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Overview on Angle marmelos (Bael) and therapeutic Uses in Ayurveda medicine

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Abstract: In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems. Over the last few years, rechears have aimed at identifying and validating plant derived substances for the treatment of various diseases. Similarly it has been already proved that various parts of plants such as Leafs, fruits, seeds etc. provide health and nutrition promoting compounds in human diet. The Bael (Aegle Marmelos) (L.) Corr.) is another Indian plant, which has enormous traditional uses against various diseases. The present review aims to compile medicinal values of Aegle Marmelos generated through the research activity using modern scientific approaches and innovative scientific tool

Key words: Aegle Marmelos, Pharmacological Activities, Medicinal Values

Introduction

Aegle marmelos has been used as a flavorer medication for the management of diabetes in Ayurvedic Unani and Siddha systems of medication in Asian country 1. People's Republic of Bangladesh (2) and Ceylon (3). Aegle marmelos (Sanskrit: Bilva) is according to possess hypoglycaemic activity bySeema et al (4). In diabetes, there's aerophilic stress related to unharness of free radicals (5). Such Associate in Nursing aerophilic stress isimportant within the development of the many of the complications of diabetes like retinopathy and uropathy (6, 7). within the gift study, we've got evaluated the hypoglycaemic and inhibitor effects of binary compound extract of Aegle marmelos leaves. (AML) on alloxan iatrogenic diabetic rats. Plasma aldohexose levels were assayed to assess the hypoglycaemic activity. Plasma glutathione-S-transferees(GST), corpuscle malondialdehyde (MDA) and corpuscle glutathione (GSH) were calculable assess inhibitor activity.

Plant Description

Bael (Aegle Marmelos (Linn), family Rutacae, is additionally called Bale angiospermous tree, may be a moderate sized, slender, aromatic tree, 6.0-7.5 m tall, and ninety to one hundred twenty cm in girth, with a some what fluted bole of three.0-4.5 meter growing wild throughout the deciduous forests of Asian country, ascending to Associate in Nursing altitude of

Fig No:1

1200 meter within the western range of mountains and conjointly occurring in Andaman island this is often typically thought of as sacred tree by the Hindus, as its leaves area unit offered to Lord Shiva throughout worship. consistent with Hindu mythology, the tree is another sort of Lord Kailashnath Leaves, fruit, stem and roots of this tree in any respect stages of maturity area unit used as ethno medication against varied human ailment

Chemical constituents

Various phytoconstituents are isolated from the varied elements of Aegle marmelos, which can be classified as,
Sr.no half Phytoconstituents

1. Leaf Skimmianine, Aegeline, Cincol, Citral,Citronella
2. Bark Skimmianine, Fagarine, Marmin
3. Fruit . Marmelosin, Luvangetin, Aurapten, Psoralen, Marmelid

Therapeutic Uses

1. Aegle Marmelos uses embrace edible fruit pulp being employed in several elements of Asian country in preparation of summer drinks, that helps overcome sunstrokes.
2. Bael leaves area unit utilized in the preparation of salads.
3. Bael fruit pulp absorbs the toxins made by microorganism and different pathogens within the gut therefore serving to within the treatment of infectious disease.
4. Bael extract oil is employed to cure metabolism issues.
5. Bael fruit is employed within the preparation of candy, squash, toffee, pulp powder, and different eatable merchandise.
6. Aegle Marmelos is medication in nature. Its extracts once applied on the exposed space, facilitate to cure inflammation.
7. Aegle Marmelos leaf juice with honey will prove helpful for treating fever.
8. Aegle Marmelos are often accustomed treat infectious disease
9. Aegle Marmelos are often accustomed treat infectious disease.
10. Aegle Marmelos is made in anti-oxidants that helps in hypoglycemic agent secretion that ends up in low glucose level.
11. TRADITIONAL USE
12. Leaves
13. Root
14. Flower
15. Fruit
16. Ripe Fruit
17. Uripe Fruit

1.Leaves

Leaves area unit used as delicate laxative, or the inflammation of the mucosa having a free discharge and for bronchial asthma. The simmering of the leaves is antipyretic, or helps in eliminating fever Associate in Nursingd is an medicinal drug, or promotes the removal of secretion from the cartilaginous tube tubes. The leaf juice is given in hydrops or the abnormal accumulation of liquid within the cellular tissue attended with constipation and jaundice A hot poultice of the leaves is applied in opthalmia or severe inflammation of mucosa with acute respiratory disorder and inflammation of the opposite body elements.

