

CHEMICAL EVALUATION OF OIL FROM *DATURA ALBA*

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Summary. *Yield, physico-chemical characteristics and chemical composition of oil from the seeds of Datura alba were determined and the results obtained were compared with those of oil from Datura stramonium. It was concluded that this oil was of fair standard and like Datura stramonium oil could be used in pharmaceutical industry.*

Introduction. Datura oil is usually obtained from the seeds of *Datura stramonium* belonging to the family Solanaceae (6). This plant which is indigenous to Asia has now spread throughout Europe. L. Wallis states that *Datura stramonium* is indigenous to shores of Caspian Sea and is believed to have spread throughout Europe about the first century A.D. (10). According to him it is common now throughout Europe, Asia, America and South Africa occurring as weed growing in waste places at the edges of the roads and rubbish heaps in the warmer districts. It is now cultivated for drugs in South England, Germany, France and Hungary. Chopra on the other hand regards it to be indigenous to India where it grows abundantly throughout the temperate Himalaya from Kashmir to Sikkim (2).

In Pakistan *Datura stramonium* and *Datura alba* are common in Punjab, Baluchistan, Murree hills, Azad Kashmir and Abbottabad at an elevation ranging from 7000 ft. to 9000 ft. (11).

Review and Literature. 15-30% of fixed oil from the seeds of *Datura stramonium* was reported by Trease (9) whereas 17-25% of oil in the same seeds was reported by Jamieson (6). 11.0% of fixed oil from the seeds of *Datura fastuosa* was reported by S. Krishna and S.V. Puntambeker (7). It has also been reported by S. Krishna that this oil is used in medicines. The usual range of characteristics of oil from *Datura stramonium* as reported by Jamieson are: specific gravity at 15°C, 0.917-0.923, saponification value, 186-202, iodine value, 113-126, and unsaponifiable matter, 1.0-2.6% (6). T.P. Hilditch and M.B. Ichaporia examined an oil sample of *Datura stramonium* which gave the following characteristics: saponification value, 287, iodine value, 115.8, acid value, 6.7, and unsaponifiable matter, 1.9%. They also reported that the mixed Fatty acid contained the following percentages of constituents: oleic acid, 33.1%, linoleic acid, 53.6%, myristic acid, 1.3%; palmitic acid, 10.8%, and stearic acid, 1.2% (4). A.J. Lutenberg and S.L. Ivanov examined a sample of seed which contained 28.7% of oil. The characteristics of the oil were as follows: saponification value,

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190.1; iodine 126.3; acid value, 1.5. The mixed fatty acids contained the following percentage of constituents: oleic acid, 33.0%; linoleic acid, 55.1%; and saturated acids 11.9 per cent. The present study was taken up with a view to find the yield and chemical composition of the oil from the seeds of *Datura alba* plant and to compare it with the oil from the seeds of exotic species, in order to explore the possibility of its commercial utilization in pharmaceutical industry.

Material and Method. *Datura alba* seeds, collected from Baluchistan Forest Division were dried and cleaned. They were powdered in the willey mill and sieved through 20 mm. mesh. The oil was extracted in Soxhlet apparatus with the help of petroleum ether (40-60°C). The oil was purified following the methods given by Jamieson (6). The individual fatty acids in the oil were determined by fractional precipitation techniques followed by Rosenthaler (8). The determination of the physico-chemical constants were carried out with the methods given by A.O.A.C., Griffin, Jamieson and Jacobs (1, 3, 5, 6).

Results and Discussion. The yield of oil from the seeds of *Datura alba* was found to be 18.10%. It was encouraging enough as compared to the oil yield of *Datura fastuosa* (11.0%) reported by S. Krishna. Moreover the oil yield of *Datura alba* (18.10) falls in the agreeable range as prescribed by Trease (15-30%) and Jamieson (17-25%) in case of *Datura stramonium* (6, 9). The yield of oleic acid from the oil of *Datura alba* is comparable to that reported by S. Krishna but it is high than those reported by T.P. Hilditch and A.J. Lutenberg. Similarly the linoleic acid obtained from the oil of *Datura alba* compare well with that reported by S. Krishna but it is low as compared to those reported by T.P. Hilditch and A.J. Lutenberg. Probably this is due to the change in locality and time of collection of the seeds because these factors effect the oil yield and its composition to some extent. The oil after purification, was yellow in colour as compared to that of oil of exotic species and have almost the same odour and physico-chemical constants. Purification of oil did not involve any serious problem as the oil does not contain waxes, resins, too much colouring matter and disagreeable odour. The usual purification procedure with activated charcoal and then with small quantity of kiesel-ghur was carried out which gave yellow coloured oil having desirable odour. Physico-chemical constants as determined of the oil of *Datura alba* are compared below with those of oil from exotic species.

It is obvious from the above talble that the physico-chemical characteristics of the oil of *Datura alba* compare favourably well with those of *Datura stramonium*.

The observed chemical composition of the oil of *Datura alba* are compared below with those of oil from exotic species.

Physico-chemical constants	<i>Datura alba</i> Lab. Work	<i>Datura stramonium</i> (reported) (G.S. Jamieson)	<i>Datura stramonium</i> (reported) (T.P. Hilditch)	<i>Datura stramonium</i> (reported) (A.J. Lutenberg)
Specific gravity at 15°C	0.893	0.917–0.923	N.A.	N.A.
Refractive Index at 27°C	1.471	N.A.	N.A.	N.A.
Saponification value	187.940	186–202	287.0	190.1
Acid value	6.210	N.A.	6.70	1.5
Iodine value	112.500	113–126	115.80	126.3
Hehner value	78.06	N.A.	N.A.	N.A.

N.A. = Not available.

Name of Constituents	<i>Datura alba</i> (Lab. Work)	<i>Datura stramonium</i> (S. Krishna)	<i>Datura stramonium</i> (T.P. Hilditch)	<i>Datura stramonium</i> (A.J. Lutenberg)	<i>Datura stramonium</i> (Trease)
	%	%	%	%	%
Oil	18.10	N.A.	N.A.	28.70	15–30
Saturated fatty acid	33.20	N.A.	N.A.	11.90	N.A.
Unsaturated fatty acid	50.40	N.A.	N.A.	N.A.	N.A.
Unsaponifiable matter	2.70	1.107–2.13	1.9	N.A.	N.A.
Oleic acid	59.80	62.20	33.10	33.00	N.A.
Linoleic acid	26.42	15.0	55.1	53.60	N.A.
Palmitic acid	6.20	10.0	10.80	N.A.	N.A.

N.A. = Not available.

It was obvious from the above table that the values of *Datura alba* compare well with those of *Datura stramonium* reported by S. Krishna but they differ from the results reported by T.P. Hilditch and A.J. Lutenberg.

Conclusion. It was concluded from the study that:

- (i) The solvent extraction yielded good recovery of oil.

- (ii) The physico-chemical characteristics and chemical composition of the oil of *Datura alba* compare well with those of oil of exotic species.
- (iii) The oil of *Datura alba* was not inferior in quality and hence can be used in medicines like *Datura stramonium* oil.

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