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An overview on phytochemical and pharmacological profile of *Cassia tora* Linn.

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Abstract
India is virtually a herbarium of the world. Research on medicinal plants is one of the leading areas of research globally. Although there is require to pay attention in regard of safety evaluation of bioactivities of medicinal plants. Medicinal plants are containing inherent active ingredients used to cure disease and relieve pain. The use of medicinal plants as raw materials in the production of new drugs is increasing day by day because of their potentials in combating the problem of drug resistance in micro-organisms. The traditional medicines and medicinal plants have been widely in most developing countries as therapeutic agents for the maintenance of good health. The World Health Organization (WHO) estimates that about 80% of people living in developing countries rely almost exclusively on traditional medicines for their primary health care needs. The present review summarizes the scientific information of various aspects of *Cassia tora* plant used in traditional system of medicine for a variety of purpose. *C. tora* is well known medicinal plant commonly found in India and other tropical countries.

Keywords: *Cassia tora* Linn., WECT (water extract of *C. tora)*, traditional use, pharmacognostic study, pharmacological activity

1. Introduction
The nature has provided the storehouse of remedies to cure all ailments of mankind. The traditional herbal medicines are still practiced in large part of our country mostly in tribal and rural areas. In many developing countries large section of population relies on traditional practitioner, who are depend on herbal folk medicine for their primary health care and has deep faith in it [1]. Medicinal plants are containing inherent active ingredients used to cure disease and relieve pain. The traditional medicines and medicinal plants have been widely in most developing countries as therapeutic agents for the maintenance of good health. The World Health Organization (WHO) estimates that about 80% of people living in developing countries rely almost exclusively on traditional medicines for their primary health care needs [2].
Research on medicinal plants is one of the leading areas of research globally. Although there is need to pay attention in regard the bioactivity-safety evaluation and conservation of medicinal plants. Some of the screening tests on medicinal plants are performed *in vitro*. The ultimate aim of the researcher is to use the medicinal plants to treat diseases in humans and animals. Traditionally, herbs have been considered to be nontoxic and used for treating various diseases. In India, we are using plants and herbs as the basic source of medicine because we are rich in them [1].
C*assia tora* Linn. is well known medicinal plant commonly found in India and other tropical countries. The use of medicinal plants as raw materials in the production of new drugs is increasing day by day because of their potentials in combating the problem of drug resistance in micro-organisms [3]. Various medicinal properties of this plant have been mentioned in the Indian traditional system of medicine as a laxative, antiseptic, antioxidant activity, antiperiodic and useful in treatment of leprosy, ringworm, bronchitis, cardiac diseases, hepatic disorder, liver tonic, hemorrhoids, and ophthalmic, skin diseases [4].

1.1 Introduction to Plant
1.1.1 Botanical Description
Source, habitat and distribution
The seed of *C. tora* Linn (Family: Leguminosae) juemingzi in Chinese, are famous traditional Chinese medicine and listed in Chinese pharmacopoeia [5]. It grows in low lying coastal area, river banks, abundant in waste places and other moist places like uncultivated fields, up to 1000-1400 meters. It is also known as 'Chakramard' in Ayurveda, 'Panwar' in Unani and 'Jue Ming Zi' in Chinese system of medicine. It is commonly known as 'Sickle pod' due to Sickle shape of pods [6].

Morphology

It is an annual foetid herb, 30–90 cm high. Leaves are green in colour, pinnate, up to 6-8 cm long, leaflets are in 3 pairs, distinctly petioled, opposite, conical at one end, ovate, oblong and base oblique. Flowers are pale yellow in color usually in nearly sessile pairs in the axils of the leaves with five petals, upper one are very crowded. Pods are subteret or 4 angled, very slender, 6-12 inch long, incompletely septate, membranous with numerous brown oblong, rhombohedral seeds [7].

