IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

A Review Article On Ethnobotany,And *Invitro* Pharmacological Activity Of *Camellia Sinensis* (Theaceae) And *Mangifera Indica* (Anacardiaceae)

Dr.Geetha G[1*], Aiswarya Sudhan[2], Alfiya Abu[2], Anagha K[2], Anjali Krishnan P[2]

[1*] Head of the Department of Pharmaceutical Chemistry, [2222]BPharm Students,

Nehru College of Pharmacy, Pampady, Thiruvilwamala,

Thrissur, Kerala, India

ABSTRACT

India is one in every of the most important producers & richest use of a of natural merchandise withinside the global approximately genetic assets of medicinal plants.From time immemorial, plants have been used for various medicinal purposes.Green tea is a sort of tea that is used for numerous diseases. Mangifera indica (MI), additionally called mango and it's been a crucial herb withinside the Ayurvedic and indigenous clinical structures for over 4000 years.This reviewsexplains the ethnobotany, pharmacognostical and in vitro pharmacology of Camellia sinensis and Mangifera indica

KEYWORDS

***Camellia sinensis, Mangifera indica*,Theaceae,Anarcadiaceae, ethnobotany, pharmacognosy, pharmacology**

INTRODUCTION

GREEN TEA

Traditional device of drug treatments stay broadly practiced on many accounts. Morethan 30 % of whole plant species, at one time or different had been used for medicinal purposes[1]. Treatment with medicinal Plants is taken into consideration very secure as there is no or minimum aspect effects.The tea plant is sincerely a version of evergreen bush, with glossy inexperienced leaves and a small white to crimson flowers. The flora can reach a peak of approximately 30 -40ft (9 -12 m) or taller in huge however are normally stored to a peak of 6ft (1.2m) or much less on tea plantations and garden[2].· The polyphenols in Green tea that act as antioxidants can also additionally surely inhibit the boom of current most cancerous cells. In a few animal studies, injections of tea extracts decreased the dimensions of cancerous tumors in animals. The Lively agent which is thought to have this action is an antioxidant, epigallocatechin-3-gallate (EGCG) [3].

MANGO

The leaves of *Mangiferaindica*,a specific species of mango had been utilized in recuperation practices like Ayurveda and conventional Chinese medicinal drug for lots of years.Although the stems ,leaves,roots,and fruit are likewise utilized in conventional medicinal drug,the leaves particularly are believed to assist deal with diabetes and different fitness conditions. Mango is full of polyphenols, which might be plant compounds, that act as antioxidants to defend our body.Mangiferin has strong antioxidant, antilipid peroxidation, immunomodulation, cardiotonic, hypotensive, wound healing, antidegenerative and antidiabetic activities as it has polyphenolic antioxidant and a glucosyxanthone[4].Mango leaves contain tannins,antioxidants,flavonoids,and vitamin A ,vitamin B ,and vitamin C .They contain phenolic compounds that may help to regulate diabetes,and lower blood pressure.Theyhave been shown to have striong anti-fungal,anti-inflammatory,and antioxidant benefits.

Various parts of plants are used as a dentrifice, antiseptic, astringent, diaphoretic, stomachic, vermifuge, tonic, laxative and diuretic and to treat diarrhoea, dysentery, anaemia, asthma, bronchitis, cough.[5]

TAXONOMICAL CLASSIFICATION

GREEN TEA LEAVES[6]MANGO LEAVES

TAXONOMY	GREEN TEA	MANGO
Kingdom	Plantae	Plantae
Phyllum	Spermatophyta	Magnoliopsida
Division	Magnoliophyta	Magnoliophyta
Class	Magnoliopsida	Magnoliopsida
Order	Theales	Sapindales
Family	Theaceae	Ancardiaceae
Genus	*Camellia*	*Mangifera*
Species	*Sinensis*	*Indica*

SYNONYMS

GREEN TEA	MANGO
Camellia angustifolia	*Mangifera foetida*
Thea bohea	*Mangifera casturi*
Camellia thea	*Mangifera indica*

VERNACULAR NAMES

	GREEN TEA	MANGO
Malayalam	Grinti ilakal	Manga ila
English	Green tea leaves	Mango leaves
Kannada	Hasiru ceha elegalu	Mavina ele
Telugu	Grinti akulu	Mamidiaku
Tamil	Paccaii teylilai ilailkal	Ma ilai
Sanskrit	Harichaayam	Amra
Hindi	Haree chaay kee pattyan	Gam kapatta

PLANT DISTRIBUTION

GREEN TEA:

Green tea vegetations are local to East Asia and possibly orginated borderland of North Burma and South Western China.*C. sinensis* especially cultivated in tropical and subtropical climates, in regions with at the least 127 cm (50 in) of rainfall a year.

