WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 9, 835-848. Review Article ISSN 2277–7105

A REVIEW OF COSMACEUTICAL BENEFITS OF *MANGIFERA INDICA* ON SKIN

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Article Received on
15 March 2025,

Revised on 04 April 2025,
Accepted on 24 April 2025

DOI: 10.20959/wjpr20259-36539

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ABSTRAT

Mangifera indica is a topical fruit tree native to South Asia and widely cultivated in many regions for its nutritional benefits. It has gained attention in cosmeceutical field due to its rich phytochemical composition. Various parts of mango tree such as fruit pulp, seeds, bark, leaves and flowers contain active compounds including polyphenols, flavonoids, carotenoids, mangiferin and essential vitamins which imparts powerful antioxidant, anti-inflammatory, anti-microbial and photoprotective properties. Mango butter extracted from seed kernels that is beneficial in skincare products for its excellent emollient, moisturizing and regenerative effects. Maintains skin hydration enhance elasticity and protect from UV radiation. Mango have various pharmacological actions like anti diabetic, anticancer, antidiarrheal and immunomodulatory effects. Its active compounds help to repair the skin barrier, reduce fine lines and wrinkles. Mango mainly incorporating in following cosmetic products like moisturizers, sunscreens, lip balms, face masks, hair conditioner and serums.

KEYWORDS: Mangifera indica, anti-oxidant, anti-inflammatory, mangiferin, emollient, UV radiation.

INTRODUCTION

The *Mangifera indica*, also known as mango, its native is southern parts of Aisa in countries such as Burma, Bangladesh, India and Pakistan. It is also cultivated in eastern Aisa and eastern Africa. Mango trees are tall up to 19-20 m, erect with a huge foliage. It is widely used in all over the world for their beneficial effects.

Mango fruit is known as the king of fruits in India. The fat obtained from mango kernels is widely used for designing confectionary fats and for making cosmetic products.[1]

Mango is the one of the tropical fruits. Its content includes polyphenolic antioxidant and a glucosyl xanthone, it has strong antioxidant, anti-lipid peroxidation, immunomodulation, cardiotonic, hypotensive, wound healing, antidegenerative and antidiabetic activities. The various parts of mango tree such as fruit, juice, seeds, leaves, bar and gum are used as dentifrice, antiseptic, astringent, diaphoretic, stomachic, vermifuge, tonic, laxative. It is also used to treat diarrhoea, dysentery, anaemia, asthma, bronchitis, cough, hypertension, insomnia, rheumatism, and hemorrhage. The most parts of tree are used medicinally and the bark also contains tannins, which are used for the purpose of dyeing.[2]

Mangoes may be particularly suited to provide compounds that benefit the skin. The bioactive compounds like phenolic acids, polyphenols, carotenoids, which are the most abundant and the vitamins ascorbic acid, thiamine, riboflavin and niacin. The compounds have reported to exhibit antioxidant activity.[3]

There are several compounds present in the fruit leads to the activation by antioxidants of signalling pathways able to regulate the expression of genes and active molecules leading to antioxidant, immunomodulatory, antiproliferative and antidiabetic effects.[4]

The phytoconstituents present in the mango is responsible for the skin exfoliating property by removing the dead cells from the skins and nourishes the skin surface.

Nowadays most of cosmetics formulation and dietary food products containing mango as the major ingredient. The uses mango has to be increased because of their therapeutic and cosmetic benefits.

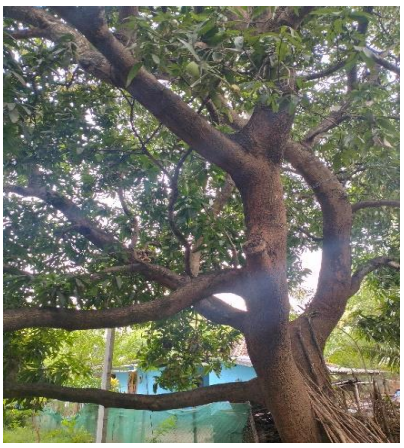

Fig No: 1.1

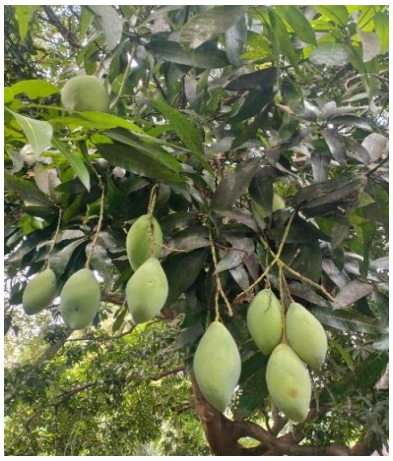

Fig No: 1.2

Fig No: 1.3

TAXONOMICAL CLASSIFICATION

Kingdom: plantae

Class: Magnoliopsida

Phylum: Magnoliophyta

Order: Sapindales

Family: Anacardiaceae

Genus: *Mangifera*

Species: *Indica.*[2]

PHYTOCONSTITUENT

The mango containing various chemical constituents which are present in different parts of the mango tree. The components included polyphenols, flavonoids, triterpenoids.

