Introduction

Numerous medicinal plants are known possessing UV absorbing property. Few of them are, Azadirachta indica, Ocimum sanctum, Calotropis gigantea L., Aloe vera, Mentha piperita, Lycopersicon esculantum and Carica papaya [1,2]. Syzygium cumini L. (family Myrtaceae) is a tropical fruit tree of great economic importance. It is a large evergreen tree up to 30 m height and a girth of 3.6 m with a bole up to 15 m. The plant is native to Nepal, Pakistan, Bangladesh, India, and Indonesia. In India the plant is found almost everywhere. In English the plant is known as Jambul tree. In Hindi, Bengali, Punjabi, Tamil, Gujarati and Malayalam the plant is called as Jamuna, Jaam, Jammun, Naval, Gambu and Njaval respectively [3]. S. cumini L has several medicinal properties. Leaf has anti-viral, anti-bacterial, anti-diabetic, anti-allergic, anti-DNA damage and anti-oxidant activities. Seeds exert anti-inflammatory and anti gastric ulcer activity. Fruit is anti-hyper lipidemic, possessing anti-cancer property. Bark and pulp of the plant are efficacious for diabetes [4].

Phytochemical studies showed that stem bark of S. cumini L contains n-hentriacontane, n-octacosanol, n-triacontanol, betulinic acid, β-sitosterol, categolic (maslinic) acid, acid soxalic, citric acid, glycidic acids, β-sitosterol-D-glucoside, quercetin, myricetin, astragalin kaempferol-3-o-glucoside, friedelin, epifriedelanol , euugenin and gallic acid. Leaves contain n-hepatcosane, n-nonacosane, sitosterol, betulinic acid, kaempferol 3-0-β-D-glucuronopyranoside, ellagitannin, nilocitin, myricetin 3-0-β-D-glucaronopyranoside and aminoacids like glycine, alanine etc. Quercetin, kaempferol, oleanolic acid, erategolic acid (maslinic acid), and myricetin flavonoids -isoquercitrin were found in the flowers of S. cumini [5,6].

Recently we have noted that acetone extract of S. cumini L leaves possesses UV absorbing property [7]. In the present study effect of season on UV absorbing property of S. cumini L leaf was investigated. Efforts were also made to estimate number of phenolic compounds in S. cumini L leaves in different seasons as there is a positive correlation between number of phenolic compounds in plant’s leaf and its UV absorption property [8].

Methodology

Plant material

S. cumini L leaves were collected from the medicinal plants garden of the University of North Bengal, Siliguri (26°41’30.9984" N, 88°02’7.45756" E, elevation, 410 ft). Dist. Darjeeling, West Bengal, India during Autumn (September – November), Winter (December – February), Summer (March - May) and rainy season (June – August) at about 9 am. Leaves were authenticated by the experts of the department of Botany.
of the said university. A voucher specimen was kept in the department of Medical Biotechnology, Sikkim Manipal Institute of Medical Sciences of the Sikkim Manipal University, Gangtok, Sikkim, India for future references. (Figure 1).

Extraction of the Plant Leaves

Collected leaves of S. cumini L. of different seasons were washed thoroughly. Leaves were then shade dried and separately powdered. The powder (100g) was extracted with 500 ml of acetone in a soxhlet apparatus at 370 C for 15 minutes. Mixture was then filtered. Filtrate was made to dryness by using lyophilizer. Brown mass obtained.

UV Ray Absorption Study

Brown mass (10 mg) obtained from the extraction process was dissolved in 100 ml distilled water. The solution was processed in a spectrophotometer for UV ray absorption at the range of 200-400 nm. Each experiment was done for three times and mean value calculated.

Total phenols content

10 mg of the brown mass obtained in extraction process was dissolved in 100 ml distilled water and total phenols content of the solution was determined by the method of McDonald et al. [9]. Here also each experiment was done for three times and mean value calculated.

Chemicals

Chemicals required for the study were purchased from Himedia Lab, Loba Chem. Lab, India and from Merck, Germany.