MANGO :

The mango is now cultivated mostly in frost-unfastened tropical and hotter subtropical climates. It is cultivated considerably in South Asia, Southeast Asia, East and West Africa, the tropical and subtropical Americas, and the Caribbean.

ETHNOMEDICAL USES:

Green tea's health promoting properties are largely due to its polyphenol content,particularly falvanols and flavanoids , which account for 30% of fresh leaf dry weight.many of the therapeutic effects have recently been linked to (-)epigallocatechin -3-gallate,the most prevalent catechin(EGCG)[8].Green tea extracts are more stable than pure epigallocatechin gallate ,one of green teas most important ingredients. In traditional Chinese and Indian medicine, green tea was used to control bleeding and cure wounds, help digestion, promote heart and brain health, and regulate body temperature.[9]

The leaves of *Mangifera indica*, have been used for various practices in Ayurveda,and Chinese medicine for long years.Although the stem, bark,leaves, roots,and fruits are used in traditional medicine,the leaves are believed to help treat diabetes and other health conditions. According to Ayurveda, numerous medicinal homes are attributed to one of a kind components of mango tree. Mango can be used for diabetes, anti-oxidant, anti-viral, cardiotonic, antihypertensive, anti inflammatory activities. Early time peoples have been used chewing of twigs of mango leaves for cleansing the teeth.[10]

PHYTOCHEMISTRY:

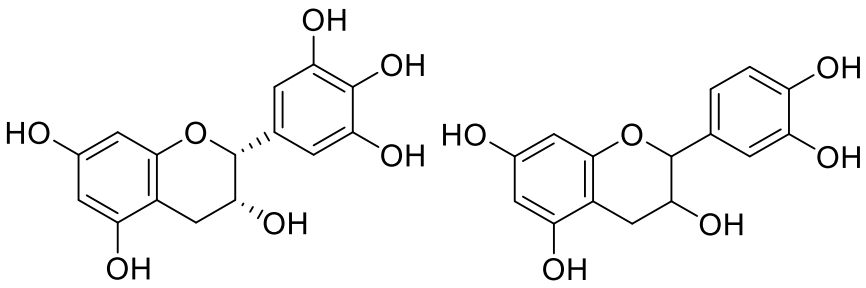
GREEN TEA

A group of chemicals known as flavonoids is found among the polyphenols in green tea. Green tea flavonoids are the basic phenolic molecules responsible for antioxidant actions such as neutralisation, which are generated throughout the metabolic process. Catechin is a flavonoid that contains a chemical called flavonoids. Epicatechin (EC), epigallocatechin gallate (EGCG), epigallocatechin (EGC), and epicatechin gallate are the major catechins found in green tea (ECG).Green tea specifically constitutes polyphenols, caffeine, aminoacids and different nitrogenous compounds, vitamins,inorganic elements,carbohydrate and lipids.The infusion specifically constitutes polyphenols,theanine,diet ,etc. Carbohydrate is the essential constituent of tea leaf that encompass cellulosic fibre.Green tea's health-promoting properties are largely due to its polyphenol content, particularly flavanols and flavonols, which account for 30% of fresh leaf dry weight. Many of the therapeutic effects have recently been linked to (-)-epigallocatechin-3-gallate, the most prevalent catechin (EGCG). Green tea extracts are more stable than pure epigallocatechin

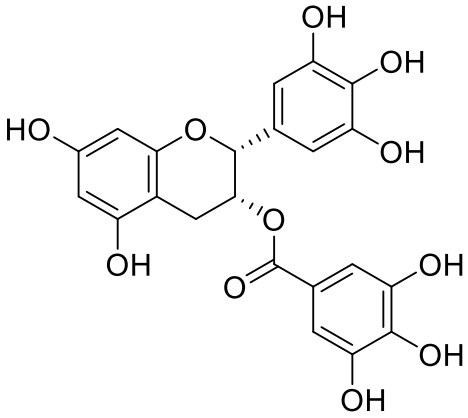
gallate, one of green tea's most important ingredients.The lively constituent in green tea are active antioxidant referred to as polyphenols. Tea is mentioned to have 4000 bioactive compounds which one 0.33 is contibuted through polyphenols.[11]