Especially tannins, gallic acid, coumarin, ellagic acid, vanillin, mangiferin, ferulic acid, cinnamic acid and unknown compounds.

Table No: 1.1

Parts	Chemical constituents
Bark	It includes proto catechin acid, catechin, mangiferin, alanin, glycine, gamma-aminobutyric acid, kojic acid, shikimic acid, and the tetracyclic triterpenoids cycloart-24-en-3β,26-dioal, C-24 epimers of cycloart-25-en 3β, 24, 27-triol and cycloartan-3β,24,27-triol. Indico side A and B, mango penal, mango lean one.
Flower	It Includes alkyl gallates such as gallic acid, ethyl gallate, n-pentyl gallate, n-octyl gallate, 4-phenyl gallate, 6-phenyl-n-hexyl gallate and dihydro gallic acid.
Roots	Contains the chromones, 3-hydroxy-2-(4-methylbenzoyl)-chromone and 3-methoxy-2-(4-methyl benzoyl)-chromone.
Leaves	The leaves and flower yields an essential oils which include humulene, elemene, ocimene, linalool, nerol etc.
Fruit pulp	Is rich in a number of phytoconstituents include Mangeferin, gallic acid, gallotannins, quercetin, isoquercetin, ellagic acid, and β-glucogallin are the phenolic compound identified in the mango pulp. An unusual fatty acid, cis-9, cis-15-octaecadienoic acid was isolated from the pulp lipids of mango. Phenolic antioxidants, free sugars and polyols isolated and analysed from mango.[5]

CONTENTS OF NUTRIENT, VITAMIN, MINERALS, AND CAROTENOIDS IN *Mangifera indica* PULP

Table No: 1.2.[7]

Nutritional value	
Fruit composition	Quantity
Carbohydrate	14.98 g
Protein	0.82 g
Fat	0.32 g
Fibre	1.6g
Vitamins	
Vitamin C	36.4 mg
Vitamin E	1.12 mg
Vitamin A	10.82 mg
Vitamin B3	669 µg
Vitamin B5	160 µg
Vitamin B6	119 µg
Vitamin B2	38 µg
Vitamin B1	28 µg

Folates	43 µg
Vitamin K	4.2 µg
Carotenoids	
B-Carotene	445 µg
α-Carotene	17 µg

TRADITIONAL MEDICINAL USES

Various parts of *Mangifera Indica* has been used traditionally in ayurvedic and various medicine systems for over 4000 years. This are the traditional uses of mango tree by using different parts:

1. Leaves: To treat asthma, bronchitis, cough and diabetes.
2. Bark: Astringent and used to treat diphtheria and rheumatism.
3. Mango fruit is refreshing and invigorating.
4. The juice of Mangifera Indica helps to treat heat stroke.
5. Seeds: utilised in the treatment of asthma and as astringent.
6. Gum applied in dressings for cracked feet and treat scabies also consider as anti-syphilitic.
7. Various parts of plant are used as antiseptic, astringent, dentifrices, diaphoretic, stomachic, vermifuge, tonic, laxative and diuretic. Treats conditions such as diarrhoea, dysentery, anemia, asthma, bronchitis, cough hypertension insomnia rheumatism tooth ache hemorrhage and piles. All parts are used to treat broken horn, rabid dog, jackal bite, tumors, snakebites, stings, datura poisoning, heatstroke, miscarriage, anthrax, blisters, wounds in mouth, colic, diarrhoea, glossitis, indigestion, liver disorders, excessive urination, tetanus and asthma.

PHARMACOLOGICAL ACTIONS

1. Antioxidant

Reactive oxygen species causes a strong oxidizing effect and induced damaged to biological molecules includes protein lipid and DNA. Major natural and the oxygens are vitamin E vitamin C beta carotene that is beneficial to prevent several chronic disorders. And this can be used for both chemo prevention and treatment purposes. This extract to show powerful scavenging activity of hydroxyl radical an acted as a Chelator of iron. The pharmacological relevance of Vi mang could be a potential compound for antioxidant therapy in diseases related to abnormal intracellular iron distribution or iron overload. The protective abilities of Mangifera indica stem bark extract Vi mang, mangiferin and selected antioxidants like vitamin C, vitamin E, beta carotene against the TPA induced 12-O -tetradecanoylphorbol-13-acetate induced oxidative damage in serum, liver, brain as well as in the hyper production of reactive oxygen species (ROS) by peritoneal macrophages was compared.

