**ISOLATION AND CHARACTERIZATION OF MEDICINAL COMPOUNDS FROM ACETONE, ETHANOL, METHANOL EXTRACT OF *Aegel marmelos,(L.) Corr***

Amirtham.S, Assistant Professor

Department of Biotechnology, Bon Secours College for women, Thanjavur, Tamilnadu

**ABSTRACT:**

In recent times, focus on plant research has increased all over the world and alargebody of evidence has collected to show immense potential of medicinal plants used in various traditional systems. Over the last few years researchers 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 tools.

The effect of the Aegle marmelos leaf extract was investigated with various solvent acetone, ethanol and methanol were examined and concluded that the Aegle marmelos leaf extract possess alkaloids, emodins, ferric chloride,lead acetate, gelatin,phenolics, volatile oils etc. and it shows the absence for steroids, triterpenes, anthracene glycosides, xanthoproteins etc. Results of present investigation reveal that the employed extracts exhibit potential (Glucose level) diabetics’ activity. The plant materials have these beneficial properties which can be used for various medicinal purposes and can use by pharmaceutical company. From the analysis it is true to be said that this medicine can be used to a large extent.

**Key Words:** Aegle Marmelos, Pharmacological Activities, Medicinal Values.

**Introduction:**

*Aegle marmelos* corrie commonly known as Bael (or bel) belonging to the family Rutaceae. Is a moderate sized, slender and aromatic tree. It is Indigenous to India and is abundantly found in the Himalayan tract, Bengal, Central and South India. It is extensively planted near Hindu temples for its wood and leaves which are generally used for worship. The bark is soft, light grey and globes with woody rind and seeds are numerous. The roots are fairly large woody and often curved. Its fresh leaf juice is used in asthmatic complaints and jaundice. The Chinese used for dysentery, some of the compounds have been screened for bioactivity.

World is endowed with a rich wealth of medicinal plants. Herbs have always been the principal form of medicine in India and presently they are becoming popular throughout the world. As people strive to stay healthy in the face of chronic stress and pollution, and to treat illness with medicines that work in count with bodies own defenses. Medicinal plants have been used to curve a number of diseases.

Although this plants is native to Northern India, it is also widelyfound throughout India Peninsula and in Ceylon, Burma, Thailand and indo-china. *Aegle marmelos* tree is held sacred by Hindus and offered in prayers to deities lord shiva and Parvathi and thus the tree is alsoknown by the name shivaduma (the tree of shiva).It is therefore widely cultivated and commonly found in the vicinity of temples. All plants of this tree, viz, root, leaf trunk, fruit and seed are useful in several aliments.

The major chemical constituted isolated from *Agele marmelos* fruitare marmelosin, luvangetin, Psoralen, Tannins, marmin are listed below in the (table 1) and are the major topic. Nature has provided a complete store house of remedies to cure aliment of mankind. About 80% of the world’s population depends wholly or partially on traditional medicine for its primary health care needs (1,2). According to a survey (1993) of world health organization, the practitioners of traditional system of medicine treat about 80% patients in India, 85% in Burma and 90% in Bangladesh.

The medicinal plants are rich in secondary metabolites and essential oils of therapeutic importance. Widely found throughout the Indian Peninsula and in Ceylon, Burma, Bangladesh, Thailand and Indo –China (6) medium to large sized deciduous labours tree with the auxiliary and 2.5cm long alternate trifoliate leaves short flower and globular fruits.

