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A REVIEW ON PHYTOPHARMACOLOGICAL ASPECTS OF AEGLE MARMELOS

Durgesh Nandkishor Boob[1]*, Chaudhary Sonali Niraj[1] and Navale Santosh Dattu[2]

[1]Sanjivani Group of Institute, Sanjivani Institute of Pharmacy and Research, Kopargaon.

[2]NDDR Scientist-I in Department of Formulation and Development, Intelliscend NDDR Pvt. Ltd, Thane (W), Maharashtra, India 400604.

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***Corresponding Author**
Durgesh Nandkishor Boob
Sanjivani Group of Institute, Sanjivani Institute of Pharmacy and Research, Kopargaon.

ABSTRACT

With developing weight of infections, the utilization of natural plant items is expanding because of its less side effects and low cost. The Aeglemarmelos, (Bael), is indigenous to India and its leaves, bark, fruits, roots and other parts have been utilized for more than 5000 years in the Indian traditional medicinal system, the Ayurveda and in different medication systems to treat different ailments. Despite the fact that all the pieces of the plants are helpful, the leaves and fruits are the most frequent part utilized as significant medication in the treatment of all the regular afflictions of the individual. Different researches indicate that the various parts of bael contain chemical constituents like alkaloids, coumarins, terpenoids, tannins, fatty acids, amino acids. Broad trial and clinical investigations demonstrate that Aeglemarmelos has antidiarrhoeal, antimicrobial, antiviral, radioprotective, anticancer, antipyretic, antiulcer, antioxidant, anti-inflammatory properties, which help it to be valuable in counteraction and treatment of numerous ailments. Aeglemarmelos has been utilized to control diabetes in customary restorative framework.

KEYWORDS:- Aeglemarmelos, Bael, Chemical costituents, ailments.

INTRODUCTION

India is broadly known as the greenhouse of the world since it is the biggest maker of restorative herbs. Restorative plants go about as an indigenous wellspring of new mixes having remedial esteem and can likewise be utilized in sedate advancement. 80% of the number of inhabitants in creating nations rely upon conventional medications, generally

normal plant items, for their essential human services needs as evaluated by who. In light of the developing acknowledgment of regular items the interest for therapeutic plants has been expanding everywhere throughout the world. They have negligible lethality, are financially savvy and pharmacologically dynamic, and give a simple solution for some human illnesses when contrasted with the manufactured medications which are a subject of contaminated and reactions. Out of the 6000 plants referenced in the conventional frameworks of medication, as it were 350 species are under use. Aeglemarmelos (L.) Corr., having a place with the family Rutaceae is one of them, which assumes an imperative job in everyday use.

Local names

Burmese (Opesheet, Ohshit); English (Bael Fruit, Indian Bael, Holy Fruit, Golden Apple, Elephant Apple Bengal Quince, Indian Quince, Stone Apple); German (Belbaum, Schleimapfelbaum, Baelbaum); Gujarati (bili); Hindi (baelputri, bela, sirphal, siri-phal, kooralam); Indonesian (majabatuh, maja); Javanese (modjo); Khmer (bnau); Lao (Sino-Tibetan) (toum); Malay (bilak, bel, bila, majapahit); Portuguese (marmelos); Thai (matum, mapin, tum); Vietnamese (trai mam, mbaunau) Aeglemarmelos (Linn) correa, normally known as bael (or bel), having the family Rutaceaeis a moderate-sized, slim , fragrant tree. It is indigenous to India and is liberally found in the Himalayan tract, Bengal, Central and South India. It is widely planted close to Hindu sanctuaries for its wood and leaves which are commonly utilized for worship. Its branches are outfitted with sharp straight spines. The bark is delicate, light dim and peeling in unpredictable pieces. The splendid green leaves are alternate and trifoliolate (infrequently five-foliolate). The blossoms are greenish white also, sweet-scented, fruits are yellowish dim and globose with woody skin and seeds are various, elongated and packed. The roots are genuinely huge, woody and regularly curved. Fresh leaf juice is utilized in asthmatic grumblings and jaundice. The Chinese utilized the leaves and youthful natural products to contaminate Opium. In Bengal it is utilized for diarrhea. In Konkan, little and unripe fruits are utilized for heaps. The juice of bark is a solution for decrease of seminal fluid. The plant has been utilized in the Indian conventional medicinal system from ancient period. It is related with different significant therapeutic properties. Chemical examination on the various pieces of the plant has brought about the confinement of an enormous number of novel metabolites.