Fig 1: Plant of *C. tora plants*

Fig 2: Seeds of *C. tora plants*

Fig 3: Leaves of *C. tora plants*

1.1.2 Phytochemistry

Leaves

Preliminary phytochemical screening of leaf shows the presence of polyphenols which prompted researchers to evaluate its antioxidant and antiproliferative potential. Presence of emodin, kaempferol-2-diglucoside is reported in the leaves. Leaves also contain chrysophanol, aloe-emodin, rhein, glucose, 1-stachydnine, amino acids, fatty acids, d-mannitol, β-sitosterol, myricyl alcohol, trigonelline, choline. Sennosides, which are well known for their medicinal importance, have been detected in the leaves of the plant. The percentage of sennoside content in the leaf of *C. tora* was found to be 0.14. Leaves also reported to contain Kaempferol-3-diglucoside (Flavonol glycoside). A potential hepato-protective constituent, Ononitol monohydrate was isolated from C. *tora* leaves [3].

Seeds

Seed contain anthraquinones namely, aurantio-obtusin, chryso obtusin, obtusin, chrysoobtusin-2-O-beta-D-glucoside, physcion, emodin, chrysophanol, obtusifolin, obtusifolin-2-Obeta-D-glucoside. Seeds contain Brassinosteroids (Brassinolide, castasterone, typhasterol, teasterone, and 28-norcastasterone), as well as Monoglycerides (monopalmitin and monoolein). Phenolic glycosides such as rubrofusarin triglucoside, nor rubrofusarin gentiobioside, demethylflavasperone gentiobioside, torachrysone gentiobioside, torachrysone tetraglucoside and torachrysone apioglucoside were also isolated [7].

Seeds contain Rhein, Aloe emodin, Rubrofusarin and its 6-β gentiobioside, Norrubrofusarin, 8-hydroxy-3-methylanthraquinone-1β gentiobioside, Chrysophanic acid & its 9-anthrone, Aurantio-obtusin, 1 desmethylaurantio obtusin, 1-desmethylchryso-obtusin, torlactone, torachrysone, Sitosterol. Two new phenolic triglucosides namely, torachrysone8-O-[beta-D-glucopyranosyl(1>3)-O-beta Dglucopyrano--syl(1->6)-O-beta-glucopyranoside] and torlactone 9-O-[beta-D glucopyranosyl-(1- >3)-O-beta-Dgluco pyranosyl-(1-->6)-O-beta-D glucopyranoside], along with seven known compounds were isolated from 70% ethanolic extract. Seeds also contain Rubrofusarin & its triglucoside, Quercetin, 6-O-β-D glucoside, 6-O-β D-gentiobioside. Along with isorubrofusarin, alaternin and adenosine were isolated and identified [3].

Three naphthopyroneglucosides, cassiaside, rubrofusarin-6-O-β-D gentiobioside and toralactone-9-O- β-gentiobioside isolated from the BuOH soluble extract of the seeds were using an *in vitro* bioassay based on the inhibition of advanced glycation end products (AGEs) formation. All the isolates were evaluated for the inhibitory activity on AGEs formation *in vitro*. From the seeds of Cassia tora, questin, 2-hydroxyemodin 1-methylether were isolated from for the first time [3].

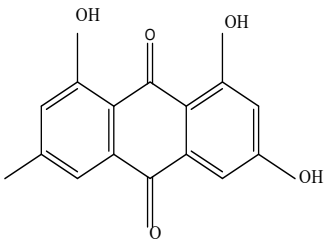
Stem bark

The isolation of a rare anthraquinone like, 1-hydroxy-5-methoxy-2-methyl anthraquinone, its glycoside, 5-methoxy-2-methyl anthraquinone-1-O-α-L-rhamnoside along with chrysophanol, emodin and β-sitosterol from the stem of *C. tora* Linn. are reported. The stem also contains d-mannitol, myricyl alcohol, β-sitosterol, glucose, tigonelline, 1-stachydnine and choline [3]. *Rai, K.N., Kumari* examined the presence of polyphenolic anthraquinone in the stem of this plant [8].

