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AN OVERVIEW ON FRUIT MANGO (*Mangifera indica*) LIFE

IMRAN M[2], FERHEEN S[1*], KHALID BM[1], SIKANDER F[1], YAQEEN S[1] AND YAQEEN Z[1]

PCSIR Laboratories Complex, Karachi-75280, Pakistan

Department of Chemistry, GHAZI University, Dera Ghazi Khan, Pakistan

***Corresponding author: Email Address: farheen_sadia@yahoo.com**

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ABSTRACT

In the medicine system of the world Ayurveda is the oldest system. The Ayurveda system of medicine was orginated 3000 years ago in India. The medicine raw material used in Ayurveda obtained from different medicinal plants as a crude drug. *Mangifera indica* is one of the most vital medicinal plants due to its nutritional value. It serves as medicine for curing of several diseases. Pharmacological, chemical, and toxicological features of this plant describe in this review. An allopathic medicine side effect reduces by the help of it and because of the availability of it in nature is easy the economic burden also reduces.

Keywords: *Mangifera indica*, Anacardiaceae, Mangiferin, Ayurveda

INTRODUCTION

Mangifera indica, is a member of an Anacardiacae family. *Mangifera indica* (Mango), known as the fruits king in India. In the tropical region of world it is the most important fruit. Around the globe, *M.indicia* different parts use as a medicinal point of view [1]. It grows in height upto 15-30m [6]. Tropical asia is the region of origination of genus mangifera, Sumatra, Java, Borneo and Malay Peninsula have the maximum number of species [14]. Different mango species contain numerous chemical components

which includes polyphenolics, triterpenoids, and flavonoids. Active bio active component is mangiferin and the derivatives are isomangiferin, tannis and gallic acid. protocatechic acid, catechin, mangiferin, alanine, glycine, γ-aminobutyricacid, kinic acid, shikimic acid and the tetracyclic triterpenoids cycloart-24-en-3β,26diol, 3-Ketodammar-24 (*E*)-en-20S,26-diol, C-24 epimers of cycloart-25 en 3β,24,27-triol and Cycloartan-3β,24,27-triol are reported that they contain by the bark of the plant. Indicoside A and B, manghopanal, mangoleanone, friedelin, Cycloartan-3β-30-diol and derivatives, mangsterol, manglupenone, mangocoumarin, n-tetacosane, n-heneicosane, n-triacontane and mangiferolic acid methyl ester are found after *mangifera indica* stem bark isolation. As dentrifrice, antiseptic, astringent, diaphoretic, stomachic, vermifuge, tonic, laxative and diuretic and to reat diarrhea, dysentery, anaemia, asthma, ronchitis, cough, hypertension, insomnia, Rheumatism, toothache, leucorrhoea,

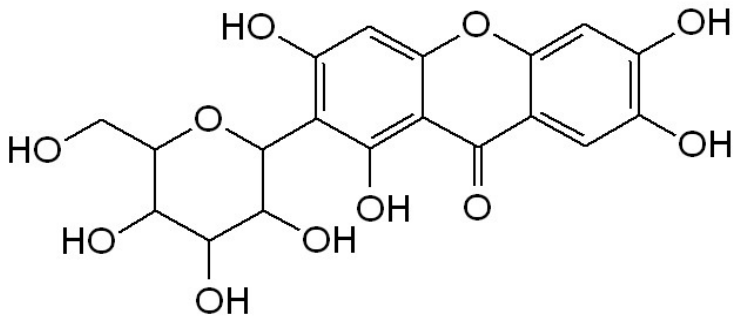
haemorrhage and piles plant different parts are used. In system of Ayurveda it is use for digestion clearing and the heat produced due to pitta. Durable antioxidant, anti-lipid peroxidation, immunomodulation, cardiotonic, hypotensive, wound healing, antidegenerative and antidiabetic activities possess by mangiferin [7, 8, 9]. It is used in different fields other than medicine. Content of stearic acid is high in mango and in making of soap fat is necessary. For the extraction of fat seed is used and after the extraction the residue for the cattle feed is used [12]. 16% to 20% tannin possess by the bark. In tropical Africa crockery mending is done by the gum which obtained from the trunk of mango. For plywood's, boxes, shoe heels, window frames are made by using the trunk of the plant [13].