MANGO

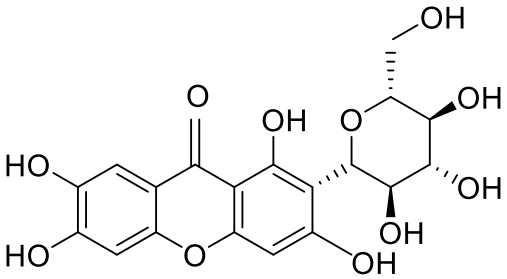
***M. indica* has been shown to have a wide range of chemical substances. The most abundant compound types in *M. Indica* are polyphenols (flavonoids, xanthones, and phenolic acids). The primary polyphenolic components discovered in *M. indica* are mangiferin, gallic acid, catechins, quercetin, kaempferol, protocatechic acid, ellagic acids, propyl and methyl gallate, rhamnetin, and anthocyanins. Mangiferin is a well-known polyphenolic substance with diverse biological characteristics that has been widely explored. The amount of various polyphenols in mango varies depending on the part and variety. Almost all *M. indica* polyphenols have been proven to have antioxidant capabilities as their primary biological feature. Other polyphenols discovered in *M. indica* include ascorbic acid and dehydroascorbic acid (an oxidised form of ascorbic acid). Polyphenols are abundant in various areas of *M. indica*. As a result, a single pure molecule has been shown to be less efficient than crude medicines, showing that the synergy of multiple *M. indica* polyphenols is required for optimal biological activity. Carotenoids are a type of natural chemical that can be found in plants. Natural organic pigments are what they're called. Carotenoids are responsible for the vivid yellow colour of the *M. indica* fruit skin and flesh[12].Carotenoids are biosynthesized in the fruit of *M. indica*, and the content of carotenoids increases as the fruit ripens. The primary carotenoids detected in *M. indica* fruit flesh and peel include -carotene, luteoxanthin, violaxanthin, neoxanthin, zeaxanthin, and cryptoxanthin. The most abundant of these is -carotene. Terpenoids are a class of lipids found in plants that are related to terpenes[13]. Several terpenoids have been found in *M. indica*, including careen, ocimene, terpinolene, myrcene, and limonene. In *M. indica*, these terpenoids are volatile and responsible for the scent[14]. Other frequent triterpenoids discovered in mango include lupeol and lupeollinoleate. Gallotannins (hydrolyzable tannins) are a type of chemical component present in the bark, leaves, kernel, and fruit pulp of the *M. indica* plant. It has also been discovered that *M. indica* contains tocopherols. Tocopherols like as alpha-tocopherol, beta-tocopherol, and gamma-tocopherol are widely found in the peel and flesh of *M. indica*. Another family of natural chemicals identified in *M. indica* is resorcinolic lipids (phenolic lipids)[15]. *M. indica* fruit peels, meat, and bark have been used to isolate a wide spectrum of resorcinolic lipids with various biological characteristics[16]. The most frequent compounds detected in *M. indica* are quercetin and mangiferin. Another well-known mango compound, kaempferol, has also been subjected to various safety and toxicity studies in order to validate its use in human diet[17].**



Epigallocatechin Epicatechin



Epigallocatechin gallate



Mangiferin

PHARMACOLOGY :

❖ Green tea for leishmaniasis[18]:

Percolation was used to make the extract. The extract was dried before being dissolved in a 1% DMSO solvent. Leishmania major promastigotes were treated with the extract at six different concentrations (3, 6, 12, 24, 48, and 96 mg/ml). This study comprised a control positive group with glucantime of 85 mg/ml and an extra untreated control group. All of the cultures were done in triplicate. The promastigotes were also counted, and the motilities of their flagellates were examined under a microscope.

In different concentrations, an ethanolic extract of green tea had significant leishmanicidal activity against L. major promastigotes. The anti-leishmanial action of the ethanol extract was shown to be consistent as the dose was increased (3, 6, 12, 24, 48, 96 mg/ml). Green tea extract concentrations of 12 mg/ml were nearly identical to glucantime concentrations of 85 mg/ml, and greater green tea extract concentrations were more effective than glucantime.

