A wide review on anthraquinones isolated from Pods of cassia Sophera Linn. Structural studies on Medicinal plants constituents and their applications

Dr. Arti Kumari

Department of Chemistry, Magadh university, Bodhgaya,Gaya, Bihar.

Abstract : -Pods of cassia sophera. (Family Leguminoae) is a large tropical genus about One of 600 species of herbs, shrubs and trees. Most of the plants of the genus are well known in Indian system of medicine for their cathartic, purgative and antibiotic properties. Many compounds of structural significance and medicinal importance have been reported from different species of this genus. Species of Cassia are rich source of anthraquinones which are well known as natural dyes, and are gaining importance in recent years due to environmental pollution caused by synthetic dyes. This paper attempts to give an overview of literature on the isolated and characterized anthraquinones from various Cassia species and their repoted applications. Besides dye yielding properties they are used in cosmetics and pharmaceuticals. Thus plants of Cassia species can serve as commercial source of naturaly occurring anthraquinones.

Keywords: - Anthraquinones, Biologically active metabolites, Cassia, Leguminoae, Pharmacological applications

Introduction :- Various natural products have been isolated from number of plant species. These isolated natural products have remarkable variety of compounds having unusual structures, many of which have found uses in the cosmetic dye and pharmaceutical industries. In addition these compounds are plant growth regulators, fungicides, insecticides, pest control agents and repellents of herbivores. With increase in awareness about environment and sustainable development natural products found to be new area of research due to its biodegradable nature and production from renewable resources. Review of compounds isolated from plant is important as these compounds have served as lead compounds for additional research, or that continue to be of interest to researchers in multiple areas Anthraquinones are one of such compounds which occur naturally in some plants, fungi, lichens, and insects, where they serve as a basic skeleton for their pigments. Natural anthraquinones are study of interest due to its wide range of applications. Anthraquinones are group of functionally diverse aromatic chemicals, structurally related to anthracene, with parent structure 9,10 dioxoanthracene. It has the appearance of yellow or light gray to gray-green solid crystalline powder. Its other names are 9,10-anthracenedione, anthradione,

9,10-anthrachinon, anthracene-9,10-quinone and 9,10-dihydro-9,10 dioxoanthracene.The vegetables used in human diet showed a large batch-to-batch variability, from 0.04 to 3.6, 5.9 and 36 mg total anthraquinone per kg fresh weight in peas, cabbage, lettuce and beans, respectively with physcion predominated in all vegetables. Anthraquinone compounds are used as laxatives mainly from their glycosidic derivatives and also used in the treatment of fungal skin diseases.. Anthraquinones and its derivatives are frequently found in slimming agents and have been valued for their cathartic and presumed detoxifying actionhowever, may cause nausea, vomiting, abdominal cramps and diarrhea with both therapeutic dose and over dose.An thraquinone derivatives show antioxidant property in following order: BHA (96%), anthrone (95%), alizarin (93%), aloe-emodin (78%), rhein (71%), emodin (36%) and anthraquinone (8%).Both natural and synthetic anthraquinones have wide-spread applications throughout industry and medicine, thereby indirectly and directly exposing the human population Plant extracts containing anthraquinones are being increasingly used for cosmetics, food, dye and pharmaceuticals due to their wide therapeutic and pharmacological properties

Pods of cassia sopheraLinn.: - It is commonly known as Tanner's cassia, a common plant in Asia, has been widely used in traditional medicine as cure for rheumatism, conjunctivitis and diabetes.. It is the source of yellow coloured dye, obtained from its pods.The pods are bitter, astringent, acrid, thermogenic, haematinic, constipating and expectorant. Seeds are also bitter, astringent, acrid, cooling, ophthalmic, diuretic, alexeteric and vulnerary. Various parts of the plant have been reported to possess a number of therapeutic activities to manage disease states like leprosy, asthama, gout, rheumatism and diabetes.It is also used as antipyretic, antiulcer and in the treatment of skin infections.In folk remedies of India, its flowers are proposed to have antidiabetic activity.. Pods of C. sophera are having potential in the development of drug for diabetes due to its antihyperglycemic and lipid-lowering activity.C. sophera exerts a strong anti hyperglycemic effect in rats comparable to the therapeutic drug Acarbose.. Aqueous leaf extract was found to lower the serum glucose level, and also found to inhibit the body weight reduction induced by alloxan administration.The ethanolic extract had nephroprotecive effect and the probable mechanism of nephroprotection by C. sophera against cisplatin and gentamicin induced renal injury could be due to its antioxidant and free-radical-scavenging property. The ethanol and methanol extracts of flowers showed antioxidant activity. The leaf extract haspotential to reduce theliver ingury caused by alcohol. Supplementation with leaf extract can offer protection against free radical mediated oxidative stress in experimental hepatotoxicity.. In addition, histopathological studies of the liverand brain confirmed the beneficial role of leaf extract.C. sophera tea has the potential to influence the bioavailability of carbamazepine, and hence its therapeutic actions.Prasannaet al (2009) evaluated the in vitro anti-cancer effect of C. sophera leaf extract (CALE) in human breast adenocarcinoma MCF-7 and human larynx carcinoma Hep-2 cell lines. The results showed the anti-cancer action is due to nuclear fragmentation and condensation, associated with the appearance of A(0) peak in cell cycle analysis that is indicative of apoptosis. These results demonstrated that CALE inhibits the proliferation of MCF-7 and Hep-2 cells through induction of apoptosis, making CALE a candidate as new anti-cancer . Above mentined therapeutic action of C. sophera can be corelated with presence of emodin. however not studied in detail. Presence of anthraquinones in other parts of plant in Table is also reported.

