increased by adding to the depth of the layer.

Essential oil content. The yield in essential oil is shown in Table I. It was found that there is no significant difference in the amount of the oil obtained from the samples that were dried under different temperatures.

Table I. The oil yield of fresh and dried leaves

Leaves	Oil yield %		Mean
	1st dist.	2nd dist.	
Fresh	0.99	1.01	1.000
Dried at 40°C	1.92	1.88	1.900
" " 50°C	1.88	1.91	1.895
" " 60°C	1.90	1.90	1.900
" " 70°C	1.91	1.90	1.905

Composition of the essential oil. Figure 6 shows a typical chromatogram received from oil of fresh leaves. Using the techniques described

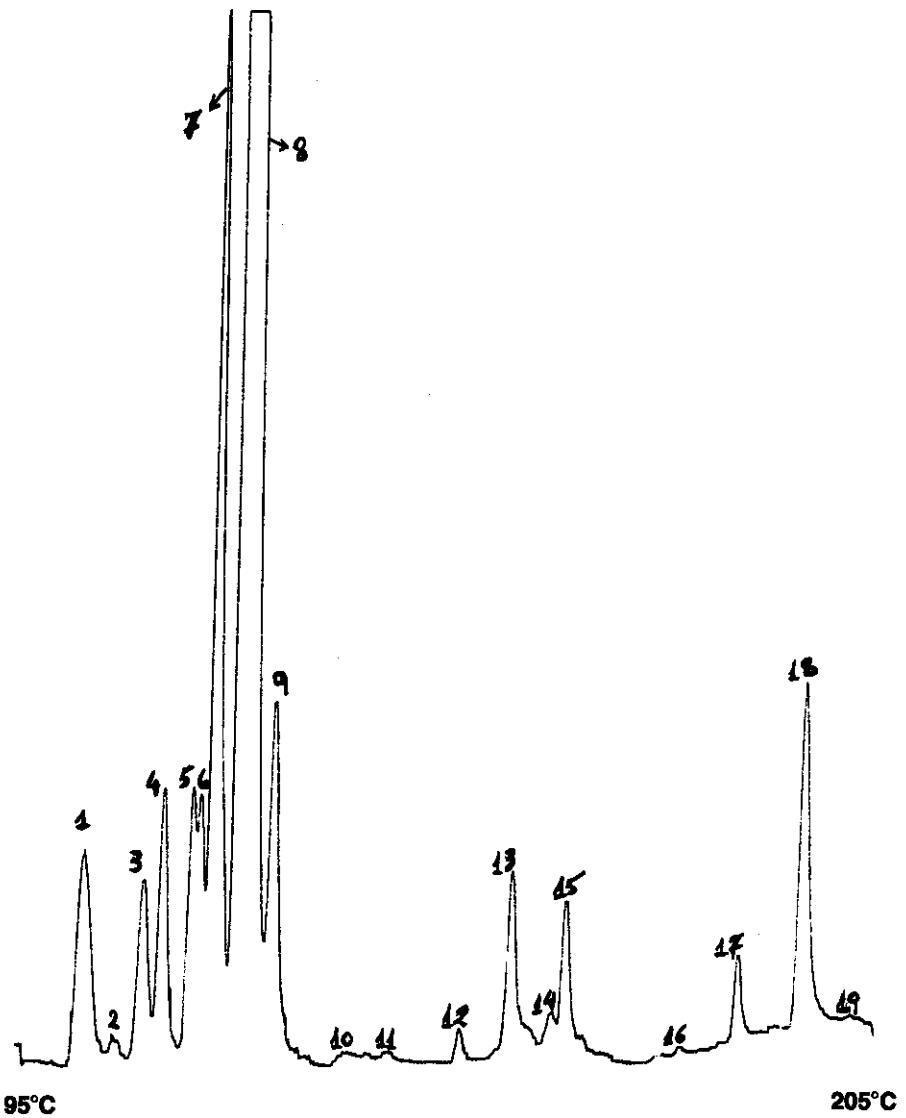

Figure 6. Chromatogram of fresh leaves oil

earlier, the following components were identified in the oil:

peak 1, α-pinene; 2, camphene; 4, d-limonene; 8, 1,8-cineole; 9, linalool; 15, α-terpineol; 16, geraniol; 17, eugenyl acetate; and 18, methyl eugenol

The chromatograms obtained from the oil of dried leaves at different temperatures show no qualitative differences, and resemble the one shown in figure 6. In other words all the chromatograms were found to contain the same constituents; only quantitative differences were found.

References

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