❖ Green tea for Amoebiasis[19]:

The impact of *Camellia sinensis* (inexperienced tea) at the boom of Acanthamoeba castellanii trophozoites became tested the usage of a microplate based-Sulforhodamine B (SRB) assay. *C. sinensis* warm and bloodless brews at 75% and 100% concentrations substantially inhibited the boom of trophozoites. The structural changes in *C. sinensis*-dealt with trophozoites the usage of transmission electron microscopy (TEM) and scanning electron microscopy (SEM) have been tested.The findings revealed that *C. sinensis* weakened cell membrane integrity, resulting in the progressive destruction of trophozoites. *C. sinensis* also reduced the rate of excystation from cysts to trophozoites and inhibited the parasite's ability to form cysts in a dose-dependent manner. On primary corneal stromal cells, *C. sinensis* had a low cytotoxic effect. In SV40-immortalized corneal epithelial cells, however, cytotoxicity was more evident. Both hot and cold *C. sinensis* brews contained the same number and type of chemical compounds, according to chromatographic analysis. *C. sinensis* was found to have anti-acanthamoebic activity against trophozoite and cystic forms of A. castellanii, according to the findings.

❖ Antimicrobial activity of Green tea[20] :

Antimicrobial activity of EGCG was found against S. aureus ATCC-25923, P. aeruginosa ATCC-27853, K. pneumoniae ATCC-BAA 1705, and E.coli ATCC-25922- MBC 99.9% was 5mg/ml. However, 99.9% of E.faecalis ATCC 29212 MBC was 10mg/ml. Except for two MRSA isolates with MBC of 10mg/ml, EGCG was effective against clinical isolates of MSSA and MRSA with MBC of 5mg/ml.

❖ Anti-adhesive property of Green tea[21]:

The polysaccharide from *Camellia sinensis* has been shown to have anti-adhesive properties against infections. The goal of this investigation was to see if hot water extracts from green tea leaves could prevent pathogens from adhering to human or mouse cell lines. Green tea extract-4 (CSI-4) has a maximum yield of 4% (w/v) and is primarily constituted of polysaccharides, with 40% uronic acids, but no catechins. With lowest inhibitory doses of 0.01-0.5 mg/mL, it showed substantial inhibitory effects against hemagglutination mediated by pathogens Helicobacter pylori, Propionibacterium acnes, and Staphylococcus aureus.CSI-4 also had an inhibitory effect on these pathogens' adherence to host cell lines, with IC(50) values of 0.14-2.3 mg/mL (50 percent suppression of adhesion). It was most effective against P. acnes, but had no inhibitory effects on Lactobacillus acidophilus, Bifidobacterium bifidum, Escherichia coli, or Staphylococcus epidermidis. The findings imply that CSI-4 has a selective anti-adhesive action against pathogenic bacteria while having no negative consequences for benign or commensal microorganisms.

❖ Anti tumour and Antimicrobial Activities of *Mangifera indica* Cultivars[22]:

M.indica L. is a member of Anacardiaceae family and is known as the "King of All Fruits".Mango kernels are dumped as trash after industrial processing,although they have various medicinal properties that have been demonstrated.Its antitumor and antibacterial properties have been investigated.In this study,15 local M.indica L. cultivars were gathered with the goal of identifying the best cultivar with high total phenolic content, flavonoid content , antitumour activity, and antimicrobial activity. The Banganapalli mango cultivar had the highest total phenolic and total flavonoid content with 63.51.1mg GAE /g and 16.70.5mg quercetin /g respectively,followed by the Royal special cultivar (TPC-16.20.6 mg quercetin/g).The antitumour and antimicrobial properties of M. Indica L. cultivar Banganapalli ,which had the highest total phenolic and total flavonoid content,were investigated.The antitumour property was investigated using the potato disc assay,which showed a tumour inhibition % of 40.12%.

Bacillus subtilis sub species.subtilis DSM 10,Staphylococcus aureus MTCC 737, and Escherichia coli MTCC 46 were used to test antimicrobial activity using the agar diffusion method. Staphylococcus aureus MTCC 737 has an inhibition area of 8.50.3 mm,followed by E.coliMTCC 46(8.20.3MM) and Bacillus subtilis subsp subtilis(6.60.5mm).The current study found that mango kernels,which are commonly discarded as garbage,had antitumour and antibacterial characteristics,and that more research is needed.