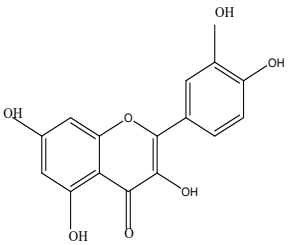
Root

Roots contain Choline, 1,3,5-trihydroxy-6,7-dimethoxy-2 methyl anthraquinone, Myricyl alcohol, chrysophanic acid and its 9 anthrone, Naphtho-α-pyrone, Physcion, Rubrofusarin & its 6 β gentiobioside, torlactone, Leucopelargonidin-3-O-α-L-rhamnopyranoside, β sitosterol [7].

1.1.3 Chemical structures of some phytoconstituents of C. *tora:*



Emodin



Quercetin

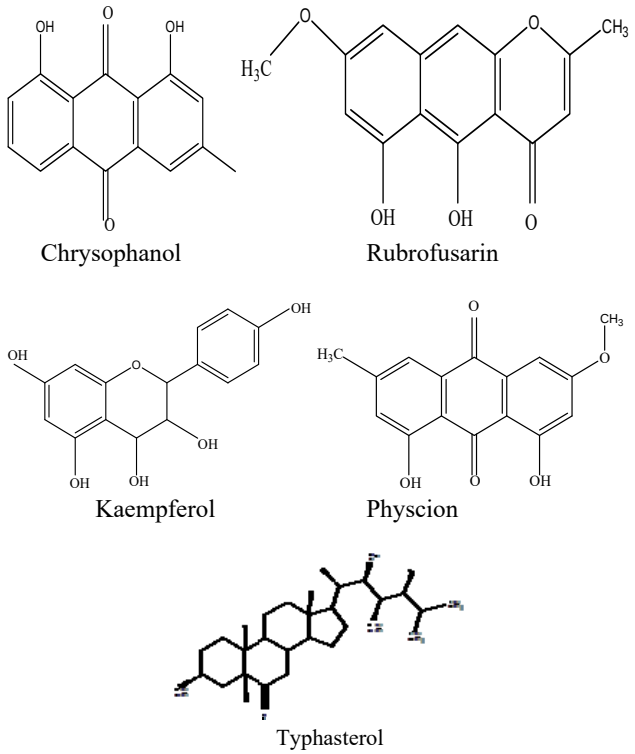


Fig 4: Chemical structures of phytoconstituents of C. *tora:*

1.2 Beneficial Effects on Health of *C. Tora:*

1.2.1 Traditional uses

Different parts of the plant (Leaves, seed, and root) are reputed for their medicinal value. The leaves of *C. tora* are reported to have antirheumatic activity in folklore practice. Decoction of the leaves is used as laxative. The seeds of *C. tora* have been used in Chinese medicine as aperients, antiasthenic and diuretic agent. It is also given to improve visual activity (eye diseases) and to treat liver disorder. In Korea, the hot extract of seeds is taken orally for protection of liver. Leaves and seeds are used in the treatment of skin disorders like Ringworm and itch. Stem bark extract is used for various skin ailments, rheumatic diseases and as laxative. Stem bark extract is used for various skin ailments, rheumatic diseases and as laxative. In Ayurveda, the plant is used in 'Dadrughani Vati' and 'Pamari Taila" [1].

In Andhra Pradesh, the tribal people had been using the leaves of this plant grounded along with peppers and water into a paste, for the treatment of Jaundice. The paste of leaves can also be applied to ringworm and eczema. Decoction of leaves and flowers is used internally for bronchitis and asthma. Plant pacifies vitiated tridosha, dandruff, constipation, cough, hepatitis, fever and hemorrhoids [1].