Fig No :2. Leaves

2.Root

The simmering of the foundation and generally the stem burkis helpful in intermittent fever, conjointly in hypochondria and palpitation of the center. The simmering of root is given with sugar and dish for checking diarrhoen and stomachal irritability in kids. Root may be a one in all the ingredients of Dasamoola a typical Ayurvedic remedy for loss of craving. And birthing diseases eg. Inflammation of female internal reproductive organ.

3.Flower

Distillation of flowers yielded a drug used as tonic for abdomen and gut, anti-dysenteric, medication. Diaphorectic and as anaesthetic. It's conjointly utilized in brain disorder and as expectoran.

Fig No:3. Flower

4.fruit

Fruit is eaten throughout recuperation once diarrhoea. It's valid for its delicate astringency and as remedy for infectious disease. The normal healers of southern Chhattisgarh use dry powder of fruit with mustard oil for the treatment of burn One a part of} powder and 2 part of mustard oil area unit mixed and area unit applied outwardly. Fruits are utilized in stomachal troubles, constipation, laative tonic, digestive, stomachic, brain and heart tonic, ulcer, antiviral, internal organ parasites, gonorrhea, epilepsy.

Fig No :4 Fruit

5.Ripe Fruit

The ripe frut promotes digestion and is useful in treating inflammation of body part. The ripe fruit extract showed antiviral activity agamst ranikhet unwellness virus. Pulp of tipe fruit is good, cooling, aromatic and nutrient once taken contemporary Fruit pulp conserves is employed as hindrance throughout epidemic cholera epidemies, conjointly given to stop the expansion of piles, helpful in patients plagued by chronic dysenteric condition characterized by alternate diarrhoea and constipation relieves flatulent pain from a condition of chronic gi redness. Contemporary juice is bitter and pungent fruit extract lower the glucose.

Fig No :5. Ripe fruit

6.Uripe Fruit

Fine powder of unripe fruit showed vital impact on internal organ parasites Associate in Nursingd conjointly effective against Entamoeba histolytica and roundworm Unipe fruit is employed as an astringent in infectious disease, stomach ache in Page diarrhoea, tonic, digective, demulcent, represented as cardiacal,restorative, given in piles, simmering of unripe fruit is astringent, helpful in diarrhoea and cchronirestorative.

Chemical constituents

Various phytoconstituents have been isolated from the various parts of Aegle marmelos, which may be categorized

Sr.no	Part	Phytoconstituents
1.	Leaf	Skimmianine, Aegeline, Lupeol, Cincol, Citral,Citronella
2.	Bark	Skimmianine, Fagarine, Marmin
3.	Fruit	Marmelosin, Luvangetin, Aurapten, Psoralen, Marmelid

Table NO:

In vivo-in vitro activity

1.Antibacterial activity

Antimicrobial activity of various leaf exttracts like oil ether, chloride, Chloroform, ethyl alcohol and liquid extract of Aegle marmeins leaves were tested against designated grandmother positive and Gram negative bacterium. Results depict that phytochemical extracts of Aegle marmelos exhibited vital anti-bacterial activity. However, the restrictive activity was found to be each organism and solvent dependent ethyl alcohol and chloroform leaf extracts of eagle marmelos were found to be a lot of active towards the microorganism species tested. Further, the liquid leaf extract was moderately active followed by chloride

extract. However, oil ether extract wasn't effective against any of the organisms tested Growth of true bacteria bulgur's and B Cereus wasn't pent-up by any of the tested leaf extracts of Aegle. Marmelos.