*Aegle marmelos* has useful effects in our body from the literature survey it has been found that most of the tribal people using the leavesforanti–diabetic,analgesic, anti inflammatory,antipyretic, anti-cholesterol,anti-helminticandantimicrobial activities. *Aegle marmelos* all plants of the tree are used in Ayurvedic preparation for various ailments. The unripe dried fruit is astringent, digestive and stomachic used to cure diarrhoea and dysentery (Watt, 1889). The ripe fruit is a good and simple cure for dyspepsia and the unripe and half-ripe fruits improve appetite and digestion (Jain,1968:jauhari *et,al*., 1969).The roots and the bank of the tree and used in the treatment of fever and to control pain in the abdomen.They are also useful in the disorders of Vata, pitta and kapha (kirtikar and Basu, 1935).The leaves are made in to a poultice and used in the treatments of ophthalmic. The rind of the ripe fruit is alsosometimes used as a medicine ( Dastur 1962) .Due to its high medicinalvalue this plant is being exploited to a larger extent by the drug and pharmaceutical industries. Micro propagation of elite genotype may play an important role in solving the problem through rapid multiplication. We report have an efficient propagation method for large-scale cultivation of this valuable tree species.

Wood apple is (*Aegle marmelos* L.) is an important tree species.There is wide genetic variability in terms of and size of the fruit (Bhati et,al.,1992).The plant has capacity to adapt successfully to a wide range of habitats from arid, semiarid, xerophytes to mesophyticsoil. Almost allparts of the tree and used is in preparing herbal medicine (Kala 2006), an astringent, a digestive and stomachic used to cure diarrheal anddysentery ( Watt 1889). The ripe eagle marvels fruit is used for curingdyspepsia (Jauhari et.al,.1969 ) anaemia, afhma jaundice, diarrhea and typhoid .The *Aegle marmelos* leaves used in the treatment of diabetes.Medicinal plants are the local heritage with global importance .Herbal medicine or phytotheraphy is the science of using herbal remedies to treat the diseases. The leaves are bitter and are used as a remedy foropthalmia, ulcer, clropsy, cholera and beriberi. Plants have been utilised as a natural source of medicinal compounds since thousands of years.

**MATERIALS AND METHODS**

**Collection of plant materials:**

The plants were collected from Thanjavur district, Ariyalur district and Tamil Nadu state in India. The collected leaves were washed

Under running tap water to eliminate dust and other foreign particles and to cleanse the leaves thoroughly and dried.

**Preparation of plant extracts:**

Collected plants were cleaned, shade dried and ground as powder form. Then the samples were extracted by using different solvents

(Acetone, Ethanol and Methanol) in sohxlet apparatus and concentrated by using rotator evaporator.

**Qualitative Phytochemical Evaluation:**

The shade dried powder and various extracts of the leaves of *Aegle marmelos* were subjected to chemicals tests for its active constituents. Identification of the chemical constituents was carried out on the same extract used in pharmacological tests according to the methodology proposed by [2] and [14]

**RESULT AND DISCUSSION**

The main focus of the present work was phytochemical investigation of *Aegle marmelos*.

The secondary metabolites were extracted from the leaves of *Aegle marmelos* through Soxhelet apparatus and screened by biochemical tests and identified the medicinal compounds. (Table 1)

The acetone extract showed the presence of fatty acids, Fecl3, volatile oil, alkaloids, emodins, phenolics, lead acetate and gelatin. It shows the absence of fivonoids, xanthopritein, carbohydrates, steroids, anthracene, etc.

The ethanolic extracts were showed the presence emodins, Fecl3, alkaloids, emodins, phenolics, ferric chloride, lead acetate, gelatin result. The triterpenes, fatty acids, flavonoids, steroids, anthracene, xanthoprotein, carbohydrates are absence.

The methonolic extract was showed presence of alkaloids, emodins, xanthoprotein, carbohydrates, lead acetate, ferric chloride, phenolics, Fecl3, The steroids, triterpenes, anthracene are absence.

**Table.1 (Preliminary phytochemical screening of Acetone, Ethanol, Methanol *Aegel marmelos***

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of the test** | ***Aegle marmelos***  **Acetone extract** | ***Aegle marmelos***  **Ethanol extract** | ***Aegle marmelos***  **Methanol extract** |
| Alkaloids | **+** | **+** | **+** |
| Emodins | **+** | **-** | **+** |
| Flavanoids | **-** | **-** | **+** |
| Steroids & Triterpenes | Both are absent | Both are absent | Both are absent |
| Phenolics | **+** | **+** | **+** |
| Volatile oils | **+** | **+** | **+** |
| 1.Fecl3  2. Lead acetate  3.Gelatin solution | **+ + +** | **+ + +** | **+ + +** |
| Anthracene Glycosites | **-** | **-** | **-** |
| Carbohydrates | **-** | **-** | **-** |
| Xanthoprotein | **-** | **-** | **-** |

Man cannot survive on the earth for long life without plant Kingdom because the plant products and their active constituents play an important role (Sudharaneshwari and Radhika, 2007). Bael has enormous traditional uses against various diseases and many bio active compounds have been isolated from this plant also (Maity *et, al.*, 2009).