Chemical constituents

Extensive examinations have been completed on various parts of Aeglemarmelos and as a result, fluctuated classes of compound viz., alkaloids, coumarins, terpenoids, unsaturated fats have been separated from its various parts. Aeglemarmelos leaves contained γ-sitosterol, aegelin, lupeol, rutin, marmesinin, β-sitosterol, flavones, glycoside, oisopentenylhalfordiol, marmeline and phenylethylcinnamamides. The nitty gritty examinations on separated compound classes are as under:

Alkaloids

The alkaloids include the biggest single class of auxiliary plant substances. New alkaloids from the leaves of Aeglemarmelos were accounted for viz., halfordino, ethylcinnamamide and marmeline. As of late, arrangement of phenylethylcinnamides, which included new mixes named anhydromarmeline, aegelinosides A and B were separated from Aeglemarmelos leaves as α-glucosidase inhibitors.

Terpenoids

The essential oils of Aeglemarmelos (L.) correa leaves were concentrated especially broadly in India by different laborers since 1950. α-Phellandrene was seen as the normal constituent of the oil from leaves, twigs .α-Phellandrene (56%) and p-cymene (17%) were accounted for from leaf oil. Limonene (82.4%) was accounted for as the principle constituent from Aeglemarmelos leaves and it was indicated that limonene is a marker for recognizable proof of Aeglemarmelos oil tests.

Carotenoids

Carotenoids are the constituents responsible for giving pale colour to fruit. Marmelosin, skimmianine and umbellliferone are the medicinally active constituents of bael plant. Minor constituents like ascorbic acid, sitosterol, crude fibres, tannins, α-amyrin, carotenoids and crude proteins are also present.

Tannins

There is as much as 9% tannin in the pulp of wild fruits, less in cultivated type. Tannin is also present in leaves as skimmianine. It is also named as 4, 7, 8-trimethoxyfuro-quinoline(5).

Flavonoids

Flavonoids are bio active compounds which normally accumulate in plant body as secondary metabolites in large quantities. Anthocyanin and Leucocyanin are the flavonoids present in Bael fruit

Pharmacological actions

Antimicrobial and Antifungal action

The antibacterial assay was done for screening purpose of selected gram positive and gram negative microorganisms showed zone of inhibition against test plant extract. Among these test micro organisms *Roultellaplantikola*are the most susceptible to methanol extract of *Aeglemarmelos.* All two Plants extracts (leaf, fruit) showed antibacterial activity against all used bacteria like Roultellaplantikola, Pseudomonasaeruginosa, Bacillussubtilis, Agrobacteriumtumifacian. Maximum zone of inhibition was observed against *Roultellaplantikola* (11 mm). Minimum zone of inhibition was observed against *Pseudomonasaeruginosa* by using fruit extract (7 mm). Inhibition zones of 11 mm and 9 mm were observed by using leaf and fruit extract against *Roultellaplantikola.* The plant extracts also showed activity against test fungal organismlike Penicilliumchrysogenum, Fusariumsolani, Aspergillusnigar, Candida albicans in that Penicilliumchrysogenum which was most susceptible to ethanolic fruit extract by forming inhibition zoneof 18mm and lowest 7mm was shown by *Candida albicans*. This fungal strain was most susceptible tomethanolic fruit extract by forming inhibition zone of 17mm and lowest zone of inhibition i.e. 9mm for leaf extract was shown by penicillium species. The Candida albicans was most susceptible to aqueous fruit extractby forming inhibition zone of 14mm and lowest was shown by Aspergillusnigeri 9mm in fruit extract.

