

### Short Communication

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## STUDIES ON THE FIXED OIL OF THE SEEDS OF *LEUCAENA LEUCOCEPHALA*. Part-I

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*Leucaena leucocephala* commonly known as Apil Apil, is a tropical tree belonging to the family Leguminosae. Much work has been carried out on the different aspects of *Leucaena glauca* [1-5] while a lot of work has still to be done on *Leucaena leucocephala*. Studies on fixed oil from the seeds of *L. leucocephala* have been reported in the present communication.

The seeds were collected from the pods of the plant which were crushed to a powdery material. 500 gms of this material was extracted with *n*-hexane using soxhlet apparatus and recovered 25 gms of oil (5% yield). The oil was filtered and used for physico-chemical investigations. The specific gravity, refractive index, saponification value, acid value, iodine value, ester value and INS value of the oil were recorded using the standard procedures [6].

The free fatty acids were liberated from the oil (5 gms) and their methyl  $\mu$  esters were prepared [7]. The I.R. spectrum showed the absence of carboxyl peak at 2.9  $\mu$  and shifting of carbonyl peak from 5.9  $\mu$  to 5.7  $\mu$ , inferring that all the fatty acids have been esterified. The methyl esters were then identified on a Pye Unicam 104 series gas chromatograph fitted with an F.I. detector using WCOT carbowax 20 meter column. Hydrogen was used as the carrier gas with a flow velocity of 26 ml/sec. and sample size 0.02 m. The temperature was programmed as 108° for 5 minutes with 10 minutes increase to 220° while detector and injector temperature were 300° and 250° respectively. The sample gave nine peaks identifying capric (0.168%), lauric (0.163%), palmitic (18.75%), stearic (20.586%), oleic (42.475%), linoleic (0.658%), linolenic (0.223%), arachidic (1.955%) and lignoceric (3.524%) acids. These results were confirmed by running a standard mixture under identical conditions.

The physico-chemical characteristics of *L. leucocephala* seed oil are given in Table 1. The fatty acid composition of the seed oil of *L. leucocephala* is markedly different from that of the *L. glauca*. A comparative study has been given in the Table 2. This shows that the fixed oil

of the different species of the same genera can differ to a much noticeable extent.

Work is in progress to study the unsaponifiable matters of the oil which are 3.8%. It is also intended to study the proteins and the carbohydrates of the seeds which are about 95% in weight. These studies will bring out the practical utility of these fractions.

Table 1. Physico-chemical properties of the fixed oil of *Leucaena leucocephala*.

Fixed oil	5%
Colour	Yellow brown
Specific gravity	8.966
Refractive index at 25°C	1.49
Saponification value	187.03
Acid value	4.7124
Iodine value	119
Ester value	182.3176
I.N.S. value	68.03
Peroxide value	96.5
Unsaponifiable matter	3.86%
Saponifiable matter	96.16%

Table 2. Fatty acid composition of the fixed oils of *Leucaena leucocephala* and *Leucaena glauca* [2]

Fatty acids	<i>L. leucocephala</i> (%)	<i>L. glauca</i> (%)
Capric	0.168	—
Lauric	0.163	—
Palmitic	18.751	12.74
Stearic	20.586	5.01
Oleic	42.457	23.63
Linoleic	0.658	54.31
Arachidic	1.955	—
Behenic	—	3.64
Lignoceric	3.524	0.67

Key words: Fatty acids, Esterification, Saponification.

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Results of surveys conducted to evaluate the ambient noise level in the city environment and to identify the sources of urban noise are being reported in this paper.

MATERIALS AND METHODS

Omni sound level Range was used in this survey. The noise level was recorded at 23 different sites of the city as shown in Fig. 1. The noise level was recorded over



Fig. 1. Map for recording noise level in Karachi city.

INTRODUCTION

Increasing trend towards urbanization and a rise for improvement of the quality of life has resulted in the use of small vehicles for transportation in the major cities of Pakistan [1]. The noise level in Karachi has accordingly increased alarmingly. The heavy delivery, motorcycles, and old motor starters the noises of the cars as well as the neighborhood in which they operate. Traffic noise may be heard in low noise level as a series of clearly defined "Noise Events" corresponding to each heavy vehicle and that due to light vehicles a below general background noise level or threshold [2]. Maximum noise level defined as the highest single noise event during the measuring time is the major determinant for annoyance [3]. In Karachi, the exploitation of cheap and small vehicles has taken the form of motorcycles, rickshaws, mop-buses and buses. Motor rickshaws constitute only 1.07% of the total traffic volume of the city and show the lowest growth rate compared with other types of vehicles [4]. They however dominate the upper noise level range. Detailed data relating to noise level in Karachi is not available, excepting a brief study of traffic noise assessment reported for nine spots [5] including the very congested areas during peak hours. Not desirable, however, with the concept of background noise level and noise events. The present authors were already engaged in the assessment of noise level in the various parts of the city as well as that of the vehicles responsible for the processes

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