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PHARMACOLOGICAL AND PHYTOCHEMICAL EVIDENCE OF SCUTIA GENUS PLANTS - A REVIEW

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Abstract:

Scutia is a natural plant, which is cultivated variety of the genus Scutia belonging to family rhamnaceae.The scientific basis for the statement that plants and their active constituents play an important role in the prevention of diseases and therapeutics. In fact the origin of many therapeutic substances from the genus scutia It is an interesting source of potential bioactive compounds like flavonoids,tannins,proteins,saponins,Alkaloids,Tri terpenoids, steroids, carbohydrates, fixed oils, glycosides with gut motility activity and CNS activity like depressant and stimulant, antioxidant, anti-inflammatory, antimicrobial, Hepatoprotective activity,anti malarial and anti proliferative , anti diabetic activity, analgesic and anti ulcer , anti tumor and anticancer activity. This work reviews the pharmacological evidence of extracts of plants from the genus scutia, giving an overview of the most studied biological effects and the known photochemical composition. Although more studies are necessary, scutia exhibits proven potential to become of important pharmacological interest.

Keywords: ***.Genus scutia, pharmacological activity, photochemical constituents, medicinal plants.anti Proliferative activity.***

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INTRODUCTION:

Scutia myrtina:

myrtina is an erect, glabrous or minutely pubescent branched ever green herb which grown as a hedge plant up to 75-80cm height and the edible fruit is used as an astringent Stem is striate, leaves are distant, and Surratt margin and ovate. Flowers are white in colour. The seeds are small and yellowish brown in colour. The aerial part of the plant was used for stomach problems. The root and Leaves of the plant traditionally used as antihelminthic. The alcohol extract of the aerial part of the plant posses antiviral activity. The root bark is used for fever and also the infusion of the plant is used to treat malaria. In eastern Tanzania the root of this plant is used for the treatment of bilharzias, intestinal worms and fever. In India the leaf is used as an ointment to hasten childbirth (South African national list of trees). The aerial part of the plant was used for stomach problems, salpingitis.The root and leaves of the plant traditionally used as anantihelminthic. The leaves and root bark decoction is used for gonorrhea, bilharzias, and intestinal worms in Tanzania. The stem bark used for chronic joint pains *It* is widely available in South India, especially in Kolli Hills, Tamilnadu. It is commonly known as Chimat (Hindi), a prickly shrub found throughout the hotter parts of India, East Africa, Kenya, Tanzania, and South Afria.

Morphology:

Shrubs evergreen, or small (7m high) tree with spiny branches , they are scandent, straggling, or erect, to 5m tall, spinescent, branches opposite to sub opposite , young branches puberulent older branches brown or red –brown, striate, glabrous, spines mostly 2 per node, axillary ,2-7mm, recurved.this species is very diverse in size,shape,and denticulation of the leaves.

Leaves:

Leaves are simple, cuneate, entire margin, hardly, evergreen, drought resistant, thorny shrub with beautiful gloosy, tiny leaves and new growth of leaves was pretty bronze colour. It makes a lovely scandent shrub, which can be trained to climb or pruned into an attractive hedge. Arranged leaves, 2-4 cm across, are somewhat circular, leathery and shining. Leaf stalks are 6mm,lateral veins 5-8 pairs, apex shortly acuminate or acute, stipules lanceolate,2-3 mm , early deciduous, petiole 3-5mm,glabrous or puberulent, leaf blade abaxially pale green,adaxially shiny, deep green, brown when dry.

Flower:

flowers are ,fragrant, small , white flowers ,borne in umbels in leaf axils, on short stalks ,also 5 slender sepals and 5 clawed petals,5 stamens, few in axillary fascicles or shortly pedunculate in auxillary condensed cymes, glabrous. In auxiliary umbellate clusters, 5-20 flowers per cluster.

Fruits & seeds:

A edible fruit is subglobose-obovoid drupe is 4-5mm in diameter with a thin, fleshy pulp that contains two-seeded stones,apiculate,dark blue when ripe, seeds 2-4,subglobose, compressed, fruiting pedicel 3-4mm,glabrous, seeds brown, flat, Obcordata.