The leaves are antipatriotic, alterative, aperients, and given to children having intestinal disorders. The leaves, roots, and even the whole plant are employed in the treatment of impetigo, ulcers, helminthiasis and as a purgative. The pounded leaves are applied as poultice on cuts and wounds like tincture-iodine and for ulcers to hasten suppuration. Seeds and leaves are also useful in itch, ringworm, and other skin diseases. Decoction of leaves is a mild laxative in doses of 5 to 15 ml, especially for children having fever while teething. Poultice of the leaves is used locally in gout, sciatica and pains in the joints. Pods are used in dysentery and in eye diseases. Seeds are also used in eye diseases, liver complaints and earache, leprosy, psoriasis. Root is considered bitter, tonic, stomachic and is antidote against snake bite. Other uses are in treatment of fungal diseases, worm infection, abdominal tumors, bronchitis and asthma. Also, this plant are most effective treatment in abnormal child birth, in bone fracture, cold, epilepsy, night blindness, scabies, scorpion bite and stomachache. It also act as vermicide and as substitute for coffee. Traditional Chinese healers use this herb to treat blindness, xerophthalmia, and conjunctivitis [1].

The seeds are reputed in Chinese medicine as vision improving, anti-asthenic, aperients, diuretic and an effective agent in lowering cholesterol and reducing blood pressure. The unripe fruits are also cooked and eaten. The seeds can be introduced as a protein rich food for livestock. The seeds are used in the preparation of sweets and the powder of the roasted seeds is substituted for coffee. The seeds yield yellow, blue and red colored dyes used in dyeing and tanning [1].

1.3 Pharmacological Profile

1.3.1 Hypolipidemic Activity

Ethanolic extract of seeds of *C. tora* and its fractions were investigated for hypolipidemic activity on triton induced hyperlipidemic profile in albino rats. Ethanolic extract and its ether soluble and water soluble fraction decreased serum level of total cholesterol. On the other hand ethanolic extract, ether soluble fraction and water soluble fraction increased the serum HDL-cholesterol level. Ethanolic extract, ether fraction and water fraction decreased triglyceride level. The reduction is found in LDL cholesterol level by ethanolic extract, ether soluble fraction and water soluble fraction [9].

1.3.2 Anti-inflammatory Activity

Methanolic extract of the *C. tora* leaves was investigated against carrageenin, histamine, serotonin and dextran induced rat hind paw oedema. It exhibited significant anti-inflammatory activity against all these agents. The extract show maximum inhibition of oedema with carrageenin, dextran, histamine and serotonin induced rat paw oedema [10].

1.3.3. Anti-genotoxic Properties

Anti-genotoxic properties and the possible mechanisms of water extracts from *C. tora* L. (WECT) treated with different degrees of roasting (unroasted and roasted at 150 and 250°C) were evaluated by the *Ames Salmonella*/ micro some test and the Comet assay. Results indicated that WECT, especially unroasted *C. tora* (WEUCT), markedly suppressed the mutagenicity of 2-amino-6-methyldipyrido (1, 2-a: 3':2'-d) imidazole (Glu-P-1) and 3-amino-1, 4- dimethyl-5H-pyrido (4, 3-b) indole (Trp-P-1) [1].

1.3.4 Nitric Oxide Scavenging Activity

The methanolic leaf extract of *Cassia tora* was evaluated for its nitric oxide scavenging activity and reducing power assays using Rutin and BHT as standards. The extract was studied for its lipid peroxidation inhibition assay using rat liver and brain [11].

1.3.5 Anti-proliferative Activity

The anti-proliferative activity of *Cassia tora* methanolic leaf extract with Cisplatin, anticancer drug was studied using human cervical cells (HeLa). Proliferation of HeLa was measured by MTT assay, cell DNA content by modified diphenylamine method and apoptosis by Caspase 3 activity [11].

1.3.6 Immunostimulatory Activity

Immunostimulatory activities of four anthraquinones of

Cassia tora (aloe emodin, emodin, chrysophanol, and rhein) was evaluated on human peripheral blood mononuclear cells (PBMC).Studies were conducted on lymphocyte proliferation by BrdU immunoassay, secretion of interferon-gamma (IFN-γ) and interleukin 10 (IL-10) by an ELISA assay and elucidation of responding immune cells by flow cytometry [11].

1.3.7 Metabolic Studies

Aloe-emodin (1, 8-dihydroxy 3-Hydroxy Methyl Anthraquinone) was isolated from the leaves of this plant and its metabolic pattern was studied. The results showed that about 15.4% of the administered aloe-emodin was excreted and the rest was probably bound or metabolized in the system [3].