Name of species	Parts of the plant	Anthraquinones Present			
		1	2	3	
C sophera	Seeds	$R^{III}=R_4=OH$ $R^1=CH_2OH$ (aloe-emodin)	$R^{III}=OH$ $R^I=COOH$ $R_4=O$ –glucose		
	Leaves	$R^{III}=OH$ $R^1=CH_2OH$ $R_4=O$ –glucose	$R^{III}=R_4=OH$ $R^I=COOH$ (rhein)		
	Pods	$R^{III}=OH$ $R^1=CH_2OH$ $R_4=O$ –glucose	$R^{III}=OH$ $R^I=COOH$ $R_4=O$ –glucose	$R^{III}=OH$ $R^I=COOH$ $R_4=O$ –glucose	

Application :-pods constitutes an ayurvedic preparation "Dadrughan-vati" which is used for ringworm, leucoderma, etc[6]. Chakramardha tailamu, a compound ayurvedic oil of this herb is beneficial in eczema, ringworm and other skin diseases[3]. In Andhra pradesh, the tribal people had been using the pods of this plant grounded along with peppers and water into a paste, for the treatment of Jaundice[8]. The paste of pods can also be applied to ringworm and eczema. Decoction of pods and flowers is used internally for bronchitis and asthma[9]. Plant pacifies vitiated tridosha, dandruff, constipation, cough, hepatitis, fever and haemorrhoids[10] . The pods are antiperiodic, alterative, aperient, and given to children having intestinal disorders[11].The pods, pods, and even the whole plant are employed in the treatment of impetigo, ulcers, helmenthiasis and as a purgative[12]. The pounded pods are applied as poultice on cuts and wounds like tincture-iodine and for ulcers to hasten suppuration[3]. Seeds and pods are also useful in itch, ringworm, and other skin diseases[13]. Decoction of pods is a mild laxative in doses of 5 to 15 ml, especially for children having fever while teething. Poultice of the pods 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[14,15] . Other uses are in fungal diseases, worm infection, abdominal tumours, bronchitis and asthma[16] . Other uses of this plant are in abnormal child birth, in bone fracture, cold, epilepsy, night blindness, scabies, scorpion bite, stomachache, vermicide and as substitute for coffee[17] . Traditional Chinese healers use this herb to treat blindness, xerophthalmia, and conjunctivitis. The seeds are reputed in Chinese medicine as vision improving, antiasthenic, aperient, diuretic and an effective agent in lowering cholesterol and reducing blood pressure[18] . Young and tender pods and stems are eaten as a vegetable and in soups. The unripe fruits are also cooked and eaten. The seeds can be introduced as a protein rich food for Pharmaceuticals.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 coloured dyes used in dyeing and tanning[3] .

Conclusion :-

Cassia is a major genus of the Caesalpiniaceae, comprising about 600 species, some of which are used in traditional folk medicines as laxative, purgative, antimalarial, ulcer healing, anti-diabetic, hepatoprotective, nephroprotective, antitumor and also used in treatment of skin infection and periodic fever throughout tropical and subtropical region. Plants of genus Cassia are important source of naturally occurring bioactive compounds anthraquinones. These plants are also reported to have antifungal, antibacterial, antiviral properties along with insecticidal property. Isolation of various anthraquinones from these plants justifies the above mentioned properties. Besides the pharmacological properties anthraquinones are also important as redox mediator in bio-decolorization of dyes and has potential to replace synthesized organic compound used as pesticides, insecticides which associated with carcinogens, toxicants and ecosystem degradation due to its nonbiodegradability and tendency to accumulate in ecosystems. This review highlights the importance of Cassia species as an alternative system for biologically active metabolites anthraquinone The work so far done on Cassia species also sets basis for future studies on the effects of anthraquinone

containing extracts of the plants which may have important practical implication in grain storage as natural preservative and their potential utilization in development of alternative medicines, novel cancer therapy as well as novel drug to treat viral diseases including polio, AIDS, etc. Antioxidant properties of anthraquinone containing extracts from these plants can be important for protection against number of diseases and reducing oxidation processes in food systems.

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