MANGO DIFFERENT SPECIES [2]:

Mangiferaaltissima, Mangiferapersiciformis, Mangifera camptosperma, Mangifera caesia, Mangifera decandra, Mangifera laurina, Mangifera odorata, Mangifera longipes, Mangifera foetida.

CHEMICAL STRUCTURE:

Mangiferin is the bioactive constituent of tree mango. Mangiferin structure established as 2-C-β-D-glucopyranosyl- 1, 3, 6, 7-tetrahydroxyxanthone [4]. The molecular formula of mangiferin is $\mathbf{C_{19}H_{18}O_{11}}$ and the Molar mass is 422.33 g/mol [2].



PHYSIOLOGICAL PARAMETERS

Table 2: MANGIFERA INDICA PHYSIOLOGICAL PARAMETERS [5]

S.No	PARAMETERS	LEAF %	ROOT %	STEM BARK %
1	TOTAL ASH	5.50	5.05	4.80
2	Acid insoluble ash	1.78	1.60	1.97
3	Water soluble ash	1.75	1.75	1.80
4	Alcohol soluble extractive	0.78	0.82	1.40
5	Sulphated ash	7.10	5.41	6.39%
6	Moisture content	5.80	0.30	7.9%
7	Water soluble extractive	0.82	0.60	2.11

IMPORTANCE NUTRITIONALLY

In enhancement and maintenance of health and immune system to fight against several diseases, phytomedicines and phytonutrients play an important role [10]. High nutritional value and uniqueness flavor is the reason behind the popularity of mango. Calcium, magnesium, potassium, sodium, phosphorous and iron, vitamin A, B, C is the vitamin and minerals contain by it. Minor quantity of malic, tartaric and citric acid is present in mango [11]. Most abundantly nutrients found in mango are iron useful for treating the anemia in people suffering from it, after menopause weakness appears in women which fulfill by taking the mango help in meeting the iron requirements. Vitamin A is helpful in aged relaxed muscular degeneration protection. It helps in the treatment of various skin diseases [15]. Vitamin B_6 and vitamin C also found abundantly in mango, help in lowering the LDL cholesterol level in the body. Help in prevention of stroke, coronary artery diseases of heart [16].

RIPE MANGO FOOD VALUE PER 100 G

Table 3: Mangiferaindica food value [17-18]

Calories	**62.1-63.7**
Moisture	**78.9-82.8g**
Protein	**0.36-0.40g**
Fat	**0.30-0.53g**
Carbohydrates	**16.20-17.18g**
Fiber	**0.85-1.06g**
Ash	**0.34-0.52g**
Calcium	**6.1-12.8mg**
Phosphorus	**5.5-17.9mg**
Iron	**0.20-0.63mg**
Ascorbic Acid	**7.8-172.0mg**
Tryptophan	**3-6mg**
Methionine	**4mg**
Lysine	**32-37mg**
Vitamin A (carotene)	**0.135-1.872mg**

Phytochemistry: Phytochemical status of a fruit *mangifera indica* describe in **Table 4**.

Table 4: Phytochemical status

S. No	Parts of Plants	Chemical components
1	**Stem bark**	**Terpenoidalsaponins, indicosideA and B, Manghopanal, Mangoleanone, fridelin, cycloartan-3β-30-diol and its derivatives [19]. MangosterolManglupenone,Mangocoumarin, n-tetacosane, nheneicosane, n-triacontane [20].**
2	**Leaves**	**protocatechic acid, catechin, mangiferin, alanine, glycine, kinic acid, shikimic acid [21]tetracyclic triterpenoids cycloart-24-en-3β,26 diol, 3-ketodammar-24(E)-en-20S,26- diol [22]**
3	**Fruit**	**Mangiferin, cis-9, cis-15-octadecadienoic acid, Xanthophyll esters, carotenes, and tocopherols [23].**
4	**Seed**	**Polyphenols such quercetin, Kaempferol, gallicacid, tannin, xanthone [24].**
5	**Flower**	**alkylgallates such as gallic acid, methyl gallate ethyl gallate[25]. 4-phenyl gallate n-propyl gallate, n-octylgallate n-pentylgallate, 6-phenyl-n-hexyl gallate [26].**
6	**Root**	**chromones, 3-hydroxy-2-(4'-methylbenzoyl)-chromone and 3-methoxy-2-(4'-methyl benzoyl)-chromone [4]**
7	**pulp**	**vitamins A and C, β-carotene and xanthophylls and Root of mango contains the chromones, 3-hydroxy-2-(4'- methylbenzoyl)-chromone [27]**

