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Phytochemical Analysis of Some Contents of CASSIA TORA and XANTHIUM STRUMARIUM Plant Seeds

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ABSTRACT: *Cassia Tora* and *Xanthium strumarium* are fast growing weeds in Vidarbha Maharashtra. The present study is based on analysis of some chemical contents from the seeds of these plants. Ethanol and aqueous extracts of *Cassia Tora* and *Xanthium strumarium* seeds were prepared by simple reflux and concentrated by distillation. Phytochemical analysis revealed the presence of saponins, tannins, alkaloids flavonoids, anthraquinones, glycosides, terpenoids, phenols, sterols and reducing sugars in ethanol and aqueous extract of cassia tora seeds and , tannins, alkaloids flavonoids in *Xanthium strumarium* seeds. The Rf values of some contents also determined by using Thin Layer Chromatography(TLC).

KEWWORDS: *Cassia tora* , *Xanthium strumarium* ,phytochemical analysis.

I. INTRODUCTION

Cassia tora L. is an obnoxious, aggressive, annual, herbaceous weed. Cassia tora Linn. Belongs to family Caesalpiniaceae.It is generally distributed throughout India, Sri Lanka, West,China and tropics[1]. The leaves and seeds of C. Tora are acrid, laxative, antiperiodic, anthelmintic, ophthalmic, liver tonic, cardio tonic and expectorant and also useful for leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders[2]. The seeds of cassia tora are reputed in Chinese medicine as vision-improving, antiasthenic, asperient and diuretic agents[3-4]. Seeds of C. Tora are hard, 1cm long, 3-4 mm thick, oblong towards both ends greenish-brown to brownish-black, smooth and shiny[5]. The known Chemical components of Cassia tora are antrhroquinones, chrysophanol,Emodin, obtusifolin, obtusin, chryso-obtusin, auranto-obtusin,and their glycosides, nathopyrones, rubrofusarin, norubrofusarin, rubrofusaring, etiobioside.Toralactone, torachrysone[6].Xanthium strumarium L. grows as weed throughout on waste lands[7]. *X. strumarium* Composite is an annual herb with 2 strong hooked beaks[8].It is belongs to the family Astraceae[9]. The present study focused on the qualitative phytochemical analysis and determination of Rf values by TLC.

II. METHODOLOGY

A. Phytochemical detection of extracts

The aqueous and ethanolic extracts of plant leaves were subjected to preliminary phytochemical analysis. The presence of various groups of phytoconstituents like Alkaloids, Flavonoids, Terpenoids, Saponin, Tannin, Carbohydrate, Anthroquinone, Glycosides, steroids, Phenols, Gums ,protein and Amino acids were analyzed by using the standard methods[10-16].

- **Alkaloids**

6 ml of extract was mixed with 6 ml of 1% HCl in steam bath, then it was filtered. 1 ml of Mayer's reagent was added. Presence of turbidity shows presence of alkaloids. Further addition of a few drops of olive oil to form an emulsion confirmed the presence of alkaloids.

- **Flavonoids**

5 ml of dilute ammonia solution was added to a portion of the aqueous filtrate of each plant extract followed by addition of concentrated H_2SO_4. A yellow colouration observed in each extract indicated the presence of flavonoids. The yellow colouration disappeared on standing after few minutes.

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- **Terpenoids**

0.5 gm extract was dissolved in 2 ml of chloroform then 3 ml concentrated sulfuric acid was added, a reddish brown colour in interphase indicates the presence of terpenoids.

- **Saponins**

0.5 g of the extract was dissolved in 5 ml distilled water. The mixture was shaken vigorously. Formation of stable persistent froth shows the presence of saponins. A further addition of 6 drops of olive oil while shaking forms an emulsion, confirming the presence of saponins.

- **Tannins**

0.5 g of the extract was dissolved in 10 ml of distilled water, then a few drops of 1% ferric chloride solution was added to obtain a brownish green or blue black precipitate, which confirms the presence of tannin.

- **Carbohydrates**

Few drops of Molisch's reagent were added to 2ml portion of the various extracts. This was followed by addition of 2ml of conc. H_2SO_4 down the side of the test tube. The mixture was then allowed to stand for two-three minutes. Formation of a red or dull violet colour at the interphase of the two layers was a positive test. Phenols 2 ml of extract was dissolved in 4 ml of distilled water and added few drops of 10% $FeCl_3$. Appearance of blue or green colour indicates presence of phenols.

- **Anthraquinones**

2.5 g extract was dissolved in 5 ml of conc. Sulfuric acid and filtered. The filtrate was dissolved in 2.5 ml of chloroform. Chloroform layer was pipetted into a tube and 0.5 ml of 10% diluted ammonia was added. Formation of pink red or violet colour shows the presence of anthraquinones.

