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Review article of Phytochemical and Pharmacological activity of Achyranthes aspera, Ficus glomerata and Leucas aspera and Microbial activity test

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Abstract:

The medicinal potential of medicinal plants is a well-known phenomenon from centuries. This review article is focus on the phytochemical, pharmacological, and microbial activity of three medicinal plants as Achyranthes aspera (Amaranthaceae), Ficus glomerata (Moraceae) and Leucas aspera (Lamiaceae). Its is rich sourse of bioactive compounds as alkaloids, flavonoids, tannins, saponins, phenolic compounds, and terpenoids. Its Various pharmacological activities have been reported as Hepatoprotective and antioxident property DNA Damage protective activity immunomodulatory activity Antifungal activity

Antimicrobial activity Antinociceptive activity antioxidant and cytotoxic activities. for the antimicrobial activity 80% methenol is use in which use, E.Coli, K.pneumoniae and S.typhi bacteria.

Keywords: Phytochemical, Pharmacological, Achyranthes aspera, Ficus glomerata,

Leucas aspera, Microbial activity test

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Introduction

Achyranthes aspera

The plants have rich source of phytochemicals in which have a wound healing and antioxidant property And antimicrobial properties It can help the reduce inflammation and infection of wound,cut,burn.Achyranthes aspera is commonly known as rough chaff tree in English.It is also known as Apamarga .this herb grow wild and Abundantly in India.India use the leave of this plant for healing wounds. Achyranthes aspera is reported various activity included Hepatoprotective(1), Cancer Chemo Preventive(2) ,Anti- inflammatory, anti- arthritic(3) ,thyroid stimulating, anti-

peroxidative(6), reproductive function(4), anti -bacterial(5), immunomodulatory(6), contraceptive (7),Saponian of this plants have phospholrylase activity on the heart root of these plants used for malarial fever hypertension asthma(8).

Phytochemical

Alkaloids, tannins, phenols, saponins, carbohydrates, steroids and glycosides are present in the achytanthes aspera(9).

Leave

Seed

Flower

Ficus glomerata

Ficus glomerata Roxb. syn. F. racemosa L. (Family: Moraceae) Gular in Hindi Cluster fig in English It is a medium-sized to large evergreen or occasionally deciduous tree and found throughout India and Southeast Asia. Its fruits are mixed with rice for making bread and used in several dishes. The bark, fruits and latex are used to treat anemia and gastrointestinal disorders like constipation, dysentery(10).

Phytochemical

Fruit

Leaf

Seed

The stem bark of F. religiosa have been reported to contain phytoconstituents of phenols, tannins, steroids, alkaloids and flavonoids β-sitosteryl-D-glucoside vitamin K n-octacosanol, methyl oleanolate, lanosterol, stigmasterol, lupen-3-one.(11) The major active constituent from the root bark F. religiosa was β-sitosteryl-D-glucoside, which exerts a peroral hypoglycemic action in fasting and alloxan-diabetic rabbits, and in pituitary-diabetic rats. The fruits contain 4.9% protein having the essential amino acids, isoleucine, and phenylalanine.(12) The seeds contain phytosterolin, β-sitosterol, and its glycoside, albuminoids, carbohydrate, fatty matter, coloring matter, caoutchoue 0.7–5.1%.(13) F. religiosa fruits contain flavonols namely kaempeferol, quercetin, and myricetin (14) Leaves and fruits contain carbohydrate, protein, lipid, calcium, sodium, potassium, and phosphorus.(15) The aqueous extract of dried bark of F. religiosa has been reported to contain phytosterols, flavonoids, tannins, furanocoumarin derivativesnamely bergapten and begaptol(16)

Pharmacological property

Hepatoprotective and antioxident property-The methanol extract of the bark when given orally along with CCl(4) at the doses of 250 and 500 mg/kg body weight showed a significant reversal of these biochemical changes towards the normal when compared to CCl(4)-treated control rats in serum, liver and kidney(17)

DNA Damage protective activity

Green fruit of Ficus glomerata is show protective oxidative DNA Damage(18)

Immunomodulatory activity

Bark and Fruit of Ficus glomerata is show phagocytic effect on human neutrophils (19)

Leucas aspera

Leucas aspera (Lamiaceae) is a small herbaceous, erect plant with free blooming nature, which grows as a weed on waste lands and roadsides all over India. It is pungently aromatic and commonly used as antipyretic herb in south India. In traditional medicine it is indicated for cold, cough, painful swellings and chronic skin eruptions. The plant was previously evaluated pharmacologically for its anti-inflammatory, analgesic and protective effects against cobra venom poisoning (20)

Phytochemical

L. *aspera* revealed presence of triterpenoids in entire plant(21). Whole plant is reported to contain oleanolic acid, ursolic acid and 3-sitosterol(22)Aerial parts are reported to contain nicotine(23), sterols(24),two new alkaloids (compound A m.p. 61-2°, α-sitosterol and β-sitosterol) (m.p. 183-4°), reducing sugars (galactose), glucoside (230-1°)(25),diterpenes (leucasperones A and B, leucasperols A and B, isopimarane glycosides (leucasperosides A, B and C), together with other compounds like asperphenamate, maslinic acid, (-)-isololiolide, linifolioside(26),] nectandrin B, meso-dihydroguaiaretic acid, macelignan, acacetin, apigenin 7-O-[6'-O-(p-coumaroyl)-3-D-glucoside], chrysoeriol, apigenin, erythro-2-(4-allyl-2,6-dimethoxyphenoxy)-1-(4-hydroxy-3-methoxyphenyl)propan-1-ol, myristargenol B, and machilin C, (-)-chicanine, (7R,8R)- and (75,85)-licarin A(27), Among the 25 compounds identified from the leaf volatiles, u-farnesene (26.4%), x-thujene (12.6%) and menthol (11.3%) were the major constituents. The flower is reported to contain 10 compounds; among them amyl propionate (15.2%) and isoamyl propionate (14.4%) were dominant(28),Seed is reported to contain palmitic acid (6.25%), stearic acid (2.84%), oleic acid (42.07%), linoleic acid (48.11%), and linolenic acid (0.65%). The unsaponifiable fraction contained 3-sitosterol and ceryl alcohol(29),Shoot contained novel phenolic compounds (4-(24-hydroxy-1-oxo-5-n-propyltetracosanyl)-phenol)(30),aliphatic ketols (28-hydroxypentatriacontan-7-one, 7-hydroxydotriacontan-2-one)(31),long-chain compounds (1-hydroxytetratriacontan-4-one, 32-methyltetratriacontan-8-ol)(32), nonatriacontane,5-acetoxytriacontane, β-sitosterol(33) and dotriacontanol, Leucolactone (I), isolated from the root of *L. aspera* have been characterized as 3,3,16c-dihydroxyoleanan-28-1,3-olide(34).