2. Anti-diabetic

50% ethanolic extract of leaves of Mangifera indica produced hypoglycemia effect at dose of 250mg/kg both in streptozotocin induced diabetic animals. The beta cells get stimulated to release insulin is part of mechanism of action. The aqueous extract of leaves of Mangifera indica have effect on blood glucose level in normal glycemic, glucose induced hyperglycemic and streptozotocin induced diabetic rats have assessed. The result shows that aqueous extract of leaves have hypoglycemic activity. This action is due to intestinal reduction of absorption of glucose. The leaves of Mangifera indica used for antidiabetic properties. Mangiferin induce improvement in oral glucose tolerance without alternation of basal plasma glucose level. Mangiferin exhibit anti diabetic, antihyperlipidemic, antioxidant properties without causing hypoglycemia.

3. Anti-diarrheal

Methanolic and aqueous extract of seed of Mangifera indica has evaluated by experimental diarrhoea caused by castor oil and the magnesium sulphate in mice.

The result shows that extract of Mangifera indica has significant anti diarrheal activity.

4. Immunomodulatory

Immunomodulatory activity of alcoholic extract of stem bark investigated in mice that shows test extract is a promising drug with immunostimulant properly.[2]

5. Anticacer

The phenolic extracts are used to cancer lines, including Molt-4 leukemia, A-549 lung, MAD-MD-231 breast, Ln Cap prostate, Sw-480 colon cancer cells and non-colon cancer cellsCCD-18Co.Mango juice and juice extracts has anticancer activity and saw that incubation of HL-60 cells with whole mango juice results in the inhibition of the cell cycle in the G0/G1 phase.

The other mechanism includes the inhibition of the telomerase and gene function.

6. Anti-inflammatory

The stem bark extract of *Mangifera indica* was reported as anti-inflammatory activity. The possible anti-inflammatory mechanism of *Mangifera indica* include the balance between the overwhelming anti-inflammatory cytokines and proinflammatory mediators, inhibition of inflammatory cellular activities, regulation of inflammatory gene expressions, and enhancement of the cellular resistance against inflammatory injuries.

7. Anti-diarrheal

The anti-diarrheal activity has been reported by the aqueous and methanolic extract of seeds of mango which provides the onset of result which has been proven by the scientist.

8. Antibacterial

The aqueous and ethanolic extract of leaves and stems of mango has been found sufficient activity against certain bacteria such as staphylococcus aureus, streptococcus pyogenes, streptococcus pneumoniae, and pseudomonas aeruginosa etc. The antibacterial activity against gram-positive and gram -negative was mainly due to the presence of gallotannin and mangiferin.

9. Cardio protective

The effect of mangiferin on the isoproterenol induced myocardial infraction. Mngiferin was found to tolerate the effect if isoproterenol induced pathological changes, reduced the lipid peroxide formation and retained the myocardial enzyme activities at normal range.

10. Laxative

The chemical constituent present in the leaf mangiferin significantly accelerate GIT movement at oral doses.[8]

COSMETIC APPLICATIONS

- Mango butter is mainly used in cosmetics due to its excellent moisturizing properties and High oxidative stability.
- Unlike Synthetic or paraffin based emollients mango butter is derived naturally and it is semi solid at room temperature that make it suitable for Creams and other skin care products**.**
- It has non saponifiable substances. Mango butter helps to protect the skin from damage causing uv rays and environmental problems.
- It helps to maintain skin hydration and reduces dryness and irritation. Mango butter is rich in vitamin E that support skin health by reducing roughness and promote elasticity.
- Vitamin E improves circulation, enhance overall appearance and helps to regenerate skin cells.
- Mango butter contain bioactive compounds like phytosterol and triterpenes which contribute to anti-inflammatory and antioxidant effects. These properties make it suitable ingredient for personal care products, including moisturizers, sunscreens etc.

- Mango kernels are nutritional include essential amino acids vitamins and the anti-oxide and compounds. It is excellent source of polysaccharides and fat.

MANGO BUTTER COSMETIC PROPERTY

1. Anti-oxidant property on skin

Mango butter Have antioxidant properties. Mango butter is rich with polyphenol. It work by donating an electron to free radicals, reactive oxygen species that leads to damage on DNA and cells. This leads to premature aging of skin cells.

