Pak. j. sci. ind. res., vol. 32, no. 1, January 1989

STUDIES OF THE ESSENTIAL OIL OF THE PAKISTANI *LAURUS NOBILIS* LINN IN DIFFERENT SEASONS

M. Riaz, C.M. Ashraf and F.M. Chaudhary

PCSIR Laboratories, Lahore

(Received November 18, 1987; revised January 18, 1989)

The essential oil of the leaves of *Laurus-nobilis* commonly known as bay oil has been studied for its physico-chemical properties and chemical composition. The leaves afforded 0.13 to 0.36% of the oil. The relative percentage of different terpenes in the oil and their characterisation was carried out by gas chromatography. The identified terpenes are, α-thujene 0.29, α-pinene 2.74, camphene 0.06, sabinene 6.2,β-pinene 2.05, myrcene 0.03, phellandrene 0.55, carene, 0.15, *P*-cymene 0.7, cineole 44.12, γ-terpinene 0.48, α-thujone 0.48,β-thujone 0.36, Linalool 0.35, terpinolene 1.90, fenchol 0.12 camphor 0.15, dihydroterpineol 0.35, 4-terpineol 3.60, α-terpineol 2.19, citral 0.33, geraniol 0.05, terpinyl acetate 0.11, eugenol 15.16, linalyl acetate 0.05, methyleugenol 2.48, caryophyllene 0.06 and acetyleugenol 0.42% as shown in the bay leaves collected in the month of November.

Key words: Essential oil, *Laurus nobilis.*

INTRODUCTION

The plant *L. nobilis* Linn [1, 2]. belongs to *Lauraceae* family consisting of 40 genera and 1000 species, which are found in nearly all tropical and subtropical regions, especially in Southeastern Asia and Brazil.

Bay or sweet laural *L. nobilis* is a large evergreen shrub occasionally reaching a height of 60 feet, and seldom assuming the character of a tree. Its small yellowish flowers, both male and female, are produced in auxillary clusters. Its fruits, known as berries are fleshy and oval in shape and vary in length from 1/3 to 1/2 inch.

Bay laurel is a native of Italy, Greece and North America. It is also cultivated in many temperate and warm parts of the world, especially in Southern Europe and around the shores of Mediterranean sea and India.

Many of the plants of this family have remarkable aromatic properties and medicinal values. Its barries are recommended in chest infections and are stimulant. The oil is also used as a cure for rheumatic pains. The plant extract has successfully been applied by Antonio Fantini [3] in controlling infective diseases of the silk worm. Czira [4] used the extract of *L. nobilis* leaves in antidandruff preparation. The leaves have also shown great repellancy against cockroaches [5]. The oil, as well as, the leaves also behave as antifungal agents [6, 7].

The studies of the essential oil of *L. nobilis* leaves have been carried out by many workers. They have been able to isolate and identify a number of mono and sesquiterpenes [8-11].

However the oil from *L. nobilis* leaves growing in Pakistan does not appear to have been studied earlier. Hence, it was considered worthwhile to examine the soil, because of its versatile properties. The results of the chemical composition of the essential oil collected in different seasons are presented in this publication.

EXPERIMENTAL

Extraction of oil. 500g of the fresh leaves were taken in a 5l round bottomed flask, fitted with Dean and Stark apparatus and a condenser. The leaves were soaked in water and heated on an isomentle for 12-15 hours for complete extraction of steam volatile matter. The oil was separated and dried over anhydrous sodium sulphate. For complete recovery, the aqueous layer was also extracted with diethyl ether. The etheral layer was washed with water and dried over anhydrous sodium sulphate. The ether was distilled off and the last traces of the solvent were removed by flushing the oily material with dry nitrogen at 40°. Both the extract were combined and weighed.

Analysis. The oil was analysed on a Pye-Unicam 104 gas chromatography fitted with an F.I. detector using 25 m Wcot SE-30 column. Hydrogen gas was used as the carrier gas with a flow velocity of 26.7 cm/sec. and split ratio of 1:60 and sample size 0.02 ul. The temperature was pro-

grammed as 70° for 5 min., with 4°/min increase to 150°, while detector and injection temperatures of 250° and 300° were used respectively. Various components were identified by their retention times and by co-injection of standard samples. Percentage composition of individual components was calculated on the basis of peak area using SP-4100 (spectra physics) computing integrator.