Seed

Plant

Pharmacological activity

Antifungal activity

In an in vitro study of chloroform and ether extracts that revealed antifungal activity against Trichophyton and Microsporum gypseum L. aspera, minimum inhibitory concentration was observed to be at 5mg/mL(35).

Activity of Leucas aspera flowers on antimicrobial

The methanolic extract of L. aspera flowers, its fractions and the expressed flower juice all showed good antibacterial activities for methanolic extracts and methanolic fractions which were found to have maximum activities for the alkaloidal residues(36).

Anti-nociceptive, antioxidant and cytotoxic activities

The ethanolic extract of L. aspera root caused a significant inhibition in acetic acid-induced writhing in mice at doses of 250 and 500 mg/kg. The extract showed significant free radical scavenging activity with an IC50 of 8 μg/ml. The extract was showed significant lethality to brine shrimp(37).

Antimicrobial activity Test

MATERIALS AND METHODS

Collection of medicinal Plants

Three medicinal plants were selected and their parts(only full grown and matured parts) during months of april and may.

Preparation of alcohol extract

the collected medicinal plant were cleaned and dried under shade. The dry plant material was converted into find powder. 500 mg of dry powder was extract with 80% alcohol at 60-80o C by using soxhlet apparatus. the extraction was continued for 24 hours. the alcoholic extract was then filtered and kept in oven at 50oC for 24 hours to evaporate the alcohol form it. A dark brown residue was obtained. the solid fractions was redissolve in dimethyl formatite formamide(DMF) and their microbial efficiency were noted. DMF was a inert organic solvent.

Selection of microorganism

Escherichia coli bacteria, Klebsiella pneumoniae becteria and Salmonella Typhi were use for the antimicrobial activity. E.Coli, K.pneumoniae and S.typhi were used in the antimicrobial screening for 24 hours cultures .

Microbial test

5% w/v test solution of each extract was prepared by dissolving 250mg of each extract separately in 5ml of sterile dimethy1 formamide (DMF). Nutrient agar medium was prepared and sterilized by an autoclave. In an aseptic room, they poured unto sterile petridishes to a uniform depth of 4mm and then allowed to solidify at room temperature. After solidification, the test organism were inoculated with the help of a sterile swab soake in a bacterial culture of suspension. Thus provides the uniform surface growth of bacterium and used for antibacterial sensitivity studies. Then the sterile filter paper discs (6mm) containing sample (100ul) were immensed in plant extracts and was placed over the solidified agar in such a way that there is no overlapping of zone of inhibition (38). Plates were kept at room temperature for half an hour for the diffusion of the sample into the agar media. The organisms inoculated petridishes were incubated at 37oC for 48 hours. After the incubation period is over, the zone of inhibition produced by the sample with different organisms in different plates were measured and recorded immediately by using a zone reader (39)

Results and Discussion:

the extracts of A. aspera, F. glomerata, L. aspera is conducted to analyze the antimicrobial activity of the E.coli, K. pneumoniae and S.typhi bacteria. zone of inhibition of A.asper show 7mm, 9mm, and 8mm, F.glomerata is show 7mm, 15mm and 8mm by zone of inhibition, L.asper is show 15mm, 14mm and 11mm by zone of inhibition. All zone of inhibition is measured and compared with the standard values. There is no zone of inhibition in the control (DMF)

against E.coli, K. Pneumoniae, and S. typhi. Depending upon the values of the measured diameter of complete inhibition of the circle containing the disc, in millimeter, the antibacterial activity can be categorized into the following types: >12mm zone of inhibition-highly sensitive, 9-12 mm zone inhibition-moderately sensitive, 6-9 mm zone of inhibition-less sensitive and <6 mm zone of inhibition-resistant (15). Thus the present study, on record are sensitivity more than 12mm zone of inhibition shown by t-extract of F.glomerta against K.Pneumoniae (15mm), L.aspera against E.coli (15mm) and K. Pneumoniae (14mm). Antimicrobial activity are expressed through the extracts as if possibly due to certain antimicrobial substances contents present within.

Conclusion

Achyranthes aspera, Ficus glomerata, and Leucas aspera are very rich in phytochemical diversity and pharmacological potency.The bioactive compounds in these plants have a variety of therapeutic properties such as anti-inflammatory, analgesic, antioxidant, anticancer, and antimicrobial activities.The microbial activity tests results show that these plants have strong antimicrobial activity and can be used in the development of drugs to overcome the drug-resistant pathogens.Despite the positive findings, more research work, especially clinical trials, would be necessary to fully exploit these plants for modern medicine. With their rich chemical composition and multifaceted activities, the plants may become a treasure in the development of new therapeutic agent.

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