- **Glycosides**

2.5 g of extract was added to 2.5 ml distilled water. 1 ml glacial acetic acid containing a few drops of ferric chloride was added then 0.5 ml of concentrated sulfuric acid was added. Presence of brown ring at the interphase indicates the presence of deoxy sugar. A violet ring below the brown ring was observed, while a greenish ring also appears above the brown ring, confirming the presence of Cardiac Glycosides.

- **Steroids**

To the test solution added 10ml of chloroform then filtered. To the 2 ml filterate added 2 ml of acetic anhydride and con.H_2SO_4. Blue green ring indicate the presence of steroids in the sample.

- **Amino acids and Proteins.**

2ml of filtrate was treated with 2-5 drops of ninhydrin solution placed in a boiling water bath for 1-2 minutes and observed for the formation of purple colour.

- **Phenols**

A fraction of the extracts was treated with aqueous 5% ferric chloride and observed for formation of deep blue or black colour.

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- **Gums**

Test for gums were performed by hydrolyzing the 1 ml of extract using dil. HCl (3ml). Then Fehling s solution was added drop by drop till the appearance of red.

B. Thin Layer Chromatography

TLC plates were prepared for different extracts using silica gel. The plates were placed in developing chamber containing mixture of solvents listed in Table no-3. The Rf Values of some selected constituents like alkaloids, flavonoids, terpenoids and saponin were determined for water and ethanolic extracts were reported in table no-2.

III. PRESENTATION AND ANALYSIS OF RESULT

A. Phytochemical contents:

The results of phytochemical contents of aqueous and ethanol extract of C. tora and X. strumarium seeds are reported in table-1.Flavonoids, amino acids and proteins were present in both plants. Water and ethanol extracts of Casia tora seeds shown positive tests for Terpenoids, saponin, tannin and glycosides. Carbohydrates and gums were absent in the extracts of both plants. Water and ethanol extracts of Xanthium strumarium seeds shown positive tests for alkaloids, and phenols. The water extract of seeds of X. strumarium contain alkaloids, flavonoids, phenols, amino acids, proteins and steroids. Water extract of C. tora contain various constituents except alkaloids, carbohydrates and gums.

B. Thin Layer Chromatography

The Rf values of water and ethanol extract of C. tora and X.strumarium seeds for alkaloids ,flavonoids ,terpenoids and saponin are reported in table-2.Rf values for seed extracts of both plants were found in t6he range of 0.46-0.86.The lowest value reported for terpenoids of ethanol extract of C.tora seeds(0.46) and highest value reported for saponin of ethanol extract of C.tora seeds(0.86).The solvent system and the spraying agents for TLC analysis was recorded in table-3.

Table No-1: Qualitative phytochemical analysis of leaves of selected plants.

Sr. No	Constituents	*Cassia tora*		*Xanthium strumarium*	
		Ethanol Extract	Water Extract	Ethanol Extract	Water Extract
1	Alkaloids	+	-	+	+
2	Flavonoids	+	+	+	+
3	Terpenoides	+	+	+	-
4	Saponin	+	+	+	-
5	Tannin	+	+	+	-
6	Carbohydrates	-	-	-	-
7	Phenols	-	+	+	+
8	Amino acids & Proteins	+	+	+	+
9	Anthroquinones	-	+	-	-
10	Glycosides	+	+	+	-
11	Steroids	-	+	-	+
	Gums	-	-	-	-

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Table No-2: Rf Values of some constituents from leaves of selected plants by TLC.

Sr. No	Constituents	Rf Value *Cassia tora*		Rf Value *Xanthium strumarium*	
		Ethanol Extract	Water Extract	Ethanol Extract	Water Extract
1	Alkaloids	0.68	0.61	0.67	0.57
2	Flavonoids	0.60	0.64	0.75	0.76
3	Terpenoides	0.46	0.58	0.80	0.54
4	Saponin	0.86	0.78	0.47	0.50

Table No-3: Solvent system and Spraying agents with color developed.

Constituent	Solvent system	Spraying Agent	Color developed
Alkaloids	NH_4OH:CH_3OH 3:17	Mayer's reagent	Yellowish
Flavonoids	$CHCl_3$:CH_3OH 18:2	Iodine vapors	Reddish
Terpenoids	C_6H_6:$CH_3COOC_2H_5$ 1:1	10% HS_2O_4	Greenish
Saponin	$CHCl_3$:CH_3COOH: CH_3OH:H_2O 6:2:1:1	Iodine vapors	Brown

IV. CONCLUSION

The C. Tora and X. Srumarium are the widespread herbs during the rainy season in Vidarbha, Maharashtra. Both the species showed the presence of some biological contents. Due to seasonal availability and post seasonal availability of these plants seeds it essential to extent the research on these plants which may be medicinally important.

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