The present study clearly indicated some of the important medicinal compounds of *Aegle marmelos.*  Hence it is concluded that all the plant extract Showed the better in hibitory effect in Aegle marmelos.

**REFERENCES**

1. BiswasK, Chatopadhyay I, Banerjee R.K. and Bandhopadhyay U. (2002),“Biological Activitiesand Medicinal Properties of neem (Azadirachtaindica),CurrSci,82 Page No.1336.

2. ChatopadhyayI, BiswasK, Bandhopadhyay U and Banerjee R.K.(2004),“Turmericand

Curcumin: Biological actions and medicine of applications”,Curr Sci., 87, Page No. 44.

3. BadamL, Bedekar S.S. Sonawane K.B. and JoshiS. P. (2002), “Invitro antiviral activity of

Bael (AeglemarmelosCorr.) UponhumanCoxsackivirusesB1-B6, j.CommunDis, 34Page No.88.

4. GuptaA.K., andTondonN. (2004), “Review on Indian medicinal plants”, Indian council of medicinal research, NewDelhi, 312.

5. C.S.I.R. (1985), “ThewealthofIndia” National Institute of Science communication and Information Resources”, Volume- I (A), 86

6. PurohitS.SandVyasS.P, “In: Aeglemarmelos CorreaexRoxb,(Bael),Medicinalplant cultivation- Ascientific approach”, Agrobios, Jodhpur, 2004. P.P.498-504

7. MaityP., Hansda D., Bandyopadhyay U.&MishraD.K.,(2009)“Biologicalactivitiesof crudeextractsofchemicalconstituentsofBael,Aeglemarmelos(L.) Corr.”IndianJournal of Experimental Biology, Vol 47, p.p. 849-861

8. SaswatiParichha2004. “Bael (AegleMarmelos): Nature's Most Natural Medicinal Fruit”, Orissa Review.

9. Kar A.Choudhry B.K. and Bandhopadhyay N.G.(2003),“Comparative evaluation of hypoglycemic activity of some Indian medicinal plants in all oxandiabeticrats”J Ethnopharmacol. 84, Page No.105-108.

10. LamprontiI,MartelloD.,BianchiN.,BorgattiM.,LambrtiniE.,.PivaR,JabbarsS., ChoudhuriM.S.,KhanM.T.andGambariR(2003), “*InVitro* anti proliferative effect on human tumor cell lines of extracts from the bangladesi medicinal plant Aegle marmelos Correa.” Phytomedicine, 10, Page No. 300-308.

11. Karunanayake E. H., WelihindaJ., Sirimanne S. R. andSinnadorai G. (1984), “Oral hypoglycemicactivityofsomemedicinal plants of Sri Lanka” J Ethnopharmacol, 11 Page No. 223-231.

[12. http://www.hort.purdue.edu/newcrop/parmar/01.html/](http://www.hort.purdue.edu/newcrop/parmar/01.html/) accessed on 30.11.10,

[13. http://www.indiamart.com/company/1753104/products.html](http://www.indiamart.com/company/1753104/products.html) / Accessed on 30.11.10

14. Upadhya,S.,Shanbhag,KK,Suneetha,G,Naidu,BM,andUpadhya,S.(2004)“Astudy of hypoglycemic and antioxidant activity of Aegle marmelos in alloxan induced diabetic rats”, Ind. J. Physiol. Pharmacol., 48, Page No. 476-480.

