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Mimusops elengi Linn : Review on Medicinal properties and It's Importance

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ABSTRACT: Medicinal plants having important unique phytochemicals which are used in the development of valuable drugs against various diseases. Which helpful in large population countries, especially in the developing and underdeveloped countries. Herbal medicine popularized because cheap, easily available and less or no side effects. The mimusops elengi linn belongs to the family sapotaceae. This is an ornamental tree , cultivated largely in gardens. Different parts of mimusops elengi are used in various ways to cure number of human ailments. Such as anti HIV, antihelmintic, anti bacterial, anti viral, cardiotonic, stomachic, astringent, diarrhea ,dysentery and decoction of the bark used as gargle etc. The present review enrich our knowledge and pharmacological properties of this plant also helpful in further research so as work on untouched pharmacological properties.

Key words: Mimusops elengi, astringent, cardiotonic, antihelmintic, anti-HIV.

INTRODUCTION:

Mimusops elengi is a large tree attaining a height of 1200cm-1500cm, distributed in western and eastern ghats , peninsular region and cultivated in the plains. Mostly the plant is cultivated for ornamental appearance and shade for fragrant flowers[1] . Its flowers as symbol of love and beauty[2]. Leaves are dark green, shiny and pointed. It is also considered as a sacred plant among hindus.

The various properties of this plant have been studied and documented. The flowers are used in lotion preparation for wounds ,ulcers and for treating asthma, also used as expectorant, brain tonic[3]. The fruit is edible and it has traditional medicinal uses. The bark , seeds, fruits and flowers are cooling, astringent, tonic and febrifuge. Mainly used in dental problems like bleeding gums, dental caries, and loose teeth[4]. Ripened fruits helps in burning urination, and the ripe fruit pounded and mixed with water is given to promote delivery in child birth. Bark decoction is used to wash the wounds.

TAXONOMY:

Kingdom : Plantae, Order : Ericales, Family : Sapotaceae, Genus : Mimusops, Species : Mimusops elengi Linn. Binomial name : Mimusops elengi.

VERNACULAR NAMES :

Bakul, Bagulam, Gokul, Boalsari, Sthirapuspa, Chirapuspa, Pagadamanu, Elangi, Madhugandha, Vakulamu, Magilan, Renje, Spanish cherry, Medlar, Bullet wood, Bakhor, Anangaka, Keshu kesara, Udumbara, Varsoli, Wowl, Vovoli, Ovalli, Surabhi, Gudhupushpa, Padyamoda, Visharada, Indian medlar, Sindhugandha, Simhakesha, Moolsarau, moolsari, Bohl, Alagu, Vagulam, Makuram, Iranni.

PHYTOCHEMICAL PROPERTIES:

A large number of phytochemicals have been isolated and characterized from different parts of M.elengi.

Leaf : Quercetin, quercitol, hentriacontane, β-carotene, glucose and lupeol.

Flower :D-manitol, β-sitosterol, its glucoside and essential oil. They also yielded quercitol, ursolic acid and triterpene alcohol which was later identified as lupeol[5].

Heart wood and Roots : A new steroidal sponin, 5α-stigmast-9(11) en-3-o-β D-glucopyranosyl (1-5)-o-β-D-xylofuranoside was isolated from the roots of M. elengi[6,7].

