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## THE FATTY ACIDS OF INDIGENOUS RESOURCES FOR POSSIBLE INDUSTRIAL APPLICATIONS

### Part VI. Investigations of the Species of Solanaceae Family

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#### INTRODUCTION

The importance of the plants of the family Solanaceae from medicinal as well as economic point of view, is well recognised. Potato tomato, tobacco, datura and belladonna are some of the common plants belonging to this family. This communication is in continuation of our work for exploiting non-conventional sources of oil, and presents studies on the seeds of *Nicotiana tabacum* (Tobacco), *Solanum esculantum* (Tomato), *Datura alba* (Datura) and *Solanum xanthocarpum*. These are either grown as crops and/or are found wild particularly in Punjab and Areas of Azad Kashmir.

#### EXPERIMENTAL

i) *Extraction and Examination of Oil.* Suitable quantities (1–2 lb) of seed samples of all the species were separately extracted with hexane. The solvent was removed from the dried extracts under nitrogen atmosphere to yield clear oils. The percentage of oil in the samples and their physicochemical characteristics were determined by the methods of Cocks and Van Rede [1].

ii) *Analysis of Component Fatty Acids of Oils.* The oils (5.0 g) were separately saponified with alcoholic caustic potash, (0.5 N, 50 ml). Fatty acids were liberated from the aqueous soap solution by treatment with 2 N sulphuric acid and were converted to their methyl esters, which were subsequently analysed by GLC using a column of polyethylene glycol succinate (PEGS 10%) on gas chrom Z support (80–100 mesh) and nitrogen as the carrier gas.

#### DISCUSSIONS

Both Tobacco and Tomato are cultivated mainly for the leaves and fruits, respectively. However, the seeds of

these plants have so far not been considered as a source for the recovery of oil. It is reported that oil is being recovered from tobacco seeds in Romania, Bulgaria, Italy and Turkey [2].

The present study shows that the yield of oil (Table 1) from cultivated *Nicotiana tabacum* (18%) and *Solanum esculantum* (20%) and wild growing *Datura alba* (15.5%) is fairly high. However, the oil yield from *Solanum xanthocarpum* is rather low (5-7%). Since both *Nicotiana tabacum* and *Solanum esculantum* are available as crops, their seeds can be obtained easily for the recovery of oil. The wild growing *Datura alba* and *Solanum xanthocarpum* seeds are also easy to collect because of the abundance of these weeds in Pakistan and, though non-conventional yet, poten-

Table 1. Physicochemical characteristics and the fatty acid composition of the seed oil from different species.

Species	<i>Nicotiana tabacum</i>	<i>Solanum esculantum</i>	<i>Datura alba</i>	<i>Solanum xanthocarpum</i>
Oil yield (%)	18.1	20.0	15.5	5.0
Free fatty acid (%)	2.7	2.3	1.1	2.2
Saponification value	190.0	194.2	195.3	193.4
Iodine value	136.0	124.5	119.9	119.0
Unsaponifiable matter (%)	1.3	1.2	1.2	1.5
<i>Fatty acids</i>				
C <sub>12</sub> :0	3.0	—	3.6	0.4
C <sub>14</sub> :0	2.3	1.9	4.0	0.3
C <sub>16</sub> :0	10.0	14.2	13.9	11.3
C <sub>16</sub> :1	—	—	—	1.3
C <sub>18</sub> :0	6.0	5.9	4.5	5.0
C <sub>18</sub> :1	17.3	22.5	32.3	22.7
C <sub>18</sub> :2	61.2	49.0	41.7	56.8
C <sub>18</sub> :3	Traces	6.5	—	2.2

tial source of vegetable oil is readily available for exploitation. Further, if an attempt is made in this direction, almost 10600 tons of tobacco seeds can be worked up every year to produce about 1950 tons of quality oil (18% recovery). Similarly tomato seeds collected from the factories processing @ 1800 tons tomato every year can yield 36 tons of seed[3].

The fatty acid profile of all the four species examined (Table 1) resembles that of the other family members reported in the literature [4]. In all these oils, the major component acids are linoleic and oleic acids while stearic and myristic acids are in minor amounts. However, traces of lauric and linolenic acids have also been detected. Because of higher percentage of linoleic acids, these oils can be used

for edible purposes after proper refining.

#### REFERENCES

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