2.Antihistaminic activity

Skimmianine may be a quinolone organic compound isolated from the roots of Aegle marmelos. Within the study the results of skimmianine on the amine unharness from rat mast cells ar tested. The study was performed by victimisation 2 cell lines, rat stainability malignant neoplastic disease (RBI-2H3) cell line, and rat serous membrane mast cells (RPMCs) DNP24-BSA, thesauri, sonomycin, compound 48/80 were used as inducers for amine unharness from rat mastocyte. Skimmianine markedly pent-up the amine unharness from RBL-2H3 cells elicited by DNP24-BSA, thapsigargin and ionomycin.

3.Anti-inflammatory,

Antipyretic and analgesic activity
The serial extracts of the leaves of Aegle marmelos were investigated for anti-inflammatory drug property. The analgesic and antipyretic properties were conjointly evaluated. The foremost of the extracts derived from the plant Aegle marmelos caused a major inhibition of the carrageenin elicited paw puffiness and cotton-pellet tumor in rats. The extracts conjointly created marked analgesic activity by reduction the first and late phases of paw licking in mice. A major reduction in feverishness in rats was conjointly created by the foremost of the extracts. This study was established anti-inflammatory, antinociceptive and antipyretic activities of the leaves of Aegle marmelos.

4.Hepatoprotective activity

The experiments were performed with four teams of animals. The experimental animals were the brown plant hopper (Nilaparata lugens Stal), Associate in Nursing administered with half-hour alkyl radical alcohol for a amount of forty days and also the fine crude plant leaves powder was fed to animals for next twenty one days. The discovered values of TBARS (Thiobarbituric acid reactive substances) in healthy, alcohol intoxicated and flavorer drug treated animals were 123.35, 235.68 and 141.85 ug/g tissue severally. The results were compared with the quality flavorer drug salymarin (133.04 µg/g tissue). The experimental res hiults indicate that, the Aegle marmelos leaves have glorious hepatoprotective result.

5.Insecticidal activity

Experiments were dispensed to work out the potentialof victimisation oil from leaves of Aegle marmelos to manage insect infestation of keep gram from Callasobruchur chinensis (L) (Bruchidae) and wheat from Ryzoperthu duminica (F.) (Bostrychidaei, Suophilus oryzar (L) (Curculionidae) and Tribolum castaneum(Herbal) (Tenebrionidae). Once introducing the check insects, keep gram and wheat samples were fumigated with oil of Aegle marmelos at five hundred ug/mL. (ppm). The oil considerably increased feeding deterrence in insects and reduced the grain injury additionally as weight loss in fumigated gram and wheat samples plagued with all insects except . castaneum. The oil at totally different doses considerably reduced oviposition and adult emergence of C. chinensis in treated cowpea seeds. The oil protected keep gram from C chinensis and wheat from R dominica and S oryzae for 2. Years. Terpene (88%) was found to be the foremost element within the oil through GC-MS analysis. Multivariate analysis of information on people in treated compea confirmed that vital reduction of oviposition and adult emergence of C. chinensis minimized with increase in doses. The findings emphasize the effectiveness of Aegle marmelos oil as chemical against insect infestations of keep grains and strengthen the chance of victimisation it as an alternate to artificial chemicals for protective keep **grains.**

6.Hypoglycemic and inhibitor activity

The symptom and inhibitor result of liquid extract of Aegle marmelos leaves (AEAM) dispensed by victimisation male unusual person rats aldohexose, carbamide and glutathione-S-transferase (GST) in plasma. Glutathione (GSH) and malondialdchyde (MDA) levels in erythrocytes were calculable all told the teams at the tip of 4 weeks. There was a decrease in glucose at the tip of 4 weeks in cluster treated with AEAM, but it didn't reach the management levels. There was a rise in corpuscle GSH and a decrease in MDA in cluster treated with AEAM as compared to diabetic rats. The plasma GST levels were raised in diabetic rats in comparison to controls within the cluster treated with AEAM, there was a decrease in GST as compared to diabetic rats, thanks to symptom and inhibitor properties, AEAM is also helpful within the long tem management of polygenic disorder