Pharmacokinetics:

Anti-inflammatory: *Mangifera indica* leaves aqueous extract showed significant anti-inflammatory act. Using the carrageenan induced rat paw edema and cotton pellet granuloma methods for chronic and acute inflammation; study was estimated [28]. 300 mg/kg dose level of ethyl acetate and ethanol extract compared with standard drug showed significant activity [29].

Antibacterial: *S.typhi, B.subtilis, E.coli and K.pneumonia* against these bacteria 2mg/ml-4mg/ml dose range of *mangifera indica* ethanolic and ethyl acetate extract shown significant activity [1]. Salmonella maximum growth inhibition showed by the methanol extract. Bacterial strains screening done by using the disc diffusion method [30].

Antioxidant: plants antioxidant capacity determined by using DPPH radical

scavenging, ABTS cation radical scavenging activity and assay of ferric thiocyanate in comparision to tannic acid, methyl gallate, ascorbic acid and α-tocopherol [31]. Lipofundin-induced oxidative stress protected by lipid per oxidation inhibited by the ectract of MI bark [32].

Antiallergic and Anthelmintic: Vimang and mangiferin are the chemical constituents presents in *mangifera indica* stem bark aqueous extract. Anti-allergic and anthelemic activity possess by vimang and mamgiferin. Using nematode and trichinella spiralis mice was infected experimentally, orally administered vimang and mangiferin 50mg/kg dose. Anti-Trichinella lgE serum levels decline by treating with Vimang or mangiferin. 50 days continuously rats orally administered with vimang or mangiferin, mast call degaranulation inhibited [33, 34].

Hepatoprotective activity: Thai mango seed kernels ethanolic extract isolation gives 1,2,3,4,6-penta-*O*-galloyl-β-D-glucopyranose (PGG), methyl gallate (MG), and gallic acid (GA) polyphenolic principle, against the liver injury induced by carbon tetrachloride in mice show hepatoprotective potential [35].

Anticancer: *Mangifera indica* leaves extract on concentration **(**962.5-500µg/ml) different ranges showed anticancer activity. Proliferation of cancer cell in vitro mainly accumulated cells in G2/M phase. Leaves of mango ethanolic extract 90% preceded the cells accumulation in G2/M phase of cell cycles [36]. The possible anticancer effects of the kernel ethanolic extract on breast cancer cells were estimated using MTT, anti-proliferation, neutral red (NR) uptake and lactate dehydrogenase (LDH) release assays showed that the extract is significantly cytotoxic to these cell lines in a dose-dependent manner, and considerably less towards normal breast cells MCF-10A [37].

Neuropathic Pain Reduction: Mangiferin contain by the extract of leaf of *mangifera indica* use as neuropathic pain treatment and prevention. Formalin induced licking and acetic acid induced writhing model used for the determination of neuropathic pain. Modulating some molecular targets implicated in central sensitization, peripheral, central and specific targets of diseases could also be regulated in special glial activation and immune system may be the possible action of mechanism [38].

Antihyperglycemic activity: hypolidemic and anti-diabetic effects possess by mangiferin lowering the FBS, TC, TG, LDL, and VLDL levels. Inhibition of alpha amylase inhibitory effect IC50 value

74.35±1.9 µg/ml) and alpha glucosidase inhibitory effect (IC5041.88±3.9µg/ml) shown by mangiferin in addition, acarbose standard drug (IC50 83.33±1.2 µg/ml) when compared with it [39].

CONCLUSION

Numerous diseases treated as a remedy by using herbs of different types. As a herbal drug different material of plant are used. Recently in the field of chemical characterization, biological, pharmacological, and toxicological estimation of medicinal plants remarkable progress is going on. Pharmacological activities and the nutrition value of *Mangifera indica* are highlighted in this review. Further research has to be made on *mangifera indica* helps to develop therapeutic agent which are multi targeted and help to fight against several diseases.

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