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R E S E A E C H A R T I C L E

Spectroscopic Analysis by UV &FT-IR of *Cassia obtusifolia* Seed Ethanolic Extract and Phytochemical Screening

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A B S T R A C T

Cassia obtusifolia is an important medicinal plant medicinal plant. The present work deals with phytochemical screening, UV and FT-IR spectroscopy of ethanolic extract of Cassia obtusifolia seed. In phytochemical screening the extract shows the presence of carbohydrates, glycosides, phytosterols, terpenoids, phenolic compounds, tannins, proteins, amino acids, flavonoids, gum and mucilage. The UV and FT- IR spectroscopy of ethanolic extract of *Cassia obtusifolia* seed shows the presence of aromatic nature of compound, 3° amine, amide, alkene (Naphthalene), Amino , Ketones, aldehydes, alkyl halides, aliphatic amines, alkanes, alkenes. The above mention bioactive compound are mainly contributed in medicinal utility of the plant.

Keywords: Cassia obtusifolia, phytochemical, UV spectroscopy, flavonoids, chromophoric groups.

A R T I C L E I N F O

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C O N T E N T S

1. Introduction

Cassia obtusifolia is locally known as chakunda in Bangladesh with family; Fabaceae. The seed of *Cassia obtusifolia* is used as blood lipid lowering drugs, antioxidant, antimicrobial, antidiuretic, antidiarrhoeal,

antihepatotoxic and antimutagenic [1-4]. Its major bioactive constituents are anthraquinones, such as aurantio-obtusin, obtusin, alaternin, etc. [5]. These constituents are well documented to possess anti-inflammatory activity. The leaves of this plant are being used traditionally to get relief from vomiting, stomach-ache and head-ache [6]. The seeds of *Cassia obtusifolia* , a plant widespread across North, Central, and South America; Asia; Africa; and Oceania, have been used in traditional Korean, Japanese, and Chinese medicine to treat eye inflammation, photophobia, and lacrimation [7], in addition to dysentery, headache, and dizziness [5]. Furthermore, *Cassia obtusifolia* extract (COE) has been reported to have an anti-helicobacter pylori effect, inhibitory actions on the growth of *Clostridium perfringens* and *Escherichia coli*, estrogenic effects, and inhibitory effects on histamine release from mast cells and platelet aggregation [8-11]. A recent study also reported that *Cassia obtusifolia* can attenuate memory impairments in mice induced by scopolamine administration or transient bilateral common carotid artery occlusion and that these effects were mediated via acetyl cholinesterase inhibition [12]. The aim of current study was to analysis the ethanolic extract of *Cassia obtusifolia* seed by UV & FT-IR along with phytochemical screening to get knowledge about the functional groups present in various secondary metabolities in this important medicinal plant. This will serve the knowledge about the justification of medicinal uses of seeds of this plant.

2. Materials and Methods

Collection and identification of the plant sample

Plant materials preparation:

The matured seeds (Figure1) of *Cassia obtusifolia* were washed to remove dirt and it was air-dried. Then it was oven-dried at reduced temperature less than 45^0C to make it suitable for grinding purpose. The screened (20 mesh) powder was then stored in air-tight container with marking for identification and kept in cool, dark, and dry place for future use.

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).

Preparation of ethanolic seed Extract:

In extraction the powered seed materials (120 g) is submerged in suitable solvents of increasing polarity as ethanol subsequently in an air-tight separating funnel for 5 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 same time and hence extracted as solution. Then these extracts were dried by using a rotary evaporator to get ethanol extract (2.0 g). The extract thus obtained was than subjected to preliminary phytochemical screening for identification of various plant constituents by methods suggested by standard methods [13-15].

The extract thus obtained was than subjected to preliminary phytochemical screening for identification of various plant constituents by standard methhods. methods. To find out the flavonoids, chemical and functional groups of phytochemicals present in the extract, spectral studies were carried out by Ultra-Violet and Infra-Red Spectroscopy [16-20].