Poly phenols helps to prevent the degradation of collagen and elastin and other compounds essential to skin structure. Topical application of bank of butter has preventive action on skin sagging, fine lines and wrinkles.

2. Smoothing and emollient property

The saturated fatty acids found in mango butter helps the skin and maintain structure. These compounds have structure similar to the lipids and that make up straighten corneum of the epidermis.

They have ability to integrate into it where they play role of Inter cellular cement. By contributing to Restoration and cohesion of stratum corneum saturated fatty acids promotes its impermeability with helps to prevent skin dehydration. Mango butter containing skin care products recommended for dry skin, atopic skin which lack lipids. They helps to restore lipid composition after prolonged exposure to Sun or pollution.

3. Anti-inflammatory property

Mango butter has anti-inflammatory properties due to phytosterols. The mechanism by which these molecules act has not yet been fully discovered and further research is still going on. Mango butter can potentially reduce itching or certain redness.

4. Acting as mask

Because of the benefits of mango butter it has been incorporated into lip mask which composed of 98% of natural ingredients which combines treatment of lipid replenishing actions of ceramids with moisturizing action of hyaluronic acid to prepare chapped lips.

The mango butter which is present in the lip mask allowed to melt on the lip and form a protective layer. We can find it out that mango butter also incorporated in radiance mask. The radiance mask also contain turmeric, lemon verbena hydrosol and yellow clay this treatment is used for restoring skin radiance.

5. Act as protective

Fatty acids and squalene found in mango butter play crucial role in restoring skins lipid barrier.

Oleic acid and Omega 9 in mango butter naturally found in hydrolipidic film which promotes skin protection and hydration film.

Mango butter have beneficial properties for skin protection. It helps to strengthen hydrolipidic film.

This film act as shield to keep the skin hydrated and protected from external environments.

6. Protect from UV rays

Mango contains salicylic acid and antioxidants which protect from sun damage. Vitamin C and vitamin E are rich in supply in mangoes.

The Mango seed oil rich with wool is less susceptible to various type of bacteria.

7. Helps in hair growth

The compounds present in mango that promote soft skin, may boost hair's natural shine and reduce scalp dryness and flakiness.

8. Skin friendly

Mango contain various vitamins that is beneficial to skin. Those vitamins used as moisturizing agent for dry skin.[9]

VITAMIN BENIFITS

- Mangos are loaded with various nutritional substances. Mangoes are packet with fibre, vitamin C vitamin b6 vitamin A vitamin E and more.
- They are also good source of minerals potassium calcium beta carotene and folate. Vitamins found in mango improves skin structure.
- Mango butter is recommended as a substitute in beauty products for cocoa butter. It shows similar and better results when compared with cocoa butter.
- Mango Butter incorporated in various topical creams because it shows various benefits like softer skin and UV protection. It is a source of treatment for cracked heels.

ADVANTAGES ON SKIN

1. Promote skin hydration

Skin hydration is a hidden benefit of mango butter. Helps to keep skin nourished and hydrated. Topical use of Mango seed butter effective to treat dry skin.

2. prevent premature ageing

Mango butter contains vitamin C. Which helps to neutralize free radical damage to prevent and reduce appearance of wrinkles and fine lines on face.

3. protect from UV rays

Mango extract act against UV induced skin ageing. According to a research study in 2013 uvb induced skin ageing test was done in mice. Along side mango butter is enriched with beta carotene and many and the oxidants which protects skin from sunrays.

4. Lightens the skin tone

The remarkable benefit of Mango seed butter help to enhance skin radiance and bring natural glow to skin, help the skin to rejuvenate by removing dead skin cells.[10]

USES OF MANGO IN VARIOUS COSMETIC PRODUCTS

- ✓ Moisturizers
- ✓ Sunscreens
- ✓ Lip balm
- ✓ Face serum
- ✓ Skin lotion
- ✓ Shampoo
- ✓ Hair conditioner
- ✓ Hair serum
- ✓ Nail lacquer

CONCLUSION

Mangifera indica is rich with its phytochemical compounds which have diverse therapeutic activity. That promises a natural cosmeceutical agent which comprises various properties like antioxidant, anti-inflammatory, anti-, photoprotective and moisturizing activities. This shows by various parts of plants make it valuable ingredient for skin formulations. Consumers are currently seeking herbal and sustainable alternatives for personal care. mango butter offers

both efficacy and safety. Further clinical studies and research studies can help to explore its full potential that paves way for broader application in the cosmeceutical industry.

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