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THE FATTY ACID COMPOSITION OF THE FIXED OIL OF *CUSCUTA REFLEXA* SEEDS

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The fixed oil (1.8%) from the seeds of *Cuscuta reflexa* (N.O. Convolvulaceae) has been characterised and studied for its fatty acid composition by GLC. The oil is found to contain capric (0.28%), lauric (0.18%), myristic (0.36%), palmitic (4.55%), stearic (0.90%), oleic (8.19%), linoleic (58.24%), and linolenic (27.29%) acids.

INTRODUCTION

Cuscuta reflexa (N.O. Convolvulaceae) locally known as "amervel" or "akashbel" and dodder in English is a common golden yellow parasite plant found throughout Pakistan. The chemical composition of the plant as grown on various hosts, has been published.[1]

The plant comes to flowering in spring and then bears seeds known as *tukhum-e-kasus* in the local materia medica. The seeds have a bitter taste but are commonly used sedative, diuretic, carminative and blood purifier. A concoction made from pulverised seeds is said to be useful in diseases of the spleen, chronic fever and hicough [2]. This study describes the evaluation of the seed oil and its fatty acid composition. The seed oil is composed of the glycerides of capric (0.28%), lauric (0.18%) myristic (0.36%), palmitic (4.55%), stearic (0.90%), oleic (8.19%), linoleic (58.24%), linolenic (27.29%), acids.

EXPERIMENTAL

Cuscuta reflexa seeds, purchased from the local market, were sieved and sorted to free them from dust and other plant material. The seeds were dried and crushed in an iron pestle and mortar. The oil was extracted by Soxhlet apparatus using *n*-hexane as the solvent. Percentage yield of the oil was recorded after decolourizing and deodourising by Fuller's earth followed by steam distillation.

The refined oil thus obtained was used for physico-chemical investigations and fatty acid composition. The specific gravity, refractive index, acid value, saponification value, iodine value, ester value and INS value of the oil[3] are recorded in Table 1.

Saponification of the oil and liberation of the fatty acids.[4] The oil (3 g) was refluxed with 50 ml. of 0.5 N alcoholic potassium hydroxide for 4 hr on water bath. The solvent was distilled out under reduced pressure and the residual soap was washed thrice with diethyl ether to remove the unsaponifiable matter. The soap dissolved in water was acidified with 25 ml. of 0.2 N sulphuric acid. The liberated fatty acids were extracted with diethyl ether and dried over anhydrous sodium sulphate. After the removal of the solvent, the mixture of the fatty acids was obtained as a clear oily liquid.

Preparation of methyl esters of the fatty acids. The fatty acid mixture obtained (1 g) was refluexed on water bath for 3 hrs with absolute methanol (40 ml.) and a few drops of conc. H_2SO_4. After the distillation of excess methanol, methyl esters of the fatty acids were extracted with diethyl

Table 1. Physico-chemical properties of the oil of *Cusuta reflexa* seeds

Fixed oil	1.8%
Colour	Yellow brown
Specific gravity at 27°	0.9476
Refractive index at 20° $n^{D)^{20}}$	1.4672
Acid value	35.00
Saponification value	188.74
Iodine value	96.29
Ester value	153.74
INS value	92.45
Peroxide value	76.78
Unsaponifiable matter	18.5%

ether, dried over anhydrous sodium sulphate, filtered and the solvent removed under reduced pressure. The absence of peak at 2.9 μm and shifting of C = 0 peak from 5.9 μm to 5.7 μm in the infra-red spectrum of the methyl esters indicated complete esterification of the fatty acids which was confirmed by T.L.C.

Resolution and identification of methyl esters by GLC. Chemical composition of the oil was determined by the GLC of the methyl esters, with flame ionisation detector and nitrogen as the carrier gas. It was injected at 200° using a glass column (1.5 x 4mm) containing 10% polyethylene glycol succinate coated on diatomite support maintained at 190°. The sample gave eight peaks of capric, lauric, myristic, palmitic, stearic, oleic, linoleic and linolenic acid methyl esters which was confirmed by running a standard mixtur under identical conditions.

DISCUSSION

The physico-chemical characteristics of *Cuscuta reflexa* seed oil are given in Table 1. The high acid and peroxide value indicate that the extracted oil is partially hydrolysed and rancid, which is possibly due to the stored seeds as procured from the market.

The results of the present study are compared with those published in the literature and shown in Table 2. The presence of capric, lauric and myristic acids in the oil of *Cuscuta reflexa* has been established for the first time. The variations can perhaps be attributed to the climatic, soil and host differences in which the parasite climber propagates itself.

The presence of free fatty acids in the oil is also confirmed by i.r. spectroscopy of the oil which besides characteristic bands also shows absorbence at 2.94 μm and 5.8 μm[4].

It is intended to further investigate the seed for its proteins and carbohydrates and also non-saponifiable matter of the oil so as to establish any medicinal attributes of *Cuscuta reflexa* seeds.

Table 2. Fatty acid composition of the *Cuscuta reflexa* seed oil

	Reported by Agarwal and Dutt[5]	Found
Capric	–	0.28
Lauric acid	–	0.18
Myristic acid	–	0.36
Palmitic acid	11.5	4.55
Stearic acid	27.2	0.90
Oleic acid	17.26	8.19
Linoleic acid	9.12	58.24
Linolenic acid	25.58	27.29

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