1.3.8 Hepatoprotective Activity

Methanolic extract of leaves at a dose of 400 mg/kg have showed significant hepatoprotective effect by lowering the serum levels of transaminase, bilirubin and alkaline phosphatase (ALP). Hydroalcoholic extracts of *Cassia tora* whole plant showed significant decrease in the levels of serum markers, indicating the protection of hepatic cells and significant dose dependent protection against paracetamol induced hepatocellular injury [7].

1.3.9. Spasmogenic and Anti-nociceptive Activity

The spasmogenic effects of the methanolic extract (soxhlet)of leaves of *Cassia tora* Linn were evaluated on guinea pig ileum, rabbit jejunum and mice intestinal transit. Anti-nociceptive activity of the extract was also evaluated in the mice [7].

1.3.10 Antifungal Activity

The antifungal activity of dealcoholized extract of leaves of *C. tora* on five different fungal organisms was determined. Crude leaf extract significantly inhibited the growth of *C. albicans*, *A. niger*, *S. cerevisiae* and *T. mentagrophytes* when tested by turbidity and spore germination methods in a concentration dependent fashion [3].

1.3.11 Anthelmintic Activity

Alcohol and aqueous extracts from the seeds of *C. tora* were investigated for their anthelmintic activity against *Pheretima posthuma* and *Ascaridia galli*. Three concentrations (25, 50 and 100 mg/ml) of each extracts were studied in activity, which involved the determination of time of paralysis and time of death of the worm. Both the extracts exhibited significant anthelmintic activity at highest concentration of 100 mg/ml. Piperazine citrate in same concentration as that of extract was included as standard reference and distilled water as control [1].

1.3.12 Antiplasmodial Activity

Antiplasmodial activity was evaluated *in vitro* against *Plasmodium falciparum* 3D7 (chloroquine sensitive) and Dd2 (chloroquine resistant and pyrimethamine sensitive) [3].

1.3.13 Antibacterial Activity

Dealcoholized extract of seeds of *C. tora* inhibited the growth of *Micrococcus pyogenes var. albus*, *Micrococcus citreus, Corynebacterium diphtheriae,* etc. The effects of the phenolic glycosides, their aglycones and several other compounds structurally related to them were examined on *Escherichia coli* K12, *Pseudomonas aeruginosa* PAO1 and some strains of *Staphylococcus aureus albus* [12].

1.3.14 Anti-mutagenic Activity

Anti-mutagenic activity of a methanol extract of seeds was demonstrated against aflatoxin B1 with the Salmonella typhimurium assay. The numbers of revertants per plate decreased significantly when this extract was added to the assay system using *Salmonella typhimurium* TA100 and/or TA98. The methanol extract was then sequentially partitioned with CH_2Cl_2, n-butanol and H_2O. The CH_2Cl_2 and n-butanol fractions possessed antimutagenic activity but the H_2O fraction was inactive [7].

1.3.15 Antiulcer Activity

Pharmacological evaluation of *C. tora* seeds was done using ethanol induced gastric ulcer model in wistar albino rats. Hydroalcoholic extract of *C. tora* was administered orally and parameters evaluated were gastric volume, pH, free acidity, total acidity, mean ulcer score and ulcer index. In result it was found that pre-treatment of the extract showed ulcer protection in a dose dependent manner (125 mg/kg, 250 mg/kg and 500 mg/kg). Formation of ulcers decreased significantly ($p<0.05$) at 125 mg/kg and very significantly ($p<0.01$) at 250 mg/kg and 500 mg/kg dose. Volume of gastric juice decreased significantly ($p<0.05$) at 250 mg/kg and 500 mg/kg dose, while free acidity and total acidity decreased very significantly ($p<0.01$) at all the three doses [13].