7.Immunomodulatory activity

The Immunomodulatory action of methanolic extract of Aegle marmelos fruimt (MEAM) in experimental model of immunity was dispensed by WBC adhesion check and carbon clearance assay, whereas, body substance immunity was analysed by mice unwholesomeness check and indirect haemagglutation assay. MEAM dose was designated by support case methodology (up and down) and administered at a hundred and five hundred mg/kg orally. The genus Ocimum sanctum (OSC, 100 mg/kg, po) was used as customary. MEAM at a hundred and five hundred mg/kg created vital will increase in adhesion of neutrophils and a rise in vegetative cell index in carbon clearance assay. Each high and low doses of MEAM considerably prevented the mortality elicited by bovine Pasteurella multocida in mice. Treatment of animals with MEAM and OSC considerably enhanced the current protein concentration in indirect haemagglunation check. Among the various doses, low one was more practical in cellular immunity models than the high. However, all the doses exhibited similar protection in body substance immunity procedures.

From the higher than findings, it's all over that MEAM possesses potential for augmenting immune activity by cellular and body substance mediate mechanisms a lot of at low dose (100 mg/kg) than high dose (500 mg/kg).

8.Myocardial pathology

The result of Aegle marmelos leaf extract (AMLE) and alphotocopherol on plasma lipids, macromolecule peroxides and marker enzymes in rats with medicament (ISO) iatrogenic myocardial infarct was dole out. Rats were pre-treated orally for thirty five days with totally different doses of associate liquid AMLE (50 mg/ weight unit, one hundred mg/kg and two hundred mg/kg) before ISO-induced myocardial infarct. The consequences on creatin enzyme, give suck dehydrogenase, plasma thiobarbituric acid reactive substances, macromolecule hydroperoxides, humor lipids and lipoproteins were studied. Pretreatment with AMLE at doses of one hundred mg/kg and two hundred mg/kg weight for thirty five days showed a major result on the activities of marker enzymes, macromolecule peroxides, lipids, lipoproteins and anticidant enzymes in ISO-treated rats. The result of AMLE two hundred mg/kg was found to be capable the result of alpha-tocopherol sixty mg/kg .

9.Testicular activity

The liquid extract of leaf of legle marmelos at the dose fifty mg/100 g weight resulted important|a big|a major} diminution within the activities of key sex gland steroidogenic enzymes along side low levels of plasma androgen and relative wet weights of sex organs in relation to management with none significant alteration generally body growth. Germ cells numbers in numerous generation of humour vegetative cell cycle were diminished considerably once the treatment of the higher than extract. The higher than mentioned dose failed to exhibit any toxicity in liver and urinary organ. Therefore, it should be foreseen that the liquid extract of leaf of Aegle marmelos features a potent antitesticular result at a selected dose.

10.Cardiotonic activity

Fresh beverage of Aegle marmelos plant with totally different dilutions were used for cardiotonic activity. The activity was tested by victimisation isolated frog heart assembly. The current preliminary studies ensure the higher cardiotonic activity of Aegle marmelos than digitalis glycoside more studies will ensure the reduced toxicity & this can be the advantage of Aegle marmelos over digitals.