Fig: 1.Plants of scutia myrtina

Scientific classification

Kingdom: plantae

Unmarked: Angiosperms

Unmarked: Eudicots

Unmarked: Rosids

Order: Rosales
Family: Rhamnaceae.
Tribe: Rhamnaeae
Genus: Scutia
Synonym: Adolia Alba lam
Adolia capensis (Thunb) Kuntze
Adolia Obcordata Kuntze
Adolia Rubra Lam
Blepetelon aculeatum Rafin.
Ceanothus Capensis DC.
Ceanothus Zeylanicus Heyne
Rhamnus Capensis Thumb
Rhamnus Lucida Roxb
Scutia buxifolia Hutch & Moss.
Scutia Capensis (Thumb) G. Don.
Scutia Circumscissa Druce
Scutia Commersonii Brongn.
Scutia eberhardtii Tardieu
Scutia myrtina var. emarginata m.m bhandari&A.K.Bhansali
Scutia myrtina var. oblongifolia (Engl.) Evrard.
Scutia rheediana Wight
Ziziphus capensis Thunb. Ex Poir.
Scutia hutchinsonii Suess.

Phytochemical constituents of scutia myrtina,

The different extract of scutia myrtina were found to contains like alkaloids, steroids, carbohydrates, tannins, fixed oils, glycosides, proteins, saponins, flavonoids new anthrone anthraquinone, bisanthrone anthraquinone, anthraquinone: aloesaponarin isolated from ethanol extracts of bark, exhibited moderate antiplasmodial activity against chloroquine resistant plasmodium falciparum.the roots have perylenequinones, scutiaquinones A&B, which is having antihelminthic activity, cyclopeptide alkaloids with moderate antimicrobial activity.ethonolic extract of this plant exhibited Hepatoprotective effects which is due to its antioxidant, free radical scavenging effects. The extracts have exhibited significantly decrease the activity of serum enzymes (AST & ALT), ALP. Bilirubin, lipid peroxidation, while it significantly increases the levels of protein, uric acid, vitamin C, vitamin E, aSH, SOD & CAT. The anthraquinone glycoside are responsible for laxative effect which potentiates the effect of acetyl choline on smooth muscles especially in intestine smooth muscles, increases the contraction of smooth muscles thus leading to an increase in gut motility, its laxative effect. Leaves are used in ointments applied locally to hasten parturition and roots are used to relieve backaches, chest pains. (25). and also believed that which is having some anti-carcinogenic effects but the main mechanism of action was not well established. Their anti-proliferative effects could be employed in management of human ovarian cancer, liver lesions. Moreover the structure of some isolated chemical constituents of scutia myrtina [5]. (Fig: 2)

