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**– Short communication**

# FATTY ACID COMPOSITION OF RIPE SEED OIL OF *NYCTANTHES ARBOR-TRISTIS* L.

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ABSTRACT

The fatty acid composition of the ripe seed oil of *Nyctanthes arbor-tristis* L. (Bengali: Seuli) were determined by GLC. The major constituent of the oil was found to be stearic acid, 39.06%. The relative percentages of other major fatty acids were found to be lauric acid, (4.46); linoleic acid, (7.89); oleic acid, (7.97). The yield of the seed oil was found to be 7.29% on extraction with pet-ether (b. p. 40°C - 60°C). Acid value of seed oil was found to be 55.44 and suggests that this oil is inedible.

Key words: *Nyctanthes arbor-tristis*, Ripe seed oil, Fatty acid composition

*Nyctanthes arbor-tristis* L. (Oleaceae) commonly known as Seuli has two species (Eva and Albert 2000). It is a $C_3$ plant (Rao and Kodandaramaiah 1982) and distributed throughout East Asia. It is a large shrub, 15 - 25 feet high and is widely cultivated as a garden plant throughout Bangladesh. The seeds are known for their use in Ayurvedic system of medicine for throat, leprosy, eye diseases, skin infections, intestinal worm infection etc. (Singh and Jindal 1985).

With the increasing demand of vegetable oils in the country, investigations on the oil seeds of plant origin have assumed great importance. For a better evaluation, analysis of fatty acids of Seuli seeds oil was undertaken in the present study.

The ripe seeds of matured Seuli plants were collected from Gandaria area of Dhaka city in Bangladesh during the months of February to March, 2002. The collected seeds were cleaned, dried (70°C for 2 hours) and crushed mechanically.

Physico-chemical characteristics *viz*. appearance, refractive index, acid value, iodine value and fatty oil of Seuli ripe seeds were determined as per standard method (National Inst. of Nutrition 1976, Royal Charter 1958, Mowlah *et al*. 1990) and the results are shown in Table 1.

Hundred gm of dried powdered samples of Seuli seeds were extracted with petroleum ether (40 - 60°C bp) in a Soxhlet extractor for 18 hrs. The evaporation of the

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extract was carried out with the help of a Rotary Vacuum Evaporator (Buchii, Switzerland) at bath temperature not exceeding 40 - 50°C. The oil sample was kept in nitrogen atmosphere in a refrigerator.

The esterification of the oil was done with $BF_3$ - MeOH complex (Griftin 1960). Five mg of oil was taken in a reaction tube and $BF_3CH_3OH$ reagent (5 ml) was added**.** The mixture was boiled for 5 min. Hexane (5 ml) was added to it and boiled for further 1 min. After cooling the tube, a solution of saturated salt was added and vortexed. Then the upper layer containing methyl esters was transferred to a vial with anhydrous sodium sulfate at the bottom. Then the ester was filtered through syringe filter and transferred to a small vial (2 ml). The residual solvent was removed by blowing nitrogen gas and stored in a refrigerator before analysis by GLC.

Standard fatty acid methyl esters (LIPID STANDARD; Sigma) were used for the identification of the peaks. The standards comprised of the methyl esters of caprylic acid, nonanoic acid, capric acid, undecanoic acid, lauric acid, myristic acid, palmitic acid, linoleic acid, oleic acid, stearic acid, arachidic acid and behenic acids. The fatty acids in the experimental samples were identified by comparing their retention time and peak positions. Relative percentage of the fatty acids were also determined (Fig. 1) by comparing their peak areas (Peak area = ½ × peak height × peak width).