11.Anxiolyticand medicament activity

The objective of the study was to judge the anxiolytic and medicament activities of methyl alcohol extract of Aegle marmelos (MEAM) leaves furthermore as its interaction with standard anxiolytic and medicament medication victimisation elevated and maze and tail suspension check in mice. Unusual person mice were treated with MEAM (75, a hundred and fifty and three hundred mg/kg, po), tricyclic antidepressant drug (20 mg/kg po), SSRI (20 mg/kg, po), and combination of sub effective dose of AM with tricyclic antidepressant drug or SSRI. Effects were determined on (a) time spent on (b) range of entries into (c) range of stretch attend postures (d) range of bead dips in arms of elevatod and maze and on length of immobility in tuul suspension check. Medicament activity of MEAM (150 mg/kg po) was considerably reduced by antihypertensive drug, antipsychotic agent and backofen MEAM showed insignificant result on motion activity of mice. It's all over that MEAM possess potential anxiolytic and medicament activities and it enhances the anxiolytic and medicament activities of tricyclic antidepressant drug and SSRI

12.Woundhealingactivity

Effect of topical and intraperitoneal administration of methanolic extract of Aegle marmelos ointment and injection was studied severally on 2 forms of wound models i.e.. The excision and also the incision wound models in rats. Each the injection and also the ointment of the methanolic extract of Aegle marmelox created a major response in each of the wound kind tested. Within the excision model the extract treated wounds were found to epithelialize quicker and also the tute of wound contration was higher, as compared to regulate wounds. The extract expedited the healing method as proved by increase within the lastingness within the incision model. The results were conjointly admire those of a customary drug mitrofurazone.

13.Anticonvulsant activity

The antiepileptic drug result of ethanolic extract from the leaves of tegle marmelos on peak shock treatment (MES) or pentylenetetrazole (PTZ) in male mice examined during this study. This healthful plant belongs to the Rutaceac family and also the leaves ar popularly utilized in the treatment of inflammation, asthma, hypoglycaemia, febrifuge, infectious disease and analgesic. The extract of Aegle marmelos (erally) was administered in mice at the doses of100 and two hundred mg/kg. The extract suppressed limb tonic extensions (HLTE) iatrogenic by MES and conjointly exhibited preserver result in PTZ iatrogenic seizures, at two hundred mg/kg dose. Since the ethanolic extract of Aegle marmelon delayed the prevalence of MES and PTZ convulsions, it's all over that it interfere with gabaergic mechanisms to exert their antiepileptic drug result additionally it reveals the presence of flavonoid attributed to their anti-convulsant action. The activity rumored was dose dependent.

14.AntistressandAdaptogenicactivity

The standardised dried liquid extracts of Aegle marmelos (SDEAM] were evaluated for opposed stress and adaptogenic activities victimisation Swimming endurance and post-swimming motor operate check, Cold swimming endurance check and compelled swim check in rats. The extracts showed the presence of phenolics, flavonoids, carbohydrates and volatile oils in preliminary phytochemical screening. In gift study the check extracts once subjected to forced swim model for adaptogenic activity in rats doesn't showed a rise in {serum|blood humor|liquid body substance|bodily fluid|body fluid|humor|humour} steroid alcohol and serum lipoid level, however the rise wasn't sustained on consequent teams. It conjointly will increase the swimming endurance time considerably along side the post motar operate like Rota rod falling time and spontaneous motar activity. The check extract conjointly will increase the cold swimming endurance time considerably. The check extracts may prohibit the rise within the level of those markers throughout stress.

15.Antifertilityactstres

The study was dole out to judge the effective concentration of binary compound extract of Aegle marmelon leaves on male genital system of unusual person rats The study was divided into 3 teams of six animals every. The primary cluster (1) received water function management The second and third teams (II and III) of animals were administered the binary compound leaf extract daily at 250mg/kg body wt and 350mg/kg body wt., severally for a amount of 45days vital decreases within the weights of ballock, epididymes and vesicle were determined A dose connected reduction within the gonad spermatozoon count, epididymal connected reduction within the gonad spermatozoon count, epididymal spermatozoon count and motility and abnormal spermatozoon count were determined. The results showed that Aegle marmelas has effects on male rat copy, moving the sexual behavior and epididymal spermatozoon concentration.

How to prove for diabetic activity of this plant? Resources purpose place up withReference

1.Aegle marmelos leaf extract is being employed in Ayurveda as a medication for polygenic disease.

