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Aegle Marmelos-Gift of Nature to the Mankind

Sweta Sinha[1], A K Ghosh[2]
[1] *Department of Biochemistry, Patna University, Patna.*
[2]*RETD. Professor & Head of Department of Chemistry, Patna University.*

Abstract : Today according to the WHO as many as 80 % of world populations are still dependent on traditional medicines .Due to less communication means, poverty, ignorance and unavailability of modern health facilities, most people especially rural people are still forced to practice traditional medicines for their common day ailments. In the last few decades, natural products are extensively studied for their medicinal properties by advanced scientific techniques and a variety of bioactive compounds have been isolated from the different part of plant and were analyzed pharmacologically. World ethnobotanical information reported that a number of herbal medicines are used for controlling many human ailments and related complications in patients because of the undesirable side effects.India a treasure of plant population of medicinal value has been using these herbal drugs since ancient times for the treatment of human ailments because of its inability to cause side effects and safer than synthetic ones.Aegle Marmelos of family Rutaceae, commonly known as wood apple (Bael in hindi) is one of the important ayurved plant with several medicinal and nutraceuticals properties.The present review aims to document the morphology, distribution and medicinal properties of A.marmelos and its future prospects for the further scientific investigation. A systematic research work should be undertaken for the development of products for their economic and therapeutic utilization.
Key Words: Medicinal plants, Aegle marmelos, Herbal drugs, Hypoglycemic.

I. INTRODUCTION

According to American Heart Association, the Centre for Disease Control and Prevention, and other government resources, cardiovascular disease is leading global cause of death accounting for more than17.3 million deaths per year,a number that is expected to grow to more,than 23.6 million by 2030.In 2020 AD, 2.6 million Indians are predicted to die due to coronary heart disease which constitutes 54.1 % of all CVD death hyperlipidemia has affected humankind since antiquity.(Giorgio R et al).Medicinal plants have always been considered as a healthy source of life for all people due to its rich therapeutic properties and 100%natural.Oer past decade herbal medicine has become a topic of global importance, having no side effects,easily available at desirable price, effective and safe, and sometimes the only source of heath care available to poor. The consumption of synthetic drugs leads to hyperuricemia, diarrhea, nausea, gastric irritation, flushing, dry skin and abnormal liver function.Among the entire flora,35000 to 70,000 species have been used for medicinal purpose.A.marmelos are among these herbal plants due to their cardio protective and hypolipidemic properties . Aegle marmelos commonly known as Bael (family Rutaceae) is another Indian plant which has enormous traditional uses against various diseases. It has been reported that the leaf of Aegle marmelos posses hypolipidemic efficacy (IJEB-2009). Fresh alcoholic leaf extracts of Aegle marmelos were reported to have a cardio tonic effects in mammals (Haravey,1968 and Nadkarni, 2000).Available ethno medical literature reveal that all parts of plant are medicinally useful like leaves, fruit pulp, flower ,stem bark, for many human ailments. Leaves of Aegle marmelos have been claimed to be useful and has enormous traditional uses against various diseases and many bioactive compounds have been isolated from this plant. The plant has shown various activities including anticancer, hypoglycemic, anti-inflammatory, antihyperlipidemic, analgesic and antiviral properties.

II. MORPHPLOGY AND DESCRIPTION

The bael is one of the sacred trees of the Hindus. Leaves are offered in prayers to Shiva and Parvathi since ancient times. It has its own place in indigenous systems of medicine. The bael fruit, Aegle marmelos Correa, is also called Bengal quince, Indian quince, golden apple, holy fruit, stone apple, bel, bela, sirphal, maredoo and mapin in Thailand; phneou or pnoi in Cambodia; bau nau in Vietnam; bilak, or maja pahit in malaya; modjo in Java; oranger du Malabar in French; marmelos in Portuguese.The bael fruit tree is slow-growing of medium size, up to 40 or 50 ft (12-15 m) tall with short trunk, thick, soft, flaking bark and spreading sometimes spiny branches the lower ones drooping. Mature leaves emit a disagreeable odor when bruised. Fragrant flowers, in clusters of 4 to 7 along the young branchlets, have 4 recurved, fleshy petals, green outside, yellowish inside and 50 or more greenishyellow stamens. The fruit round, pyriform, oval or oblong, 2 to 8 in (5-20 cm) in diameter may have a thin, hard, woody shell or a more or less soft rind, gray-green until the fruit is fully ripe when it turns yellowish. Found almost in all states of India, from sub Himalayan forests, Bengal, Central and in Burma (Nadkarani, 1927).It is found

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inIndia,Ceylon,China,Nepal,SriLanka,Bangladesh,Nepal,Combodia,Indonesia.(S Dhankar et al ,2011)