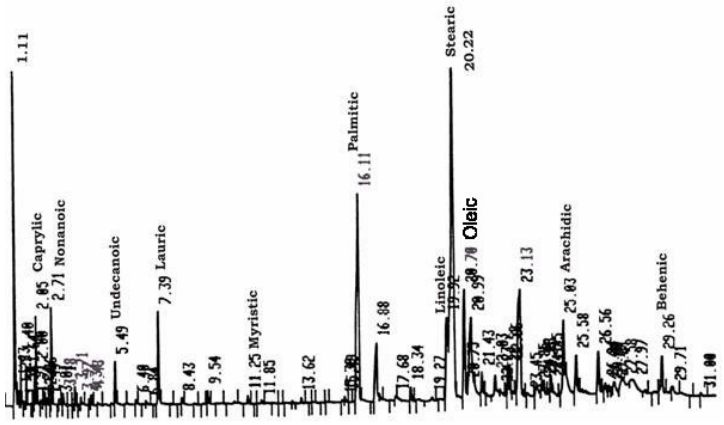


Fig. 1. GLC of methyl ester of Seuli ripe seed oil.

The fatty acid methyl esters were quantified by gas-liquid chromatography method using a capillary column (2000 mm × 4 mm) equipped with a flame ionization detector (Pye Unicam 4500). Column packing was done with 10% diethylene glycol succinate on 100 - 120 mesh diatomic CAW with column temperature 100°C, detector temperature 220°C, hydrogen flow rate 4 ml/min and samples volume of injected 0.1 ml.

## RESULTS AND DISCUSSION

The oil was light yellowish colour and appeared as a translucent viscous oily liquid at room temperature of 29 - 30°C. The yield of the oil was 7.29%. From seed kernels, Vasistha (1938), Tyagi and Vassishtha (1983) and Turnbull *et al*. (1957) reported 14, 14 and 12 - 16% of oil, respectively.

**Table 1. The physico-chemical properties of the oil.**

| SI. No. | Characteristics of ripe seed oil | Result |
|---|---|---|
| 1 | Appearance | Translucent, viscous oily liquid and light yellowish colour |
| 2 | Refractive index (at 29°C) | 1.4737 |
| 3 | Acid value | 55.44 |
| 4 | Iodine value (Hanus) | 41.04 |
| 5 | Fatty oil | 7.29% |

The refractive index of the oil was found to be 1.4737 at 29°C which indicates that the oil contains long chain fatty acids. Acid value and iodine values (Henus) of seed oil were found to be 55.44 and 41.04, respectively. High acid value indicates that this oil is inedible.

Gas liquid chromatography was employed for the determination of the FAME composition ripe seed oil of seuli. The relative percentage of the individual acids are shown in Table 2.

**Table 2. Fatty acids composition of seuli ripe seed oil.**

| Name of the acids | Retention time (min) | Area (mm) | Relative % |
|---|---|---|---|
| Caprylic | 2.05 | 7225 | 2.16 |
| Nonanoic | 2.71 | 9476 | 2.83 |
| Undecanoic acid | 5.49 | 5718 | 1.71 |
| Lauric ” | 7.39 | 14922 | 4.46 |
| Myristic ” | 11.25 | 1292 | 0.39 |
| Palmitic ” | 16.11 | 5984 | 1.79 |
| Linoleic ” | 19.92 | 26397 | 7.89 |
| Stearic ” | 20.22 | 130620 | 39.06 |
| Oleic ” | 20.70 | 26638 | 7.97 |
| Arachidic ” | 25.03 | 12420 | 3.72 |
| Behenic ” | 29.26 | 8362 | 2.5 |
| Unknown | 16.88 | 16025 | 4.79 |
| Unknown | 20.99 | 26359 | 7.88 |
| Unknown | 23.13 | 42992 | 12.85 |

There are three unidentified peaks in the chromatogram with retention times 16.88, 20.99, 23.13 min and relative percentage of 4.79, 7.88 and 12.85, respectively. It is evident from Table 2 that the percentage of stearic acid was highest and the oil therefore may be tapped as a source of stearic acid. Myristic and undecanoic acids were present in small amounts in the oil. Unsaturated fatty acids *viz*. oleic and linoleic acids were found to be of moderate quantity. Vasistha (1938) reported that fatty acids *viz*. linoleic, oleic, lignoceric, stearic, palmitic and myristic acids are found in the seed kernel.

## CONCLUSION

Higher percentage of stearic acid was found in the oil of ripe seeds and is the main component of the oil. The oil obtained form seuli seed dose not satisfy the requirement as edible. It may be used for non-edible commercial and medicinal purposes.

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