1.3.16 Antioxidant Activity

The antioxidant propertie for *Cassia tora* seed extract was evaluated and it was found that the leaves and seeds of *Cassia tora Linn* showed a significant total antioxidant property. In the study antioxidant activity of ethanolic extract of *C. tora* leaves was investigated using three *in vitro* assays [14]. *C.S. Rejiya et al*. demonstrated that phytochemicals in CTME may have a significant effect on antioxidant and antiproliferation activities. Hence, CTME can be used as easy accessible source of natural antioxidants, as a food supplement and in pharmaceutical industries [15].

1.3.17 Larvicidal activity

Mosquito larvicidal activity of *Cassia obtusifolia* seed-derived materials against the fourth-instar larvae of Aedes aegypti, Aedes togoi, and Culex pipiens pallens was examined. The chloroform fraction of *C. obtusifolia* extract showed a strong larvicidal activity of 100% mortality at 25 mg/L. The biologically active component of *C. obtusifolia* seeds was characterized as emodin by spectroscopic analyses. The LC (50) values of emodin were 1.4, 1.9, and 2.2 mg/L against C. pipiens pallens, A. aegypti, and A. togoi, respectively. Pirimiphos-methyl acts as a positive control directly compared to emodin. Pirimiphos-methyl was a much more potent mosquito larvicide than emodin. Nonetheless, emodin may be useful as a lead compound and new agent for a naturally occuring mosquito larvicidal agent [3].

1.3.18 Radical scavenging effects

Radical scavenging principles on 1,1-diphenyl-2-picrylhydrazy (DPPH)radical was isolated from the seeds of *Cassia tora* L. Assignment of the 1-H- and 13C-NMR data showed the active components to be an anthraquinone, alaternin and two naphthopyran glycosides(nor-rubrofusarin-6-beta D glucoside (cassiaside) and rubrofusarin-6-D-gentiobioside). Alaterinin showed more potent radical scavenging effects than the others [3].

1.3.19 Wound healing Activity
The ethanolic extract of the leaves of *Aristolochia bracteata* and *Cassia tora* were studied for its effect on wound healing in rats excision wound model. Simple ointment (ointment base) was used as a control and nitrofurazone ointment as a reference standard. Ethanolic extracts of both the plants have been shown to possess good therapeutic potential as anti-inflammatory agent and promoter of wound healing due to the presence of active terpenes, alkaloids and flavonoids. It was observed that the wound contracting ability of the extracts were significantly greater than that of the control, which was comparable to that of the reference standard nitrofurazone ointment [16].

1.3.20 Cardiotonic Activity
The study was undertaken to evaluate cardiotonic activity of alcoholic and petroleum ether extract of *Cassia tora* Linn seeds by using isolated guinea pig heart perfusion technique. Calcium free Ringer Locke solution was used as a vehicle for administration of alcoholic and pet ether extract of *Cassia tora* Linn. as a test extract and digoxin as a standard.
A significant increase in height of force of contraction (positive inotropic effect) and decrease in heart rate (negative chronotropic effect) at a very low concentration (0.25 mg/ml) was observed with test extract as same dose like standard digoxin. The results indicated that a significant increase in height of force of contraction with decrease in heart rate was observed as the dose of both the text extract increased however, alcoholic extract of *C. tora* produced little more positive inotropic effect then pet. Ether extracts [17].

1.3.21 Anti-asthmatic Activity
The anti-asthmatic activity of the *C. tora* leaves by using different concentration of aqueous was evaluated in isolated goat trachea chain preparation by using standard drug histamine. In study histamine produced dose dependent concentration of goat tracheal chain preparation was studied. The actual dose required to produce bronchodilation did not know, so comparison had been done by testing various concentration of drug extract of *C. tora* [18].

1.3.22 Oxytocic Activity
The seeds of *C. tora* contain oxytocic principle. It was found to be effective in producing the contraction of isolated uterus of guinea pig. The claim for oxytocic principle from the seeds lacks credibility due to insufficient experimental data [10].

1.3.23 Anti-nutritional and Antimicrobial Activity
In *C. tora* seeds maximum reduction of the anti-nutritional factor viz. oxalic acid, Phytate Phosphorous and tannins was observed in 24 hr soaked seeds, germinated and roasted seeds respectively. Hence to reduce the anti-nutritional factors to a greater extent, it may be suggested to use different combination of various processing methods rather than using any other [19].