Seed and Fruit : Myricetin, quercetin, dihydroquercetin, hederagenin, glycosides, betulinic acid and ursolic acid, β-D-glycosides of β-sitosterol, α-spinasterol[8]. Six new saponins were isolated from seed kernel[9]. Two new pentacyclic triterpene acids as mimusopic acid and mimusopsic acid, possessing the novel skeleton, mimusopane[10]. Mimusopsgenone and mimugenone[11], pentacyclic triterpenes 3,6β,19α,23-tetrahydroxy-urs-12-ene and 1β-hydroxy-3β-hexanoyl lup-20(29)-ene-23, 28-dioic acid have been isolated[12]. Taxifolin, Mi-glycoside 1, alpha-spinasterol glucoside, two new triterpenoid saponins mimusopside A & B were also isolated[13]. Two novel saponins: mimusopsin and mimusopin were isolated from the seeds[14] and minor triterpenoid saponin mimusin was isolated along with two known saponins, Mi-saponin A and 16α-hydroxy Mi-saponin A[15]. The seed oil was comprised of capric, myristic, stearic, lauric, palmitic, oleic, arachidic and linoleic acids[6]. The fruit of elengi reported to contain protein(1.29%), fat(2.76k.cal), moisture(79.2%), reducing sugar(8.9%), non reducing sugar(6.3%), fiber(1.13%), total sugar(15.2%), mineral content(0.32%), vitamin C (3.27mg/100gm), sodium(5.16 mg/100gm), potassium(98.5mg/100gm), iron(0.59mg/100gm)[16].

Stem bark : Ethanolic extract of bark contain a saponin which on hydrolysis produce brassic acid and β-amyrin. Also tarexerol, betulinic acid, sinasterol, taraxerone, ursolic acid, sodium salt of betulinic acid and fatty acid esters of alpha-spinasterol was isolated from the bark[17]. New gallic acid esters, characterized as phenyl propanoxyl gallate[18]. The steam distillation of bark yielded 0.18% of volatile organic matter. The major constituents were reported as α-cadinol, hexadecanoic acid, diisobutyl phthalate, tau muurolol, octa deca dienoic acid[19]. A new triterpene 3β-hydroxy-lup-20(29)-ene-23, β-amyrin, 28-dioic acid[20]. Mimusop farnanol, farnane type pentacyclic triterpene was isolated along with farnan-3-one, lup-20(29)-en-3β-ol and olean-18-en-2-one-3-ol[21].

PHARMACOLOGICAL ACTIONS:

All parts of Mimusops elengi used for various human ailments. However , the bark has been studied extensively for its pharmacological properties. It exhibits various biological and pharmacological actions such as ……*etc.* due to presence of a varity of active phytochemical constituents.

DENTAL EFFECTS AND ODONTOPATHY:

Herbal mouth rinse prepared from bark aqueous extract was found tobe potent plaque inhibitor and anti inflammatory acting against gingivitis[22]. Unripe fruit and seed are used for fixed loose teeth. Dried flower, twig useful for cleaning teeth and also useful for arresting of bleeding gums. Bark and seed coat are used for strengthening of the gums and also used in ayurvedic formulations lke vajradanti, dantapavana, bakuladya taila, bakula puspa taila etc[23]. chloroform extract of bark showed significant antibacterial activity in dental patients by ditch plate technique[24].

ANTIBACTERIAL ACTIVITY:

The leaf extracts shows invitro anti bacterial activity against bacillus species, staphylococcus albus, vibrae cholerae and xanthomonas malvacearum, the inhibition was significant against xanthomonas compestris and bacillus anthracis[25]. The ethanol extracts were found to be more potent than aqueous extracts of all the medicinal plants[26]. The fruit extracts were found less potent against most of the tested bacteria compared to those preparations from bark and leaves of elengi. Acacia Arabica, Glycyrrhiza glabra, Achyranthus aspera, Acacia catechu and Mimusops elengi extracts were tested for their antibacterial activity against dental infection micro organisms such as Staphylococus aureus, S.mutans, S. sanguis, S. salivarius, Lactobacillus acidophilus and Candida albicans by well diffusion method , all the plant extracts shows significant activity against all pathogens[27].

ANTI VIRAL ACTIVITY:-

Kusumoto IT, Nakabayashi T et.al, reporting antiviral activity with crude aqeous and methanol extracts of mimusops elengi inhibited HIV type-1 protease by more than 70% at a concentration of 0.2mg/ml as determined by HPLC[28] .