III. MEDICINAL PROPERTIES

Aegle marmelos plants leaf, fruit and bark are widely used for many diseases.(Gupta et al.,2011) According to the verse in Agathiyar Gunavakadam, leaf, flower, and fruit are used for venereal diseases, ulcers and azoospermia..The unripe dried fruit is astringent, digestive, stomachic, used to cure diarrhea and dysentery. Sweet drink (Sherbet) prepared from the pulp of fruits produce a soothing effect on the patients who have just recovered from bacillary dysentery. The unripe and half ripe fruits improve appetite digestion. The ripe fruit is a good and cure dyspepsia (indigestion).The pulp from the unripe fruit is socked in gingerly oil for a week and this oil is smeared over the body before bathing. This oil is said to be useful is removing the peculiar burning sensation in the soles.The roots and the bark of the tree are used in the treatment of fever by making a decoction of them.Good against malaria. The leaves are made in to a poultice and used in the treatments of ophthalmic. The roots are sweet, cure the fevers caused by tridosha, stop pain in the abdomem, the palpitation of the heart and allay urinary troubles. An unripe Bael fruit is taken it's cracked in two or three places and roasted when the inside of the fruit is a softened by the heat and the starch is further converted in to sugar.This is mooed with let water to which a little fried and pulverized Anise (Foeniculum vulgare) is added and the whole mixture is strained so that the starch water containing Bael-sugar, the active anti-dysenteric principle of Bacl fruit and the fine particles of the carminative anise, are taken as food three or four times a day (Nadkarani,1927).Ethnomedical information on Aegle marmelos is available from many parts of India and other countries. Available ethnomedical literatures reveal that entire plant, leaf, fruit, stem bark, root and essential oil of fruits of this plant are used in various diseases. A**.** Hypoglycaemic effects**:** The hypoglycaemic effect of the water extract of the fruits of Aegle marmelos was examined in streptozotocin-induced diabetic Wistar rats.Oral administration of the water extract (125 and 250mg/kg) twice a day for 4 weeks resulted in significant reductions in blood glucose, hydroperoxides, and a significant elevation in plasma reduced glutathione and Vitamin C in diabetic rats. The effect of the extract at a dose of 250 mg /kg was more effective than glibenclamide in restoring the values of these parameters. The results of this study clearly showed the hypoglycaemic activity of the fruit extract. (Kamalakkannan N et al.,2003)The aqueous extract of Aegle marmelos seeds was administered orally at different doses (100, 250 and 500 mg/kg) to normal as well as sub (fasting blood glucose (FBG) normal; glucose tolerance abnormal) and mild (FBG 120–250 mg/dl) diabetic rats. The dose of 250 mg/kg was found to be most effective dose and it decreases blood glucose level (BGL) by 35.1% in normal healthy rats after 6h of administration. The same dose also showed a marked reduction in BGL of 41.2% in sub and 33.2% in mild diabetic rats in glucose tolerance test (GTT) after 2 h.Treatment of severely (FBG >250 mg/dl) diabetic rats for14 days with a dose of 250 mg/kg reduces the fasting blood glucose by 60.84% and urine sugar by 75% than their pretreatment levels. It brought about fall in level of total cholesterol (TC) by 25.49% with increase of 33.43% in high density lipoprotein (HDL) and decrease of 53.97 and 45.77% in low density lipoprotein (LDL) and triglyceride (TG), respectively. These results clearly indicate that aqueous seed extract of Aegle marmelos possess antidiabetic and hypolipidemic effects in diabetic rats .(Narayan A, Kumar R, Kumar S.,2006) B.Antidyslipidemic activity**:** From the leaves of A. marmelos an alkaloidal-amide, Aegeline 2, was isolated and found to have antihyperglycemic activity as evidenced by lowering the blood glucose levels by 12.9% and 16.9% at 5 and 24h, respectively, in sucrose challenged streptozotocin induced diabetic rats (STZ-S) model at the dose of 100 mg/kg body weight. Aegeline 2 has also significantly decreased the plasma triglyceride (Tg) levels by 55% ($P < 0.001$), total cholesterol (TC) by 24% ($P < 0.05$), and free fatty acids (FFA) by 24%, accompanied with increase in HDL-C by 28% and HDL-C/TC ratio by 66% in dyslipidemic hamster model at the dose of 50 mg/kg body weight.(Narender T, Shweta S, Tiwari P, et al.,2007). Lipid lowering effect of 50 percentage of ethanolic extract of the leaves of A.marmelos (L.) was evaluated in triton and diet induced hyperlipidaemic models of wistar albino rats. The extract at 125 and 250 mg/kg dose levels inhibited the elevation in serum cholesterol and triglycerides levels of triton WR 1339 administration in rats. The extract at the same dose levels significantly attenuated the elevated serum total cholesterol and triglycerides with an increase in the high-density lipoprotein cholesterol in high-fat diet-induced hyperlipidaemic rats. The standard drugs atorvastatin in the former and gemfibrozil in the latter studies showed slightly better effects (Vijaya et al., 2009). C.Anti-inflammatory, antipyretic and analgesic: The serial extracts of the leaves of Aegle marmelos Corr. wereinvestigated for anti-inflammatory property. The analgesic and antipyretic properties were also evaluated.The most of the extracts derived from the plant Aegle marmelos caused a significant inhibition of the carrageenan-induced paw oedema and cotton-pellet granuloma in rats. The extracts also produced marked analgesic activity by reduction the early and late phases of paw licking in mice. A significant reduction in hyperpyrexia in rats was also produced by the most of the extracts. This study was established anti-inflammatory, antinociceptive and antipyretic activities of the leaves of A.marmelos(Arul et al.,2005)

