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Shahin A *et al.*
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Original Article

Spectroscopic Analysis of *Abroma augusta* Ethanolic Leaf Extract by UV & FT-IR

Tahmina Khondokar Mitu [1], Shahin Aziz [2, *], Md. Sharif Al-Reza[1]

[1] Department of Applied Chemistry and Chemical Engineering, Islamic University, Kushtia 7003, Bangladesh
[2] Senior Scientific Officer, Chemical Research Division, BCSIR Laboratories, Dhaka-1000, Bangladesh Council of Scientific and Industrial Research, Dhaka, Bangladesh

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ABSTRACT

Abroma augusta is an important medicinal plant. In Bangladesh the plant is known as "Ulatcombol." The present work deals with UV and FT-IR spectroscopy of ethanolic leaf extract of *Abroma augusta*. The spectrum shows the presence of Carbonyl group (ketone), amine group, amide group, aldehyde group. The above information is mainly contributed to medicinal utility of the plant.

Keywords: *Abroma augusta,* UV spectroscopy, FT-IR spectroscopy, flavonoids.

Corresponding author *
Shahin Aziz
Senior Scientific Officer
Chemical Research Division, BCSIR Laboratories
Bangladesh Council of Scientific and Industrial Research,
Dhaka, Bangladesh.Dhaka-1000, Bangladesh
E-mail: shaziz2408@yahoo.com

1. INTRODUCTION

Abroma augusta (Family: Sterculiaceae) is known as ulatkombal in Bangladesh. It is a shrub and small tree, attaining a height of 3-5 meters with horizontal and velvety branches. The leaves are polymorphous about 10-30 cm. Long and 6-18 cm. Broad, repand-denticulate, base 3-7 lobed, cordate nerved. The flowers of these plants are 5 cm. in diameter, dark red, purple or yellow occurring on few-flowered cymes. Sepals are 2.5 cm. Lanceolate, free nearly to the base. Petals are scarcely exceeding the sepals, imbricate in bud, deciduous. And fall soon. Stemens are

present on short stamina tube.F ive staminoides are present. Capsules are almost 4 cm. Long, obpyramidal, membranous finally pubescent, and truncate at the apex. Capsules are thrice as long as the persistent calyx. Each carpel has a triangular wing behind it. Flowering and fruiting occur in December and January. Seeds are small, blackish, covered with silky hairs[1, 2, 3]. The leaves are shown in picture 1.

Fig 1: Leaf of *Abroma augusta*

Abroma augusta has a long history of medicinal use in the Ayurvedic system. It is highly possesses in gynecological disorders. It regulates the menstrual flow and also used as an abortifacient and anti-fertility agent. In India, it is used in dysmenorrhea but in Indonesia, it is used in scabies. It is used in dermatitis, anti-inflammatory and analgesics. The leaves and stems of *Abroma augusta* were used by the traditional healers of Bogra district, but the bark of roots was used by the traditional healers of Jessore district [4].

The aim of current research *Abroma augusta (A. augusta)* ethanolic leaf extract by UV and FT-IR spectroscopy to gain knowledge about the functional groups available in different secondary metabolites in this potential plant. This analysis will carry the understanding of the validation of medicinal uses of this plant.

2. MATERIAL AND METHODS

2.1 Collection and identification of the plant sample

Fully matured fresh leaves of *A. augusta* were collected from the area of were collected from the campus of Bangladesh council of scientific and industrial research, BCSIR, Bangladesh in ***December*** 201***6*** and identified by the taxonomist of Bangladesh National Herbarium, Dhaka, where a voucher specimen (**No. =43071**) has been deposited.

2.2Plant materials preparation

The matured leaves of the plant were washed to remove dirt, and it was air-dried. Then it was oven-dried at a reduced temperature less than 450°C to make it suitable for grinding purpose. The screened (20 mesh) powder was then stored in an air-tight container with marking for identification and kept in a cool, dark, and dry place for future use.

2.3 Solvents and Chemicals

Analytical or laboratory grade solvents and chemicals were used in these experiments. All solvents and regents used in the experiments were procured from E. Merck (Germany), BDH (England).

2.4 Preparation of ethanolic leaf Extract

For the process of extraction, powered leaf material (150g) are submerged in ethanol in an air-tight separating funnel for five days at room temperature with occasionally shaking and stirring. The major portion of the extractable compounds of the plant material will be dissolved in the solvent during this and hence extracted as a solution. Then the extract was dried by using a rotary evaporator to get ethanol (3.0 g) extract. Thus, the extract was collected by standard method. [5, 6].