ANTIFUNGAL ACTIVITY:-

Different extracts (ethyl acetate, petroleum ether and methanol) from bark, fruit and leaves of mimusops elengi were tested for antifungal activity against some pathogenic fungi. Fruit extracts shows less potent activity compared with those prepared from bark and leaves of elengi and were inactive against the fungus Trichoderma viride. However the leaf extracts shows good activity against Trichoderma viride[29]. Hexane , ethanol, ethyl acetate and methanol extracts of mimusops elengi and other medicinal plants were tested against the dental caries causing bacteria and fungus Candida albicans isolated from infected pathogens. However , mimusops elengi did not show any antifungal activity against candida albicans[30]. The aqueous and different solution extracts of petroleum ether, benzene, chloroform, methanol, ethanol was screened for in vitro antifungal activity, by poisoned food technique against phyto pathogenic fungi[31].

ANTIHYPERLIPIDEMIC ACTIVITY :-

Ghaisas M et al, evaluated the antihyperlipidemic activity on wistar rats using of methanolic bark extract. Showed significant reduction of levels of triglyceride and cholesterol[32].

NEMATICIDAL & LARVICIDAL ACTIVITY:-

Azhagumurugan and M.k.rajan investigated the methanolic leaf extract of mimusops elengi for nematicidal activity in root knot nematode (meloidogyne incognita) and their study suggests mimusops elengi plant potent nematicide[33]. Ruikar AD, Pawar PV et al, found larvicidal activity with hexane and ethyl acetate extracts of bark of mimusops elengi against A. aegypti and C. quinquefasciates and its bebefts in developing environmentfriendly new type of larvicide for mosquito control[34].

ANTIOXIDANT ACTIVITY:-

Priyanka Dhar and Suseen investigated the anti-oxidant activity of leaves of mimusops elengi by performing hydroxyl radical scavenging assay[35]. The methanolic extract of the leaves was evaluated by using DPPH scavenging assay. The extract showed significant antioxidant assay compared to the reference antioxidant ascorbic acid in dose dependent manner[36].

CNS ACTIVITY:-

Ganu G, Agarwal Vet al,found anticonvusantactivity with methanolic, n-butanolic and aqueous extracts of bark of mimusops elengi in maximal electroshock(MES) indused convulsions in rats and INH indused convulsions in swiss mice. It was concluded that methanolic extract of elengi showed maximum protection against convulsions[37], and also found anti anxiety activity with aqueous , methanolic and n-butanolic extracts of bark of mimusops elengi was studied in swiss mice and was found methanolic extract had more potent anxiolytic action as compared to other extracts[38].

ANTIMICROBIAL EFFECT:-

Jebashree et al, reported antimicrobial activity with Hexane, Ethanol, Methanol and Ethyl acetate extracts of M. elengi. All the extracts were tested against dental caries causing bacteria Streptococcus mutans isolated from caries induced patients. All extracts showed good antibacterial activity against staphylococcus mutans[39]. The leaves extract shows good activity against Bacillus subtilis and Trichoderma viride and were inactive against Helmintosporium sativum[40]. The acetone extract of bark was tested for antimicrobial activity against salivary microflora from children of 6-12 years of age by 'paper disc diffusion' method and this extract showed good

antimicrobial activity[41]. Mayuri et al, investigated antimicrobial properties of bark acetone extract, this can be tested by agar well diffusion method, it shows good zone of inhibition[42].

CYTOTOXIC EFFECT :-

The ethanolic extract of bark of elengi were investigated on meristimatic cells of root tips of allium cepa with different concentrations (2.5, 5, 10mg/ml) of standard drug cyclophosphomide and ethanolic extract. Reported chromosomal abnormalities with increasing concentration of ethanolic extract. The results revealed that there is a significant decrease mitotic index and root length of allium cepa with respective time and with increasing concentration[43]. The methanolic bark extract of Mimusops elengi was screened for cytotoxic activity by shrimp lethality bioassay[44]. The methanolic leaf extract was investigated for cytotoxic activity which was done by shrimp lethality bioassay as an indicator of toxicity. The clear study indicates the methanolic extract having cytotoxic substances[45].