Statistical Analysis

Data were analysed statistically by SPSS 20. The statistical significance between UV absorption spectra of different extracts was evaluated with Duncan’s multiple range test (DMRT). 5% was considered to be statistically significant [10].

Results and Findings

UV absorption spectra of acetone extract of S. cumini L. leaves of rainy season is shown in (Figure 2). The extract absorbed maximum UV ray at 200 nm wave length which was 1.5. UV ray absorptions by the same extract at 250 nm, 300 nm, 350 nm and 400 nm wave lengths were found 0.8, 0.6, 0.3 and 0.18 respectively (Figure 3), shows UV absorption spectra of acetone extract of S. cumini L. leaves of winter. At 200 nm wave length the extract absorbed maximum UV rays. Value was 1.2. At 250 nm, 300 nm, 350 nm and 400 nm wave lengths the same extract of S. cumini L. leaves showed absorption 0.75, 0.5, 0.25 and 0.15 respectively.

UV absorption spectra of S. cumini L. leaves of summer is shown in (Figure 4). The extract showed maximum UV absorption at 200 nm. It was 1.0. UV ray absorptions by the same extract at 250 nm, 300 nm, 350 nm and 400 nm wave lengths were 0.7, 0.5, 0.2 and 0.1 respectively (Figure 5), shows UV absorption spectra of acetone extract of S. cumini L. leaves of autumn. At 200 nm the extract absorbs maximum UV rays. It was 0.92. At 250 nm, 300 nm, 350 nm and 400 nm wave lengths acetone extract of S. cumini L. leaves, however, showed absorption 0.67, 0.48, 0.15 and 0.08 respectively.
Effect of season on amount of phenolic compounds in S. cumini L. leaves is shown in (Figure 6). S. cumini L. leaves collected during rainy season had 63.0 mg phenolic compounds in 1 g dry wt of the leaves whereas S. cumini L. leaves collected during winter, summer and autumn had 40.0, 35.0, 30.0 mg of phenolic compounds per g dry wt of the leaves respectively (Figure 7).

When compared the UV absorbing property of acetone extract of S. cumini L. leaves of different seasons, we have noticed that S. cumini L. leaves collected during rainy season had maximum UV absorbing property in 200 nm followed by S. cumini L. leaves collected during winter, summer and autumn (Figure 7). This is probably the influence of climate of different seasons on secondary metabolites in medicinal plants. Several authors demonstrated that season can change amount of bio active compounds in different parts of the plants [14-23].

In the present study we also estimated number of phenolic compounds in S. cumini L. leaves of different seasons. Results showed that S. cumini L. leaves of rainy season had maximum number of phenolic compounds (Figure 6). This high number of phenolic compounds may have correlation with maximum UV absorbing property of S. cumini L. leaves of rainy season.

Ebrahimzadeh et al. also showed a positive correlation between number of phenolic compounds in plant’s leaf and its UV absorption property [8]. UV absorption property of S. cumini L. leaves may be due to presence of other compound(s) apart from phenolics. Presently work is now going on in this direction.

**Conclusion**

Acetone extract of S. cumini L. leaves of rainy season contains high number of phenolic compounds and has maximum UV radiation absorbing property.

**Recommendation**

In preparation of sun screen lotion and other UV guard materials acetone extract of S. cumini L. leaves of rainy season may be used.

**Acknowledgement**

We gratefully acknowledge the cooperation of taxonomists of the department of Botany, University of North Bengal, Siliguri, Dist. Darjeeling, West Bengal for identification of S. cumini L. leaves.

**Conflict of Interest**

Nil
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DOI: 10.19080/GJPPS.2018.06.555687

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How to cite this article: Prasenjit M, Prasanta K M, Tanaya G. Effect of Season on UV Absorbing Property of Syzygium cumini L. Leaves. Glob J Pharmaceu Sci. 2018; 6(3): 55568. DOI: 10.19080/GJPPS.2018.06.555687.