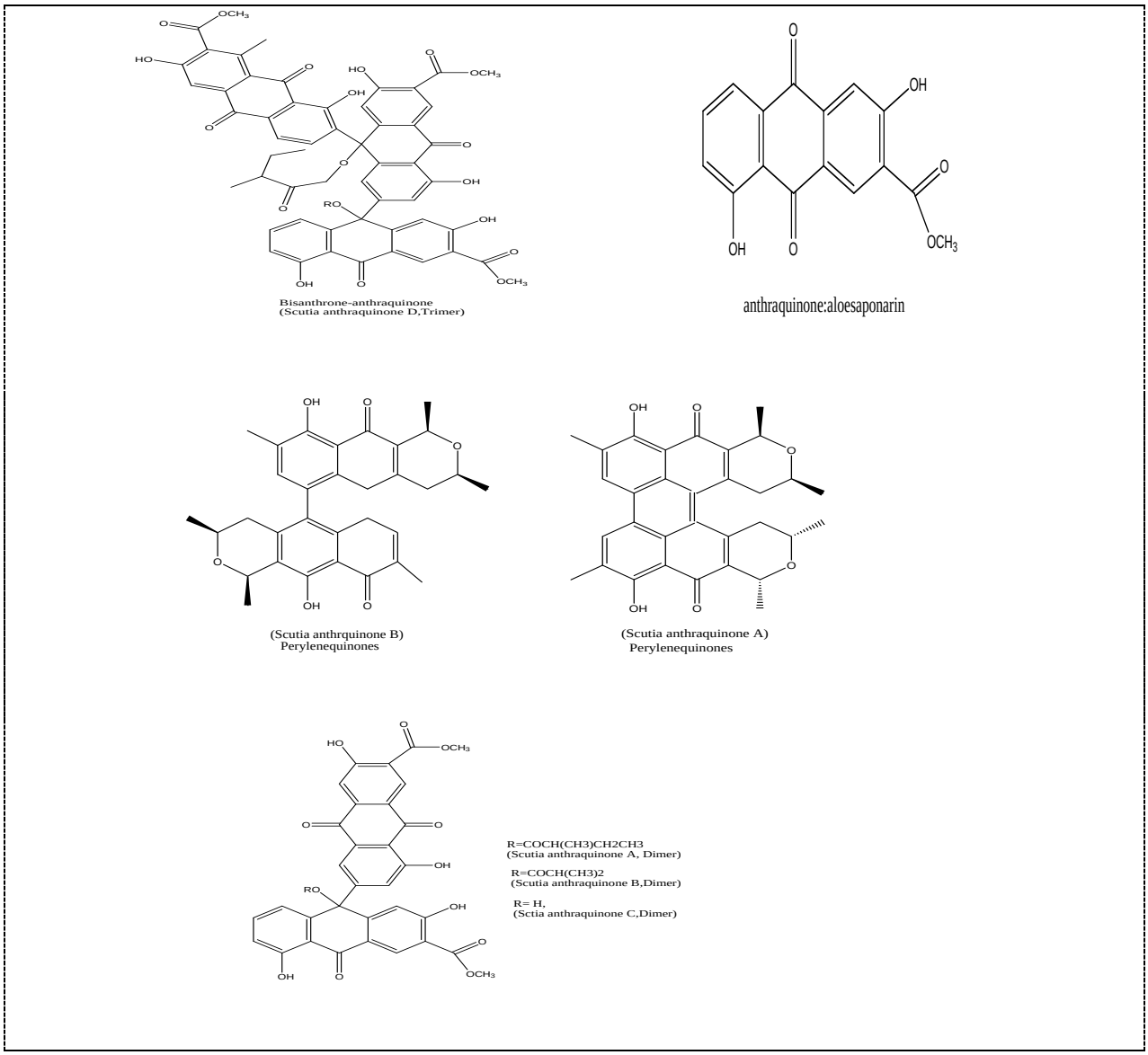

Fig: 2

3. Pharmacological Activities:

Gut motility activity & laxative effect [1]

Ethanol extract of whole plant of scutia myrtina were evaluated phytochemical studies revealed the presence of alkaloids, flavonoids,glycosides (anthraquinone), tannins and screened gut motility activity by different parameters depending on respective animal models using standard drugs as castor oil & Glexenna. the extracts concentration of 200mg/Kg& 400mg/Kg in three animal models ,compared with standard drugs such as, Gut motility activity in isolated rat intestine and propulsive gut motility in mice, laxative activity in mice.thes results which indicates that scutia myrtina potentiates the effect of acetylcholine on isolated rat intestine, that indicates ,the contraction of rat intestine as well as which exhibited significant gut motility and thus laxative activity , due to the presence of anthraquinone glycosides.