Aegle marmelos leaf extract is being employed in Ayurveda as a medication for polygenic disease. The current study examined the action of Aegle marmelos against experimental polygenic disease moreover because the inhibitor potential of the drug. A methanolic extract of Aegle marmelos was found to cut back glucose in alloxan diabetic rats.
The most common and effective medicine healthful plants of Indian origin ar Babul (Acacia arabica), bael (Aegle marmelose), church steeples (Agrimonia eupatoria), onion (Allium cepa), garlic (Allium sativum), ghrita kumara (Aloe vera), neem tree (Azadirachta indica), ash gourd (Benincasa hispida), Beetroot..
Aegle marmelos leaf extract is being employed in Ayurveda as a medication for polygenic disease. The current study examined the action of Aegle marmelos against experimental polygenic disease moreover because the inhibitor potential of the drug. A methanolic extract of Aegle marmelos was found to cut back glucose in alloxan diabetic rats.

2.Diabetes

Bael would possibly lower glucose levels. If you've got polygenic disease and take medications to lower your glucose, adding bael would possibly build your glucose drop too low.
Controls diabetes: Bael contains laxatives that keeps glucose levels on top of things, thereby serving to in dominant polygenic disease.
For people who ar battling polygenic disease, wood apple may be a excellent answer. It counteracts polygenic disease by dominant the severity of the condition. It manages the flow and secretion of sugars within the blood. It conjointly controls the spikes and plunges in sugar levels that may be dangerous for diabetics.
If you've got polygenic disease, you'll be able to still relish alimentary paste. Simply take care to stay a watch on your parts. Choose whole wheat alimentary paste, which can increase your fiber, vitamins, and minerals, and cut back any glucose spikes compared to white alimentary paste.
Share on Pinterest carefully, some varieties of rice is healthful for individuals with polygenic disease. It's best to settle on brown or wild rice as a result of these varieties have a better fiber content than polished rice, therefore it takes longer for the body to digest them.
For those who manage their polygenic disease & diet arrange, ingestion whole wheat chapatti may be a higher various. Polished rice encompasses a higher glycemic index than chapatti , which implies, it will increase glucose sooner. So chapatti is usually a most popular choice for diabetic people.
With a glycemic index between fifty and fifty eight, basmati rice may be a low to medium glycemic index food. If you've got polygenic disease, tiny parts of basmati rice is a district of your healthy diet.

3.Bengal gram

With a glycaemic index as low as eight, the diabetic patients will go simple with Chana decaliter because it contains a high quantity of proteins at the side of B complex that helps within the formation of latest cells, particularly red blood cells.
Jagger's glycemic index is extremely high and thence, it's not advisable for diabetics to consume saccharide. Even typically, polygenic disease patients should eliminate sweet foods and desserts altogether as an enormous a part of handling erratic glucose is additionally killing the appetency altogether
A blend of whole flour and pulse/legume flours, AASHIRVAAD Sugar unharness management Atta is dead acceptable be used as a staple food by diabetic individuals or non-diabetic people World Health Organization ar involved regarding their health. It releases the sugar slowly within the body, thus, helps in managing the sugar level spikes.

4.Prediabetes Diet

Eat additional Veggies. 1 / 12. Plant-based fiber fills you up while not raising glucose. …
Cut Back on Starchy Vegetables. 2 / 12. …
Snack on Fruit. 3 / 12. …
Choose Whole Grains. 4 / 12. …
Add additional loopy and Seeds. 5 / 12. …
Add Some supermolecule. 6 / 12. …
Avoid sugar-coated Drinks. 7 / 12. …
Limit another Sugars. 8 / 12.

CONCLUSION

It is quite evident from this review that Aegle marmelos contains variety of phytoconstituents that reveals its uses for numerous therapeutic functions. The Plant or its individual components are often used for the treatment of varied disorders in person like, diabetes, liver toxicity, zymosis, microorganism infection, inflammation, febrility and to alleviate pain. Still, such a lot work is needed with the Aegle marmelos to analyze the mechanism of actions with different therapeutic activities.

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