Fig 1: Seeds of Casssia obtusifolia

3. Results and Discussions

Phytochemical screening :

The ethanolic seed extract of *Cassia obtusifolia* shows the presence of carbohydrates, glycosides, phytosterols, terpenoids, phenolic compounds, tannins, proteins, amino acids, flavonoids, gum and mucilage. The results are presented in (Table 1).

UV Spectroscopy:

The UV spectrum of ethanolic seed extract of *Cassia obtusifolia* were recorded in the range of 272.84-292.35 nm and presented in Figure-2 & in Table-2 respectively.The UV specrum of *Cassia obtusifolia* shows weak absorption bands at 339.86 nm is due to aromatic nature of compound, α-β unsaturated ketones and aldehydes. These weak bands indicate flavone and fisetin types of flavonoids. A broad band at 288.40 nm indicates the presence of 3° amine. There is a band at 287.56 nm reveals the presence of Amide group (protein).There is a band at 286.62 nm is due to Alkene group (Naphthalene). The band at 285.22 nm shows the presence of Amino group (Aniline). The characteristic band at 284.00 nm is due to Ketones, aldehydes group. The band at 281.24 nm indicates the functional group of Aldehyde group. Here the band at 280.60 nm, 279.74 nm. 279.22 nm, 277.92 nm and 276.98 nm is due to Ketones group. The sharp band at 275.06 nm and 273.22 nm is due to Alkene group.

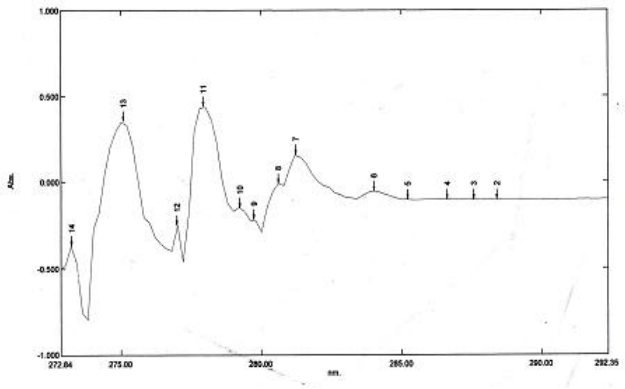

Fig 2: UV Spectrum of ethanolic extract of *Cassia obtusifolia* seed

FT-IR Spectroscopy:

The FT-IR spectrum of ethanolic extract of *Cassia obtusifolia* seed are presented in Figure 3 & Table 3 respectively. The FT-IR spectrum shows the peak at 649.06 cm^{-1} indicates the presence of alkyl halides, C-Br stretching vibrations. The sharp peak at 879.78 cm^{-1} is due to aromatic substitution, C-H bending vibrations. The very sharp peak at 1046.19 cm^{-1} and 1087.7 cm^{-1} show the presence of aliphatic amine, C-N strecting vibrations. Sulfur compound prominently active against microbes. The peak at 1273.68 cm^{-1} indicates C-F (alkyl halide) stretching vibrations. The characteristic peak at 1326.27 cm^{-1} confirms the presence of C-N (aromatic amines) stretching vibrations. The peak at 1381.17 cm^{-1} is due to C-H (alkanes) bending vibrations. The medium peak at 1657.83 cm^{-1} indicates the presence of –C=C- (alkenes) stretching vibrations. The strongest peak at 2928.09 cm^{-1} and 2974.85 cm^{-1} are recorded is due to presence of alkanes group (C-H). Appearance of peak at 3361.74 cm^{-1} reveals the presence of N-H stretching vibrations.