Anti proliferative and antimalarial activity [2]

An ethanol extract of the bark of scutia myrtina, isolated three new anthrone-anthraquinone A, B, &C, one new bisanthrone-anthraquinone, scutia anthraquinone D, scutia anthraquinone and the known anthraquinone, aloesaponarin I. The structures of all compounds were determined using a combination of 1D & 2D NMR experiments, including COSY, HSQC, HMBC, and ROESY sequences, mass spectrometry. All the isolated the

compounds were tested against the A2780 human ovarian cancer cell line for antiproliferative activities, against the chloroquine – resistant plasmodium falciparum.the strains Dd2 and FCM29 for antiplasmodial activities.scutianthraquinone A,B &D (1,2,4)showed weak antiproliferative activities against A2780 cell line, while all isolated (1-4) compounds showed moderate antiplasmodial activities against P.falciparum Dd2 and compounds A,B & D (1,2,4) exhibited moderate antiplasmodial activities against P.falciparum FCM2

CNS Depression activity and Analgesic activity [3]

In present study ,was evaluated the central nervous system(CNS) depressant and analgesic activities of the ethanol extract of scutia myrtina (EESM) in Swiss albino mice by used methods such as general behavior, exploratory behavior, muscle relaxant activity and phenobarbitone sodium induced sleeping time were studied. Analgesic effect was evaluated in acetic acid induced writhing & hotplate tests. The results revealed that, the EESM at the dose of 200 and 300mg/kg produced significant reduction in the spontaneous activity (general behavioral profile), decrease in exploratory behavioral pattern (Y- maze and Head Dip test),a reduction in muscle relaxant activity (rotarod & traction tests), also significantly potentiated phenobarbitone sodium – induced sleeping time. The results suggest that ethanol extract of scutia myrtina exhibited CNS depressant and analgesic activity in tested animal models.

Antidiabetic activity and CNS stimulant activity [4]

The methanol extract of whole plant of scutia myrtina was carried out with soxhlet apparatus using solvents-petroleum ether and methanol were evaluated Antidiabetic, CNS stimulant activity .flavonoids are isolated by using solvent toluene: ethyl acetate (5:1). the extracts obtained were subjected to various phytochemical tests, to identify the active constituents the whole plant extract showed the presence of alkaloids,tannins, glycosides, flavonoids, triterpenoids.the isolated fraction were characterized by spectral studies like UV, NMR, IR & MASS which indicates that the isolated fraction might flavonoids type of compound. The methanol extract of whole plant at the dose of 400mg/kg was administered orally once a day to the groups for 21 days**.** The plant methanol extract significantly, decreased the levels of Glucose, Cholesterol, Triglycerides, SGOT and SGPT and also significantly ($p<0.001$) increased the level of Total protein Glibenclimide used as standard drug (0.5 mg/kg,). Moreover it showed that flavonoids present in the extract which may be possible of responsible for the pharmacological actions. It also significantly increased the locomotors activity when compared to the standard drug caffeine, no significant effect on Rota rod. The pharmacological studies of extract showed that, extract possess CNS Stimulant activity decreased the no. of entries and the time spent in the open arm in the elevated plus maze. Also significantly ($p<0.001$) increased the no of entries in the Y maze. Also significantly ($p<0.001$) decreased the immobility time and increased the frequency of swimming and climbing in forced swim test. The results which indicates that the extract exhibited CNS stimulant properties, which probably act via competitive antagonism at adenosine receptors leading to increase in nor-epinephrine secretion, enhanced neural activity in numerous brain areas.

The antisecretory and cytoprotective activity [5]

the ethanol extract of scutia myrtina (Indomethacin,ethnolic, cold restraint induced ulcer) *at the dose levels of 200mg/kg and 400mg/kg significantly decrease in ulcer with increasing percentage protection and decrease in the volume of gastric juice thereby increasing the pH of the gastric juice. When comparable and equipotent with that of standard drug omeperazole*The results of free acidity and total acidity estimation of gastric juice of *Scutia myrtina* treated groups indicate that there was a significant decrease in the free acidity and total acidity of the gastric juice. But 400mg/kg showed more significant decrease of free acidity ($p<0.01$) and total acidity ($p<0.01$) than 200mg/kg ($p<0.05$) and 400mg/kg was equipotent as that of Omeprazole ($p<0.01$). From the above study it may be concluded that *Scutia myrtina* can be further studied to isolate the compounds responsible for the above shown activities and can be used as Raw Material for preparing Cytoprotective formulations.

