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**STUDIES ON THE CHARACTERIZATION FATTY ACID COMPOSITIONS OF PETULI  
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M.A. KHALEQUE, M.A. HYE AND M.A. ISLAM

Bangladesh Council of Scientific and Industrial Research Laboratories (BCSIR), Rajshahi-6206.

Corresponding author & address: Md. Abdul Khaleque, E-mail: dtbcsir12@gmail.com  
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**ABSTRACT**

Khaleque MA, Hye MA, Islam MA (2012) Studies on the characterization fatty acid compositions of petuli (*Trewia nudiflora* Linn.) seed oil and its application for the preparation of water proof cotton cloth. *Int. J. Sustain. Crop Prod.* 7(3), 47-49.

Studies were carried out on the characterization fatty acid compositions of petuli seed oil and its application for the preparation of water proof cotton cloth. It was found that petuli seed grown under the soil and climatic condition of Bangladesh contains 22% pale-yellow coloured oil. The physico-chemical properties of the oil were studied by the conventional methods and fatty acid compositions by GLC. The results revealed that the oil can be used suitably for the preparation of water proof cotton cloth on account of its higher iodine value (148) and the unsaturated fatty acid component  $\alpha$ -eleostearic acid (38.50%) content. The prepared water proof cotton cloth was found to be water proof after immersed in water.

**Key words:** *petuli seed oil, physico-chemical properties, GLC, fatty acid, water proof cotton cloth*

**INTRODUCTION**

Petuli tree is an uncultivated medium size tree having the botanical name *Trewia nudiflora* Linn. It grows more or less in all the districts of Bangladesh but thrives well in the northern part of the country. It likes to grow in moisty and swampy places and bears a lot of fruits. Its seed is wasted every year in huge quantity although it is a good source of non-edible oil, reported to contain 21.6% oil having drying property (Anonymous 1976). The oil shows good stability in accelerated oxidation tests inspite of its relatively higher unsaturation (Riemenschneider *et al.* 1945). The oil is similar in composition to tung oil and can be used in surface coating industry (Sarker *et al.* 1956). The oil is also a good source of  $\alpha$ -eleostearic acid (Vaughan 1970), which may be a cheap potential raw materials for the preparation of water proof cotton cloth. In our previous paper (Mondol *et al.* 2006). Studies on the preparation of powerful phenyl from petuli seed oil have been reported, information on the characterization, fatty acid compositions of petuli seed oil and its application for the preparation of water proof cotton cloth is lacking. So the present study is an attempt in this direction.

**MATERIALS AND METHODS**

Ripe mature petuli seeds were procured from locally. The seeds were then deshelled manually and the kernels thus obtained were crushed into smaller particles in an iron mortar and dried in the oven at a temperature of 105°C. The oil was then extracted in a soxhlet apparatus using the solvent ethyl-acetate for 8 hours. The extracted solvent was removed by a rotary vacuum evaporator under reduced pressure and calculated the percentage of the oil. The specific gravity of the oil was determined at 28°C with the help of a pycnometer. Refractive index, moisture and volatile matters in the oil were determined by the Standard IUPAC method (Anonymous 1979). The percentage of free fatty acid (as oleic) saponification value, iodine value, peroxide value and unsaponifiable matter in the oil were also determined by the Standard AOCS method (Anonymous 1980). Hanus method (Anonymous 1955) was followed to determine the iodine value of the oil.

**Analysis of fatty acid compositions**

Fatty acid compositions of the petuli seed oil were analyzed as their methyl esters which were prepared by the Bron-trifluoride methanol method (Morrison *et al.* 1964). Analysis was carried out by a GCD-Pye unicam Gas liquid Chromatographic instrument equipped with a flame ionization detector. Nitrogen carrier gas was used at a flow rate of 25 ml/min. The column was operated isothermally at 190°C. The injector and detector temperature was maintained at 230°C for all GLC analysis. Gas Chromatographic peaks were identified by comparison with standard methyl esters with respect to retention time against equivalent carbon length. The peak areas were determined by multiplying peak height by peak width at half height. The percentage of each peak was calculated as the percentage of the total area of all the peaks.

**Preparation of water proof cotton cloth**

100-g petuli seed oil was taken in the experiment. One part of the experiment, 50g petuli seed oil was taken in a conical flask and dissolved the oil by adding 50ml ethylacetate. Then the other part of the experiment, the rest 50g petuli seed oil was taken in conical flask and 2% sebacic acid at the weight of oil taken was added with it and shaken well. Now the above two experiments were mixed together and shaken well. The product thus obtained which was then sprayed on cotton cloth and dried the cloth.

Table 1. Physico-chemical properties of the petuli seed oil

| Sl. No. | Physico-chemical properties   |             |
|---------|-------------------------------|-------------|
| 1.      | Percentage of the oil         | 22          |
| 2.      | Milting point                 | 30°C - 31°C |
| 3.      | Refractive index at 28°C      | 1.4556      |
| 4.      | Specific gravity              | 0.921       |
| 5.      | Free fatty acid (as oleic)    | 1.6         |
| 6.      | Saponification value          | 185         |
| 7.      | Iodine value                  | 148         |
| 8.      | Peroxide value                | 0.50        |
| 9.      | Moisture and volatile matters | 0.115       |
| 10.     | Unsaponifiable matters        | 0.25        |

Table 2. Fatty acid comparison of petuli seed oil

| Sl. No. | Fatty acid                                      | wt. percentage |
|---------|---|----------------|
| 1.      | $\alpha$ -elaeosteric acid (C <sub>18:3</sub> ) | 38.00          |
| 2.      | oleic acid (C <sub>18:2</sub> )                 | 34.80          |
| 3.      | Linoleic acid (C <sub>18:1</sub> )              | 26.20          |
| 4.      | Arachidic acid (C <sub>20:0</sub> )             | 1.00           |

## RESULTS AND DISCUSSION

The solvent extraction method petuli seed yielded 22%. Pale-yellow coloured oil. The physico-chemical properties of the oil were determined by the conventional methods and the results were shown in Table 1. From the results it is found that the specific gravity and refractive index of the oil were normal in composition with vegetable oil (Hilditch 1949). But the iodine value of the oil is predominant which is more or less good agreement with the reported results of (Wig 1948). The fatty acid compositions of the petuli seed oil were analyzed as their methyl esters by GLC and the results were presented in Table 2. From the results of GLC it is found that the unsaturated fatty acids present in the oil are  $\alpha$ -elaeosteric acid (38.00%), oleic acid (34.80%), linoleic acid (26.20%) and small amount of saturated fatty acid arachidic (1%) acid.

From the results in Table 1 and 2, the iodine value and the unsaturated fatty acid component  $\alpha$ -eleostearic acid contain of the oil are found to be high and these properties of the oil makes very suitable for the preparation of water proof cotton cloth.

The prepared materials were applied on cotton cloth and dried the cloth. Then the cloth was immersed in water and found no effect of appearance.

## CONCLUSION

Petuli tree bears a lot of fruits. Its seed is wasted every year in huge quantity although it is a good source of non-edible (22%) oil. It helps to bridge the oil gap in the country. From the fatty acid analysis it is found that the amount of unsaturated fatty acid  $\alpha$ -eleostearic acid is high. So the oil may be considered as a good source of unsaturated fatty acid. Moreover for its higher iodine value and  $\alpha$ -eleostearic acid contain the oil may be used for the preparation of water proof cotton cloth.

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