1.3.24 Toxicity
The toxicity of the crude extract of the leaves of *C. tora* on swiss mice was investigated. A dose of 200mg/Kg given orally was found to be lethal. Dose level of 100mg/Kg was lethal when given intraperitoneally and intravenously respectively. Continuous administration of diet containing 0.5% or more seed of *C. tora* for 13 weeks proved toxic to rats producing myeloid hyperplasia with peripheral leukocytosis, thrombocytosis and mild anaemia [20, 21].

1.3.25 Antitumor and Antiviral activity
Numerous polyphenolic substances isolated from medicinal plants were found to exhibit antioxidant, antitumor and antiviral properties depending on the chemical structure of each polyphenol [22, 23].

1.3.26 Anti-shigellosis Activity
The ethylacetate fraction of the crude extract of *C. tora* showed maximum activity with the zone of inhibition ranging between 23-25 mm at the concentration of 200 µg disc-1. The minimum inhibitory concentration (MIC) of ethylacetate, chloroform and ethanol extracts was found between 32-64 µg ml-1 whereas the methanol and petroleum fractions showed MIC values between 128-512 µg ml [3].

1.3.27 Estrogenic Activity
Throught an estrogenic activity bioassay-guided fractionation of 70% ethanolic extract of of C. tora seeds two new phenolic triglucosides, torachrysone 8-o-[beta-D- glucopyranosyl(1-->3)-o-beta-D-glucopyranosyl(1-->6)-o-beta-D-glucopyranoside] (1) and torlactone 9-o-[beta-D-glucopyranosyl(1-->3)-o-beta-D-glucopyranosyl(1-->6)-o-beta-D-glucopyranoside (2), along with seven known compound were isolated. The estrogenic activity of the fraction and isolated compound were investigated using estrogen dependant proliferation of MCF -7 cell [24].

1.3.28 Hypotensive Activity
In pentobarbital anesthetized rats, the medial portion of the medullary reticular formation has been identified to be directly involved in the hypotensive effect of extracts from the seeds of *C. tora.* This conclusion was drawn from the observed decrease in arterial blood pressure following local injection of extracts of this herb into this reticular site and from its inability to promote hypotension when the same reticular site has been electrolytic ally lensioned. The role of medullary reticular formation in *C. tora* - induced hypotension was suggested to be one which modulates the basic cardiovascular reflexes, favoring a decrease in vasomotor tone [25]. Experimental effect indicate hypotensive effect of c. tora extract possibly involves a vagal reflex which reciprocally alter vasomotor tone of central emanating sympathetic nervous system [26].

1.3.29 Purgative Activity
The purgative action of crude methanolic extract & isolated aloin emodin from separated from *C. tora* leaf has reported [27].

1.3.30 anti- arthritic activity
The aqueous extract posse's anti- arthritic activity and it was comparable to the standard drug. Anti- arthritic effect of *cassia tora* Linn. leaves was studied by testing various *in vitro* studies.
The effect of the selected plant on inhibition of protein denaturation and effect of membrane stabilization was 87.22 % and 87.25% respectively for the aqueous extract of the selected plant leaves. The results were compared with the standard drug Diclofenac sodium and acetyl salicylic acid at the concentration of 250ug/ml [28].

2. Substituents & Adulterants
Cassia occidentalis Linn. is sometimes used as a substitute for cassia tora on account of linguistic similarity in regional names. *A cassia tora* seed is as substitute for coffee [21].

3. Conclusion

It is strongly believed that above detailed information from extensive literature survey, on various activity of of *C. tora* might provide detailed evidence for the varied pharmacologIcal and medicinal spectrum. Toxicity of plant leaves also was investigated so there is need of further research in regard; how to expel the toxicity of plant leaf. However, evaluation needs to be carried out on of *C. tora* in order to explore the concealed areas & their practical clinical application, which can be used for the welfare of the mankind.

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