IMMUNOSTIMULATORY EFFECT:-

Rakesh et al,scrutinized by immunostimulatory effect with methanolic bark extract in mice, at the dose of 10,20,40 mg/kg/body weight.the immunostimulatory activities on specific and non specific immunity were studied by carbon clearance test (CCT), haemagglutination antibody (HA), and delayed type hypersensitivity using sheep red blood cellsas the antigen[46]. Antigen specific immune response was evaluated by using *Mesua ferrea* and *Mimusops elengi* leaves aqueous extract. The results showed thatdecline antigen specific immune response in CD14 monocyte surface marker as compared to IBD (infectious bursal disease) virus and control[47].

WOUND HEALING ACTIVITY:

Gupta N, Jain UK investigated wound healing activity of methanolic extract of bark in the form of ointment. The extract ointments showed good response in three types of wound models on mice i.e. the excision, the incision and dead space wound model[48].

DIURETIC ACTIVITY:

The aqueous, ethanol and ethyl acetate extract was evaluated for diuretic activity. This can be carried out in rodents by measuring urine volume for 24hrs with intervals. The aqueous extract showed significant diuretic activity when compared with other extracts[49]. Koti BC et al, investigated diuretic and electrolyte excreation activity with alcoholic bark extract. After dosing of extract the standard collected urine was recorded for 5 hours. Experiment shows highest diuretic activity[50].

SPERMICIDAL ACTIVITY :

The seedstested against antifertility activity. The aqueous powdered drug (2gm/body weight) was administered to male albino rats has proved to be an effective contraceptive drug. Activity was confirmed by significant decrease in sperm count[51].

ANTIDIABETIC EFFECT :

Alcoholic and aqueous extracts of leaves were screened for antidiabetic activity using alloxan induced hypoglycemic rats on acute and prolonged induded hypoglycemic treatment. Both alcoholic and aqueous extracts showed significant antidiabetic effect[52].

ANTI-INFLAMMATORY, ANTIPYRETIC AND ANALGESIC ACTIVITIES :-

The ethanol extract of bark screened for anti-inflammatory, analgesic and antipyretic activities in animals. The bark ethanol extracts inhibited the carrageenan induced paw oedema in cotton pellet model. It reduced the transudative weight and little extent of granuloma weight. In analgesic models also alchoholic extract decreases the acetic acid induced writhing and also reduces the rectal temperature in Brewers yeast pyrexia. The results showed that ethanolic bark extract has an anti-inflammatory, antipyretic and analgesic activity[53]. The methanolic leaf extract was investigated for analgesic activity using acetic acid induced writhing of white albino mice and hot plate test. In hot plate test the extract shows significant prolongation in response of time to the heat stimulus[45].

ANTIULCER ACTIVITY:-

The bark alcoholic and petroleum ether extracts was evaluated antiulcer activity in rats by ulcer index and percentage of ulcer healing methods. The findings reveals significant antiulcer activity[54]. The different fractions of bark extract namely alcohol, ethyl acetate, methanol, N-butanol and aqueous extract against different ulcer models concluded that ethyl acetate fraction possesses significant activity[55].

CONCLUSION AND FEATURE SCOPE

The present review, taxonomy looking forward to prepare and developing of new drugs from Mimusops elengi extracts are very effective against dental problems, odontopathy, ---activities of Mimusops elengi are well accepted because of the scientific literature review supports these effects. It is good evident from this review Mimusops elengi is an important medicinal herb, it shows anti HIV activity from bark extract was proved so that the research work on anti HIV effect will be possible and it contains number of phytoconstituents, which are the key factors in the medicinal value of this plant. It elicits on all aspects of plant origin and attention of pharmacological researchers to carry out the work for developing the new formulations which can ultimately useful for the human being.

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