Antitumor and anticancer activity [7]

The ethanol extract of scutia myrtina (EESM) evaluated antitunour,antioxidant activity against Ehrlich's Ascites carcinoma(EAC) in mice , 24hrs after tumour incubation extract (EESM) was administered at doses 100,200 and 300 mg/kg $^{-1}$ body weight/mice/day for 21 days which (EESM) caused a significant($p\leq0.01$) decrease in Ascites volume, packed cell volume ,viable cell count and also prolonged the life span of EAC tumour-bearing mice.Haematological profiles are near to normal levels in extract treated mice ($p\leq0.01$).and also produced protective effects by significantly decreasing the activity of serum enzymes,bilirubin and increasing the protein ,uric acid levels ($p\leq0.05$). These extract (EESM) significantly ($p\leq0.05$) decreased the levels of lipid peroxidation, while it

significantly ($p \leq 0.01$) increased the levels of enzymatic, non enzymatic antioxidants. The results which indicate that ethanol extract of scutia myrtina exhibited significant antitumor and antioxidant activities in EAC- bearing mice.

Hepatoprotective effect and antioxidant activity [8]

The present study was investigated, ethanol extract of scutia myrtina (EESM) evaluated, and hepatoprotective effect and antioxidant activity against paracetamol induced liver damage in rats. The degree of protection was measured by using biochemical parameters like The degree of protection was measured by using biochemical parameters such as serum transaminase (SGPT and SGOT), alkaline phosphatasem (ALP), total protein and uric acid,bilirubin. Furthermore, the effects of extract on lipid peroxidation (LPO), glutathione (GSH), Vitamin E and Vitamin C, Superoxide dismutase (SOD), catalase (CAT) were estimated. The EESM doses 100 and 200mg/kg produced significant activity ($p \leq 0.05$) Hepatoprotective effect by decreasing the activity of serum enzymes, bilirubin and lipid peroxidation while it significantly increased the levels of protein, GSH, uric acid, Vitamin C, Vitamin E, SOD AND CAT ($p \leq 0.05$).the effects of ethanol extract of scutia myrtina were comparable to that of standard drug Silymarin. The effects of EESM were comparable to that of standard drug Silymarin. The result which indicates that EESM showed Hepatoprotective effects on paractamol induced liver damage in rat which may be due to antioxidant, free radical scavenging activity of ethanol extract of scutia myrtina (EESM).

Anti inflammatory, antimicrobial activity [10]

The present study was evaluated the anti-inflammatory, antimicrobial activity of petroleum, ethanol extracts of scutia myrtina.antiinflammatory carrageenan,histamine induced paw oedema and cotton pellet induced granuloma for acute and chronic inflammatory models were studied Wister albino rats .the extract of scutia myrtina (200,400mg/kg body weight) against experimental model exhibited significant anti inflammatory activity. A total 10 microorganisms were selected (6 bacterial, 4 fungal organisms), both the extracts were tested against bacterial, fungal organisms at the concentration of 100µm/ml by agar diffusion method. Based on the results, the petroleum ether, ethanol extracts of scutia myrtina exhibited significant anti-inflammatory and anti microbial activities'.

CONCLUSION:

The above collected information regarding the use of genus Scutia in world is matched with available literature. Recent years, ethno-botanical and traditional uses of natural compounds, especially of plant origin received much attention as they are well tested for their efficacy and generally believed to be safe for human use. It is best classical approach in the search of new molecules for management of various diseases. Thorough screening of literature available on genus Scutia depicted the fact that it is a popular remedy among the various ethnic groups, Ayurvedic and traditional practitioners for treatment of ailments. Researchers are exploring the therapeutic potential of this plant as it has more therapeutic properties which are not known. The presence of various active constituents of this plant showed various potent effects but still the exploration of the exact moiety is required to study the mechanism behind these activities. Thus this review will give an insight of various possible activities carried out and the activities which can be carried out for its attribution which will emphasize on standardization and biological need of the species for the healing of ailments with better result and safer dose.

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