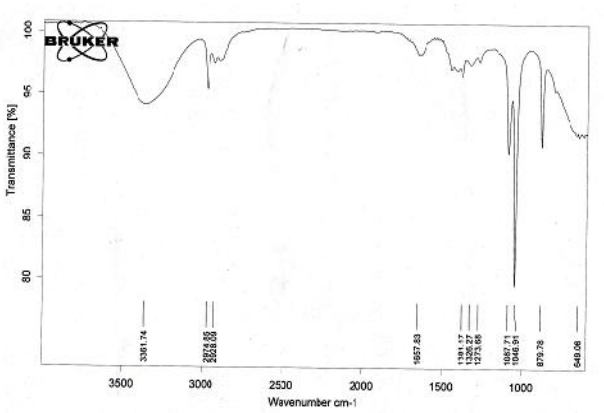

Fig 3: FT-IR Spectrum of ethanolic extract of *Cassia obtusifolia* seed

Table 1: Preliminary phytochemical screening of ethanolic extract of *Cassia obtusifolia* seed

Sl No.	Plant constituents Test/Reagents	Result	Sl No.	Plant constituents Test/Reagents	Result
1.	**Alkaloid**		6.	**Saponins**	
	(i) Mayer's reagent	-		(i) Foam test	+
	(ii)Wager's reagent	-	7.	**Phenolic Compounds**	
	(iii) Hager's reagent	-		(i) Ferric chloride solution	+
2.	**Carbohydrates**		8.	**Tannins**	
	(i) Molisch's test	+		(i) Lead acetate solution	+
	(ii) Benedict's reagent	+	9.	**Protein**	
	(iii) Fehling solution	+		(i) Xanthoproteic test	+
3.	**Types of Carbohydrates**			(ii) Biuret test	+
	(i) Glucose	-	10.	**Amino acids**	
	(ii) Fructose	-		(i) Ninhydrin reagent	+
	(iii) Galactose	-	11.	**Gums and Mucilages**	
	(iv) Lactose	+		(i) Alcoholic precipitation	+
	(v) starch	+		(ii) Molisch's test	+
4	**Glycosides**		12.	**Anthraquinones**	-
	(i) Keller kiliani test	+		Borntrager's test	
5	**Phytosterols**		13.	**Terpenoids**	
	(i) Liebermann's test	+		(i) Salkowski test	+

Table 2:UV spectroscopy of ethanolic extract of *Cassia obtusifolia* seed

S.No.	Wavelength (nm)	Abs.	Chromophoric group
1	339.86	0.043	Aromatic
2	288.40	0.100	3° amine
3	287.56	0.101	Amide group (protein).
4	286.62	0.101	Alkene group (Naphthalene).
5	285.22	0.101	Amino group (Aniline).
6	284.00	0.051	Ketones, aldehydes group.
7	281.24	0.162	Aldehyde group.
8	280.60	-0.006	Ketones group.
9	279.74	-0.215	Ketones group.
10	279.22	-0.145	Ketones group.
11	277.92	0.443	Ketones group.
12	276.98	-0.246	Ketones group.
13	275.06	0.335	Alkene group.
14	273.22	-0.366	Alkene group.

Table 3: FT-IR spectroscopy of ethanolic extract of *Cassia obtusifolia* seed

S. No.	Peak value (cm^{-1})	Functional group
1	649.06	Alkyl halides, C-Br stretching vibration.
2	879.78	Aromatics, C-H bending vibration.
3	1046.91	Aliphatic amines, C-N stretching vibration.
4	1087.71	Aliphatic amines, C-N stretching vibration.
5	1273.68	Alkyl halides, C-F stretching vibration.
6	1326.27	Aromatic amines, C-N stretching vibration.
7	1381.17	Alkanes, C-H bending vibration
8	1657.83	Alkenes,-C=C- stretching vibration.
9	2928.09	Alkanes, C-H stretching vibration.
10	2974.85	Alkanes, C-H stretching vibration.
11	3361.74	1°,2 ° amines, amides, N-H stretching vibration.

4. Conclusion

This investigation has given preliminary information to determine the chemical composition of *Cassia obtusifolia* seeds. The presence of chromophoric group, functional group, flavonoids, glycosides, phytosterols, terpenoids, phenolic compound, tannins is mainly contributed in medicinal utility of plant. The presence of these bioactive compounds in plant extract confirms the correct use of this plant in traditional medicinal system. It also holds for the production of novel drugs with isolation of specific compound.

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