3. RESULTS AND DISCUSSIONS

3.1 UV Spectroscopy

Standard protocol were applied to get UV spectrum [7,8]. The UV absorbance spectra of ethanolic leaf extract of *A. augusra* were recorded in the range of 272 - 339 nm. The UV spectrum of *Abroma augusra* shows weak absorption bands at 315.86 nm is due to the aromatic nature of compound, α-β unsaturated ketones and aldehydes. These weak bands indicate flavone and fisetin types of flavonoids. A broad band at 289.30 nm indicates the presence of 3° amine. There is a band at 288.04 nm reveals the presence of Amide group (protein). There is a band at 286.24 nm due to Alkene group (Naphthalene). The band at 285.82 nm shows the presence of an Amino group (Aniline). The characteristic band at 285.00 nm is due to Ketones, aldehydes group. The band at 283.02 nm indicates the functional group of the Aldehyde group. Here the band at 281.30 nm, 280.86 nm. 279.98 nm is due to Ketones group. The sharp band at 274.32 nm, 273.22 nm, and 272.48 nm is due to Alkene group. (Figure No. 2, Table No. 1).

Table 1: UV spectroscopy of ethanolic leaf extract of *Abroma augusta*

SI.No.	Wavelength nm	Abs.	Chromatographic group
1	315.86(1)	-1.688	Aromatic Group
2	289.30 (40)	-0.703	3° amine
3	288.04(42)	-0.276	Amide group (protein).
4	286.24(44)	-0.351	Alkene group (Naphthalene).
5	285.82(45)	-0.635	Amino group (Aniline).
6	285.30(46)	-0.478	Ketones, aldehydes group.
7.	283.02(49)	-0.217	Aldehyde group.
8.	281.30(50)	-0.190	Ketones group.
9.	280.86(51)	-0.327	Ketones group.
10	279.98(52)	-0.310	Ketones group.
11.	278.60(54)	-0.556	Alkene group.
12.	274.32(61)	-0.514	Alkene group
13.	273.02(62)	-0.162	Alkene group.
14.	272.48(63)	-0.406	Alkene group.

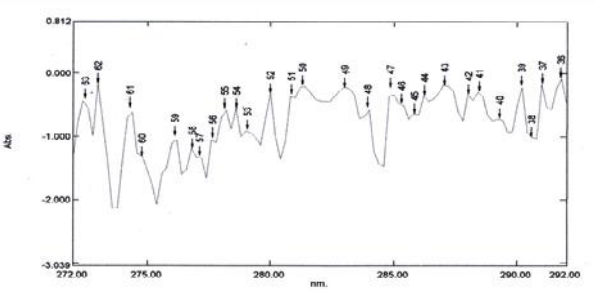

Fig 2: UV spectrum of ethanolic leave extract of *Abroma augusta*

3.2 FT-IR Spectroscopy

The FT-IR spectrum shows the peak at 638.59 cm-1 indicates the presence of alkyl halides. The sharp peak at 880.46 cm-1 is due to alkyl halides. The FT-IR spectrum and peak are presented in Figure -3 and Table-2, respectively.

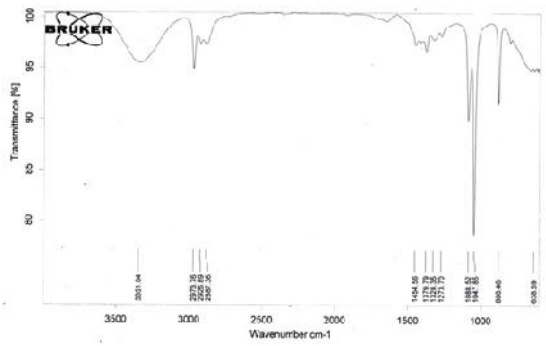

Fig 3: FT-IR spectrum of ethanolic leave extract of *Abroma augusta*

The very sharp peak at 1047.85 cm-1 shows the presence of compound S=O stretching vibrations, thiocarbonyl group, sulfoxides and NaQSA [Sodium Salts of Quercetin 5' Sulfonic Acid]. The presence of the sulfur compound, thiocarbonyl group, and NaQSA [Sodium Salts of Quercetin 5' Sulfonic Acid] further supported by the strong peak at 1088.52 cm-1. A peak 1328.35 indicates the presence of aromatic amine group. The peak at 1454.56 cm^{-1} shows the presence of aromatics group. The peak at 2973.76 cm^{-1} shows the presence of alkanes group. A sharp peak at 3363.82 cm^{-1} shows the presence of amines.

Table 2: FT- IR spectroscopy of ethanolic leaf extract of *Abroma augusta*

SI. No.	Peak cm^{-1}	Functional group
1	3351.04	Amines stretching
2	2973.76	Alkanes stretching
3	1454.56	Aromatics
4	1328.35	Aromatics amines
5	1088.52	Aliphatic Amines
6	1047.85	Aliphatic Amines
7	880.46	Alkyl halides
8	638.59	Alkyl halides

4. CONCLUSION

This investigation has gives preliminary information to determine the chemical composition of *Abroma augusta* leaf. The presence of these functional groups in plant extract confirms the correct use of this plant in the traditional medicinal system. It also holds for the production of novel drugs with the isolation of specific compound.

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