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IV. CONCLUSION

In recent years interest in herbal agents as therapeutic treatment option has increased due to their limited side effects. Numerous phytochemical and pharmacological studies have been conducted on different parts of Aegle marmelos. The present literature supports the potential of Aegle marmelos as a medicinal tree.In view of nature of plant,more research can be done to explore the therapeutic potential of this plant,which can be boon to humankind.

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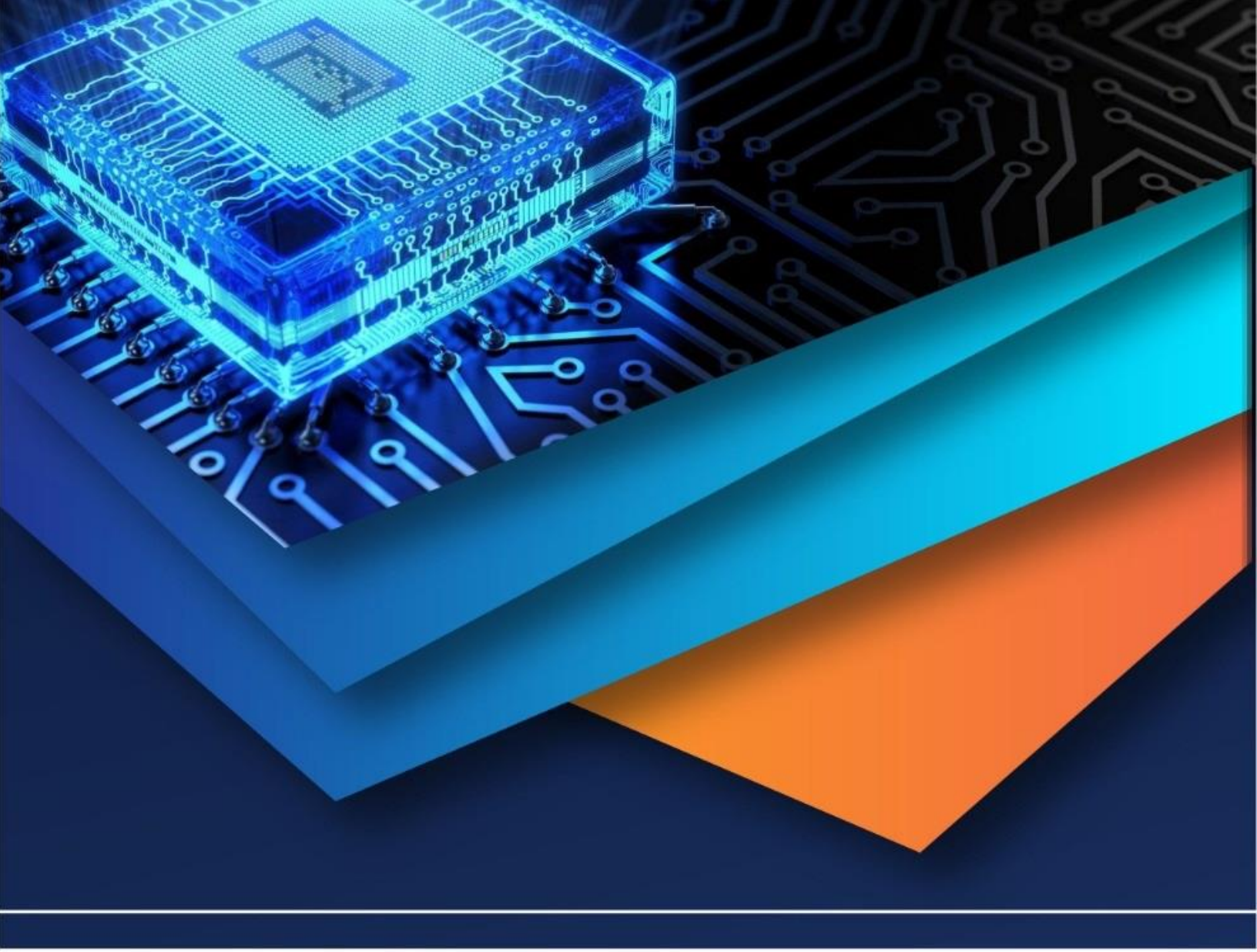

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