15. Marzine, PS, andGilbart, R. (2005), “TheeffectofanaqueousextractofA.marmelos fruitsonserum andtissuelipidsinexperimentaldiabetes”, J.Sci.FoodAgriculture, 85(4), Page No.569-573.

16. Sundaram, E.N., Raddy, UmaMaheswaraPandSinghK.P (2009); “EffectofAlcoholic Extractsof IndianMedicinalPlantsontheAlteredEnzymatic Activitiesof DiabeticRats”, Indian Journal of PharmaceuticalSciences; 71(5), Page No.594-598.

17. Kuttan, Rand Sabu, M. C (2004); “Antidiabetic activity of Aegle marmelos and its relationshipwith its antioxidant properties”, Indian J Physiol Pharmacol; 48 (1), Page No.81–88.

18. HemaC.GandLalithakumariK (1999); “ScreeningofPharmacologicalactionsofAegle marmelos”, Indian J. Pharmac**.**; 20, Page No.80-85.

19. Singanan,V.,Singanan,MandBegumH(2007);“Thehepatoprotectiveeffectofbael leaves (Aegle marmelos) in alcohol induced liver injury in albino rats”; International Journal of Science & Technology; 2(2), Page No. 83-92.

20. Singh R and Singh H Rao (2008) “Hepatoprotective effect of the pulp/seed of *Aegle Marmelos* correaexRoxbagainstcarbontetrachlorideinducedliverdamageinrats” International Journal of Green Pharmacy, Page No.232

21. Maheshwari, VL, Joshi, PVandPatil, RH (2009); “Invitroantidiarrhoealactivityand toxicityprofileofAeglemarmelosCorrea ex.Roxb.driedfruitpulp”,NaturalProduct Radiance; Vol 8 (5), Page No.498-502.

22. Kaur, S., Kaur, P., Walia, A. andKumar,S(2009);“Antigenotoxic Activity of Polyphenolic RichExtractsfrom Aeglemarmelos(L.) CorreainHumanBloodLymphocytesandE.coli PQ 37”; Rec. Nat. Prod.; 3:1, Page No. 68-75.

23. Citarasu,T.,Rajajeyasekar,R.,VenkatmalingamK.,Dhandapani,P.SandPeterMarianM ( 2003); “Effect of wood apple Aegle marmelos, Correa ( Diacotyledons, Sapindales, Rutaceae) Extract as an antibacterial agent on pathogens infecting prawn ( Penaeus indicus) larviculture”, Indian Journal of Marine Sciences; 32 (2), Page No.156-161.

24. Arul, V., Miyazaki, S and Dhananjayan R (2005); “Studies on the anti-inflammatory, antipyreticandanalgesicpropertiesof the leavesofAeglemarmelosCorr.”,Journalof Ethnopharmacology, 96 (4), Page No.159-163.

25. GhangaleG.R.,SurveV.S.,AnbarasanK. and GatneM.M.(2008),“EvaluationofAegle marmelos(Bael)foranti-inflammatoryactivity inrats”TheJournalofBombayVeterinary College, Volume : 16, Issue:1

26. ShankarnanthV., BalakrishnanN. SureshD. SureshpandianG. EdwinE.andSheejaE., “Analgesicactivityofmethanol;extractofAeglemarmelos leaves”, Fitoterapia, Vol-78, Issue 3, Page No. 258-259.

27. PatilR.H.,ChaudharyB.&SettipalliS.(2009),“AntifungalandAntiaflatoxigenicactivity of Aegle marmelos Linn.”, Pharmacognosy Journol,Volume1,No.4

28. Rana B. K,.Singh U. P andTaneja V., (1997). “Anti-fungal activityand kinectics of inhibitionbyessentialoilisolatedfrom leavesofAeglemarmelos”,JEthanopharmacol*.*57, Page No.29-34

29. PitreSandSrivastavaS.K.(1987),**“**Pharmacological,microbiologicalandphytochemical studies on the root of Aegle marmelos”, Fitoterapia, 58, Page No.194

30. Latica,V,andCosta,L.(2005)”EvaluationofanticancerpotentialusedinBangladeshifolk medicine”, J. Ethnopharmacol., 99(1), Page No. 21-38.

