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PHYSICO CHEMICAL CHARACTERIZATION OF *LAWSONIA ALBA* OIL OF THE FAMILY MYRTACEAE

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INTRODUCTION

Lawsonia alba commonly known as Mendhi or Henna is planted in the plains of Pakistan as an ornamental shrub [1]. The grounded herbs, leaves and seeds of this plant is used for rheumatism, staining hands and finger nails to protect them from decay and diseases, healthy growth to hair and as an ointment for the care of wounds and ulcers [2].

The present work is an attempt to fractionate the oil into different classes of lipid compounds as hydrocarbons, wax esters, triglycerides, free fatty acids and identification of component fatty acids by the application of column, thin layer and gas liquid chromatography [3 – 6].

EXPERIMENTAL

(i) *Extraction and Examination of Oil.* The seeds (100 g) were crushed, dried and extracted with distilled hexane. The dark green oil (8.9 g) after the removal of solvent was obtained to proceed further.

(ii) *Fractionation of Oil.* A glass column of length (45 cm) and dia (2.5 cm) with silicagel (50 g, 60 – 120 mesh) was used for the fractionation of the oil (2.50 g) into hydrocarbons (0.028 g), wax esters (0.040 g), triglycerides (1.757 g) and free fatty acids including colouring material (0.675 g) by using hexane only (400 ml), 2 % ether in hexane (400 ml), 4 % ether in hexane (800 ml) and ether only (1000 ml) respectively.

(iii) *Identification of Component Fatty Acids of Oil.* The oil (2 g) after saponification with 0.5 N alcoholic potassium hydroxide (30 ml) for 3 hr was reacted with 2 N sulphuric acid to librate fatty acids after the separation of unsaponifiable matter by diethyl ether. The fatty acids (400 mg) were converted into methyl esters by refluxing with dry methanol (6 ml) and 1 % w/w sulphuric acid for 2 hr and were subsequently analysed by a Pye Unicam 204 Series GLC using a colum of diethylene glycol succinate (DEGS 10 %) coated on diatomite (80 – 100 mesh) at 200°. Nitrogen was used as a carrier gas at a flow rate of 40 ml/min.

RESULTS AND DISCUSSION

The fixed oil of *Lawsonia alba* has been fractionated first time into hydrocarbons (1.1 %) wax esters (1.6 %) triglycerides (70.3 %) and free fatty acids including colouring material (27.0 %) by column and TLC. The fractionated compounds have been identified by having their comparison with the standard lipid compounds on TLC by using the solvent system of ether: hexane (1:9 v/v). These compounds have been characterised by their R_f values as the R_f value increases the polarity of respective compound decreases and vice a versa (Table 1). The component fatty acids of the oil after saponification, methy-

Table 1. R_f Values of standards and fractionated percentage-wise lipid compounds.

No.	Sample	Standards	R_f value	Lipid compounds %
1.	A	Octadecane (Hydrocarbon)	0.89	1.1
2.	B	Octadecyl octadecanoate (Wax ester)	0.75	1.6
3.	C	Stearin (Triglycerides)	0.40	70.3
4.	D	Octadecanoic acid (Fatty acid)	0.06	27.0

Table – 2. The physico-chemical characteristics and fatty acid composition of *Lawsonia alba* oil.

Fatty acid area %	
Lauric	0.7
Myristic	5.1
Palmitic	14.8
Stearic	5.1
Oleic	23.6
Linoleic	47.0
Linolenic	2.2
Arachidic	Traces
Lignoceric	1.5
Characteristics	
Yield (% age)	8.9
Moisture (% age)	0.2
Saponification number	193.0
Iodine value	127.0
Refractive index	1.4720
Acid value	21.9

lation and purification were identified by GLC in addition to the physico-chemical evaluation of the oil (Table 2). The major component fatty acids of *Lawsonia alba* are palmitic (14.8 %), oleic (23.6 %) and linoleic (47.0 %) which on having comparison with the previous work [7] on the species of *Myrtus communis* shows quantitative difference as regards to palmitic (23.0 %) and oleic (14.3 %) whereas linoleic acid (47.6 %) is in fair agreement. However, these component fatty acids reflect that the fixed oils are of two different species of the same family.

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