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STUDIES ON THE ESSENTIAL OILS OF THE PAKISTANI SPECIES OF THE FAMILY UMBELLIFERAE

Part XL *Scandix pecten-veneris*, Linn (Eng. Venus's comb; local, Jungli sowa) Seed Oil

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Physical values and chemical composition of the essential oil distilled from the mature seed of *Scandix pecten-veneris* cultivated in Lahore, have been studied for the first time. The oil with a yield less than 0.1% contains α-thujene (1.54%), α-pinene (2.57%), camphene (4.00%), β-pinene (1.69%), limonene (4.69%), γ-terpinene (4.51%), 2-undecanone (1.20%), lauric acid (38.00%), 2-undecanoic acid (7.31%) and a mixture of coumarins and tarry material (23.25%). The plant possesses a considerable medicinal importance.

INTRODUCTION

The genus *Scandix* is represented by about 20 species restricted chiefly to the Mediterranean region. Most of the species grow in Europe and Asia and a few of these are found in North and South America and Australia. The plants are annual herbs. Three species of the genus namely *Scandex iberica, S. pecten-veneris* and *S. stellata* have been recorded to grow in Pakistan.

Scandix pecten-veneris is a wild growing plant which is rarely found in Chitral, Hazara, Kaghan (Notrh West Frontier Province), Murree, Rawalpindi (Punjab) and Quetta (Baluchistan). The young tops of the stems of the plant have been prescribed for bleeding, amenorrhoea and bladder affections. The present investigations were carried out to study the quality and chemistry of this valuable medicinal plant.

MATERIALS AND METHODS

Mature seeds of *Scandix pecten-veneris*, successfully cultivated in the PCSIR Laboratories, Lahore, were used to distill the essential oil. The general methods employed for these studies have been described in our earlier papers [1, 2].

The essential oil (5 g) was column chromtographed using silica gel (150 g) as an adsorbent. The hydrocarbon fraction of the oil was eluted with n-hexane and further resolved into individual components by GLC using a copper column (3 m x 3 mm) packed with 7.5% carbowax on Celite (60–80 mesh), nitrogen as the carrier gas and flame ionization detector. The column temperature was maintained at 110° and 170° for the resolution of mono- and sesquiterpenes respectively.

The oxygenated components of the oil were eluted with different ratios of n-hexane and diethyl ether and were identified by m.p., TLC, GLC, IR comparison and also by conversion into their known derivatives.

RESULTS

The percentage yield, physical values and chemical composition of the essential oil of *Scandix pecter-veneris* are recorded in Tables 1–2.

DISCUSSION

The essential oil distilled from the seeds of *Scandix pecten-veneris* is mainly composed of lauric acid and a mixture of coumarins. The hydrocarbon fraction which amounts to 19.6% of the total oil contains monoterpenes only and no sesquiterpene was detected under the conditions mentioned earlier.

Table 1. Percentage yield and physical values of the essential oil of *Scandix pecten-veneris* seed.

Distillation time (hr)	24
Yield of the oil (%)	0.008 including water cohobation oil
Colour	Orange
Specific gravity	0.9948^{30}
Refractive index	1.4680^{30}

The superscripts indicate the temperature at which these parameters were determined.

Table 2. Percentage composition of the essential oil of *Scandix pecten-veneris* seed.

Eluent	Constituent	Percentage
n-Hexane	Hydrocarbons*	19.96
	Santene	0.96
	α-Thujene	1.54
	α-Pinene	2.75
	Camphene	4.00
	Limonene	4.69
	γ-Terpinene	4.51
	β-Pinene	1.96
2% diethyl ether in n-hexane	2-Undecanone	11.20
10% diethyl ether in n-hexane	Lauric acid	38.00
15% diethyl ether in n-hexane	2 -Undecanoic acid	7.31
50% diethyl ether in n-hexane	Mixture of coumarins and tarry material	23.26

*Resolved and estimated by GLC.

2-Undecanone was identified by IR comparison with its standard spectrum:(3.5, 5.9, 6.8, 7.3, 8.7, 9.0, 14.3 nm). Lauric acid was identified through its m.p., 45° and IR: (3.2, 3.5, 5.9, 6.9, 7.8, 8.1, 9.4, 10.8, 13.4 nm). This compound has not been reported earlier to be the constituent of the essential oil of this species. 2-Undecanoic acid was also identified by IR. (2.0, 3.5, 5.9, 6.9, 7.1, 7.8, 9.0, 10.8, 14.0 nm) comparison with the standard spectrum of this acid.

The last fraction of the oil, as eluted from the column with 50% diethyl ether in n-hexane, is consisted of a mixture of coumarins and tarry material. The coumarins were not further separated and identified.

In the light of the present studies, it can be concluded that although the essential oil of *Scandix pecten-veneris* does not seem to possess any commercial importance because of its very small yield yet the pharmaceutical values of the oil may indeed be high. The value of the seed as medicine may have to be closely examined and from this point of view our successful cultivation of the plant will prove useful.

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REFERENCES

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