31. JagetiaGC,VenkateshP,BaligaMS.(2005);“Aeglemarmelos(L.)Correainhibitsthe proliferationoftransplantedEhrlichascitescarcinomainmice”,BiolPharmBull28(1), Page No.58-64.

32. Jagetia,GC,andVenkatesh,P.(2005)“RadioprotectionbyoraladministrationofAegle marmelos (L.) Correa in vivo.” J. Environ. Pathol.Toxicol.Oncol., 24, Page No.315-332.

33. Jagetia,GC,Venkatesh,P,Archana,P,Krishnanand,BR,andBaliga,MS.(2006), “EffectsofAeglemarmelos(L.)Correaonthe peripheralbloodandsmallintestineofmice exposed to gamma radiation”, J. Environ.Pathol.Toxicol.Oncol., 25, Page No.611-624

34. Sur,T.K,Pandit,S,Pramanik,T.(1999);“AntispermatogenicactivityofleavesofAegle marmelos, Corr. in albino rats: A preliminary report”, Biomedicine; 19, Page No.199-202.

35. Pramanik, T., Sur, T.K., Pandit, S and Bhattacharyya, D ( 2002); “ Effect of Aegle marmelos leaf on rat spermmotility: An invitro study”, IndianJournal of Pharmacology; 34, Page No.276-277.

36. RemyaM.,.SharmaR.C., ShoaibH,AsadU.J.RandSinghS.,(2009)“InvitroeffectofAeglemarmelosonhumansperm

motility”JournalofMedicinalPlantsResearchVol.3(12), Page No. 1137-1139.

37. GoelR.K.,MaitiR.N,ManickamM.and.RayA.B.(1997).”Antiulceractivityofnaturally occurring pyrano cumarin and isocoumarins

andtheir effect on prostanoid synthesis using human colonic mucosa”, Indian J Exp Biol. **35**, Page No. 1080-83.

38. DhuleyJ.N;(2007),“Investigationonthegastroprotectiveandantidiarrhoeal propertiesofAegle marmelos unripe fruit extract”,

Hindustan Antibiot Bull, 45-46,41.

39. PandaS,KarA;(2006)“Evaluationoftheantithyroid,antioxidativeandantihyperglycemic activityofscopoletinfromAeglemarmelosleavesinhyperthyroidrats”,PhytotherRes. Vol- 20(12), Page No.1103-5.

40. VeerappanA,MiyazakiS,KadarkaraisamyM,RanganathanD(2007)“Acuteandsubacute toxicitystudiesofAeglemarmelosCorr.,anIndianmedicinalplant”.Phytomedicine.14(2-3), Page No.209-15.

41. SubramaniyaB.R.,MalligaR.M.,.MalathiG.K.,.AnbarasuKand.DevarajS.N.,(2009) “Effect of Aqueous Extract of *Aegle marmelos* Fruit on Adherence and β-Lactam Resistance of*EnteropathogenicEscherichiacoli*byDownRegulatingOuterMembrane Protein C”, American Journal of Infectious Diseases 5 (2), Page No.161-169.

42. KumarR,KumarA,PrasaC.S.,Dubey N.K.andSamantR(2008)“Insecticidalactivity *Aeglemarmelos*(L.)Correaessentialoilagainstfour storedgraininsectpests”Internet journal of food safety, Vol.10, Page No.39-49

43. Kamalakkannan, N, andPrince, SMP. (2003) “Effect of Aegle marmelos Correa. (Bael) fruit extract on tissue antioxidant sinstreptozotocin diabeticrats”.Ind.J.Exp.Biol. 41, Page No.1285-1288.

44. Vimal, V, and Devaki,T.(2004)“Linearfuranocoumarinprotectsratmyocardiumagainst lipidperoxidationandmembranedamageduring experimentalmyocardialinjury.Biomed. Pharmacother”, 58, Page No.393-400