Antitumor action

Data collected from preclinical investigations recommends that Bael is helpful in the treatment and counteraction of malignant growth. Be that as it may, holes in the investigations directed are evident, which should be spanned so as to abuse the full restorative capability of Bael. With respect to antineoplastic exercises, contemplates have plainly indicated that both Bael concentrates and a portion of its phytochemicals, for example, marmelin, butyl p-tolyl sulfide, 6-methyl-4-chromanone, butylatedhydroxyanisole, lupeol, citral, cineole (1, 8 cineole), d-limonene, and eugenol are seen to be powerful in specifically repressing expansion of neoplastic cells. While most examinations have been

finished with refined cells and assert the antineoplastic exercises, concentrates with tumor-bearing creatures of various histological, and increasingly significant, with exceptionally metastatic cells ought to be performed. Just when these investigations are performed will the viability of these mixes in malignant growth control be figured it out.

Antipyretic action

Study indicates that ethanolic extract just as aqueous extract of Aeglemarmelos (L.) Correa leaves (200 mg kg-1 body wt. furthermore, 400 mg kg-1 body wt.) indicated asignificant antipyretic impact in yeast-incited rise of internal heat level in rodent. It has been seen that ethanolic extract progressively viable against raised internal heat level in rodents in correlation with aqueous extract in portion subordinate way. In both the cases, the extracts caused a huge bringing down of internal heat level, with the impact being practically identical to that of paracetamol. The present pharmacological examination affirms the remedial estimation of A. marmelos as antipyretic.

Anti-inflammatory action

In chronic studies, the inflammatory granuloma is a typical symptom of chronic inflammatory reaction. The dry weight of the cotton-pellets correlates well with the amount of granulomatous tissue. The various serial extracts obtained from the leaves of Aeglemarmelos showed significant anti-inflammatory activity in the cotton-pellet test. This effect showed the ability of the extract in reducing the number of fibroblasts, and synthesis of collagen and mucopolysaccharide, which are natural proliferative events of granulation tissue formation. However, the effect was less when compared to phenylbutazone.

Antioxidant action

The current examination uncovered that the leaf concentrate of A. marmelos, which hold most extreme measure of flavonoid and phenolic compounds, displayed the best antioxidant activity. In spite of across the board utilization of A. marmelos as old stories meds in India, the writing contains not many reports on its antioxidant action. Right now test, we surrendered out an efficient record on the relative free radical searching action in methanolic concentrate of chosen portions of A. marmelos. We have moreover set up the relationship of absolute flavonoid and phenolic substance by methods with the expectation of complimentary radical scavenging action. Leaf extract of *A. marmelos* showed higher scavenging property it may be due to thepresence of hydroxyl groups in the phenolic and flavonoid compounds chemical configuration that can provide the necessary constituents as a radical scavenger. It

was likewise indicated that leaf extract indicated essentially higher antioxidant action than BHT, rutin and ascorbic acid in scavenging of DPPH free radical. This might be backing to the high measure of flavonoid and phenolic mixes in the mehanolic extract of A. marmelos.

Antidiarrheal action

The unripe or half ripe fruit of Aeglemarmelos is effective in treatment of chronic diarrhea and dysentery. Dried fruit or its powder gives best results. When the fruit is green in colour it is cut into pieces, these pieces are dried in direct sunlight and then powder. This powder is stored in air tight container and used when required. The unripe fruit can be baked and mixed with jiggery or brown sugar and taken to treat diarrhea. The powdered drug is useful in sub acute or chronic dysentery. The use of fruit powder reduces presence of blood in stools and consistency of stool also become solid. Continue use for some days also decreases presence of mucous in stools.

CONCLUSION

It is very clear from this review that *Aeglemarmelos*is a divine tree which has taken an important place in *Ayurveda, Unani, Siddha* traditional system of medicine. The plant has various therapeutic applications due to its blessed presence of phyto constituents. Bael contains several significant bioactive components and some have as of now demonstrated their helpful potential. Hence it can be used for the treatment of various disorders in human being such as, diarrhea, ulcer, fungal infection, microbial infection, inflammation, pyrexia , cancer, viral infection etc. Unfortunately the greater part of the components have not appropriately been assessed for the investigation of new lead particle or pharmacophore. Additionally, mechanism of actions of a couple of bioactive components have been distinguished up until now. Henceforth, broad research is required to discover the components of activity as well as bioactivity of different phytochemicals in crude extracts and to discover their restorative potential to battle different ailments.

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