DISCUSSION

The leaves of *L. nobilis* were collected from Botanical Gardens of the Punjab University Lahore and the LDA nursery on the canal side in the months of March, July, September and November after an interval of two to four months to study the yield of the oil and chemical composition.

The results of essential oil content of various collections are shown in Table 1. The comparative studies indicated that the yield was minimum in March (0.13%) and

Table 1. Physico-chemical properties of the essential oil of *L. nobilis*.

	March	July	Septem-ber	Novem-ber
1. Yield (%)	0.13	0.23	0.36	0.18
2. Colour	= Pale Yellow.			
3. Moisture content of the leaves	= 52.15%			
4. Refractive index at 37°	= 1.4645			

started increasing till it reached a maximum in late September (0.36%) and constantly decreased thereafter. These observation appear to contradict an earlier report by Yoshida *et. al.*, [12] who studied the behaviour of essential oil content in bay leaves and claimed that their essential oil recovery increased in early June reached a maximum in late July and constantly decreased thereafter. This change may be attributed to the soil and ecological conditions which may significantly vary in different regions.

The results of essential oil composition have been given in Table 2. GLC analysis showed 70 peaks corresponding to different terpenes, but only 27 peaks were identified. Cineole and eugenol were the main components in each case. The relative quantities of all the other components almost remain constant throughout the year. Linalylacetate was found absent in the leave oil collected in March.

It may be worthwhile to point out that none of the earlier studies indicated the presence of so many compounds in their oil content [9, 10, 12].

Table 2. Chemical compositions of the essential oils.

Peak No.	Compound Name	% Area		
		March	July	Novem-ber
2.	α-Thujene	0.31	0.33	0.29
3.	α-Pinene	3.45	3.65	2.74
4.	Camphene	0.09	0.08	0.06
5.	Sabinene	6.45	6.52	6.20
6.	β-Pinene	3.29	3.43	2.05
7.	Myrcene	0.05	0.1	0.03
9.	Phellandrene	0.32	0.24	0.55
11.	Δ^3-Carene	0.15	0.29	0.15
12.	*P*-Cymene	1.02	0.89	0.70
14.	Cineole	39.51	42.24	44.12
17.	γ-Terpinene	0.52	0.67	0.48
18.	α-Thujone	0.28	0.33	0.48
19.	Linalool	0.28	0.25	0.35
20.	β-Thujone	0.17	0.24	0.36
21.	Terpinolene	2.23	1.93	1.90
22.	Fenchol	0.1	0.11	0.12
23.	Camphor	0.15	0.13	0.15
25.	Dihydro-terpineol	0.29	0.31	0.35
26.	4-Terpineol	3.75	3.73	3.60
28.	α-Terpineol	1.64	1.63	2.19
29.	Citral	0.35	0.23	0.33
30.	Geraniol	0.05	0.18	0.05
36.	Terpinylacetate	0.05	0.09	0.11
37.	Eugenol	16.70	16.41	15.16
38.	Linalyl acetate	–	0.12	0.05
39.	Methyl eugenol	2.44	2.46	2.48
40.	Caryophyllene	0.09	0.31	0.06
55.	Acetyleugenol	0.21	0.46	0.42

This may again be ascribed to different geographical conditions prevailing at various places.

REFERENCES

1. *Encyclopaedia Britanica*, **13,** (1955) pp. 768-69.
2. W. Dymock, The Journal of the Institute of Health and Tibbia (Medical) Research, Pakistan, **15**(3), 214 (1972).
3. A. Fantini. Ital. Pt. 457, 929 (1950).
4. A. Czira. Brit. Pt. **1,** 185, 825 (1970).
5. M. Verma and C.E. Meloan, Am. Lab. (Fairfield, Conn.) **13,** 64, 66 (1981).
6. J.C. Maruzzella and L. Ligouri, J. Am. Pharm. Assoc.,

47, 250 (1958).
7. M. Karapinor, Int. J.Fd.Microbiol., **2,** 239 (1985).
8. G. Rovesti, Rivista Ital., Essenze e Profumi., **12,** 241 (1930).
9. M.G. Pertoldi and B. Stancher, Atti Congr. Qual., **6,** 303 (1968).
10. N.A. Kekelidze, L.V. Beradze and M.I. Dzhanikashvili, Maslozhir. Prom-st, **1,** 32, (1977).
11. B.V. Artemev, A.V. Pekhov, G.I. Kasyanov and N.F. Dyubankova, Rastit. Resur, **16,** 209 (1980).
12. T. Yoshida, Nettai Nogyo, **23,** 6 (1970).