❖ Mango for Diabetes and Cancer[23]:

The goal of this study was to see if the ethanolic leaf extract of *Mangifera indica* cv. Okrong and its active phytochemical compound, mangiferin, had anti-diabetic and anti-cancer properties. Using 1 mM of p-nitro phenyl—D-glucopyranoside as substrate, anti-diabetic effects against yeast -glucosidase and rat intestinal -glucosidase were determined. The inhibition of swine pancreatic -amylase was tested using a substrate of 1 mM 2-chloro-4 nitrophenol—D-maltotroside-3. At 405 nm, the nitrophenol product was spectrophotometricallymeasured.Using the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide test, anticancer activity was assessed against five human cancer cell lines and two human normal cell lines[24.] Mango leaf extract and

mangiferin inhibited yeast -glucosidase with IC50s of 0.0503 and 0.5813 mg/ml, respectively, and rat -glucosidase with IC50s of 1.4528 and 0.4333 mg/ml, respectively, as compared to acarbose, which had IC50s of 11.9285 and 0.4493 mg/ml, respectively. Mango leaf extract, at 200 g/ml, was found to have anticancer efficacy against all cancer cell lines examined. In vitro, mango leaf was found to have anti-diabetic and anti-cancer properties[25].

CONCLUSION

Camellia sinensis and Mangifera indica possess unlimited number of applications for various diseases and ailments in human body.Plants has a number of medicinal applications reported so farr from various parts of plant.The leaves and its extracts cover lot of pharmacological activities.These plants possess promising wide range of medicinal properties which could be utilized in several medical applications because of its effectiveness and safety.

ACKNOWLEDGEMENT

It is our privilege to express a deep and heartfelt sense of gratitude and our regards to our beloved DR. GEETHA .G, M PHARM, Ph D, HOD, Department of Pharmaceutical chemistry, Nehru college of pharmacy, , pampady, for guidance, advice, help, support, and encouragement.The authors are acknowledging the chairman and managing trustee , Adv. Dr. P .Krishnadas, L . L. B, MBA, BEM, Nehru college of pharmacy , pampady, Thiruvilwamala, Thrissur, Kerala, for providing all the support.

REFERENCES :

1.PDR for Herbal Medicines, 3rd ed. Montvale, NJ: Thompson Healthcare, 2004.

2.Pierce, Andrea. The American Pharmaceutical Association Practical Guide to Natural Medicines. New York: William Morrow, 1999.

3.Tracy, Timothy S. And Richard L. Kingston, eds. Herbal Products: Toxicology and Clinical Pharmacology. Totowa, NJ, Humana Press, 2007.

4.Julia F Morton (1987). "Mango (Mangifera indica L.)". In: Fruits of Warm Climates; New Crop Resource Online Program, Center for New Crops and Plant Products, Purdue University. pp.221–239. Retrieved 24 December 2021.

5.Warschefsky, Emily J.; Wettberg, Eric J. B. (June 2019). "Population genomic analysis of mango (Mangifera indica) suggests a complex history of domestication". New Phytologist. 222 (4):2023–2037. doi:10.1111/nph.15731. PMID 30730057.

6.Anand J, Rai N.Green tea:A magical herb with miraculous outcomes.Int Res J Pharm 2012;3; 139-148.

7.Deependra Yadav,Singh SP, Mango:History origin and distribution,J.Pharmacog.Phytochem.2017;6(6):1257-1262.

8.Sabu M Chacko *et.al*;Beneficial effects of green tea;Chinese medicine 2010

9. McKay DL,Blumberg JB:The role of tea in human health:An update.J Am Call Nutr 2002,21:1-13.

10.https://www.healthline.com/nutrition/benefit-of-mango-leaf

11.Graham, H. N,1992.Green tea composition, consumption,and polyphenol chemisyry. Prev. Med.21,334-350

12.F. Delgado-Vargas, A. R. Jiménez, and O. Paredes-López, "Natural pigments: carotenoids, anthocyanins, and betalains—characteristics, biosynthesis, processing, and stability," Critical Reviews in Food Science and Nutrition, vol. 40, no. 3, pp. 173–289, 2000.

13.F. Chen, D. Tholl, J. Bohlmann, and E. Pichersky, "The family of terpene synthases in plants: A mid-size family of genes for specialized metabolism that is highly diversified throughout the kingdom," The Plant Journal, vol. 66, no. 1, pp. 212–229, 2011.

14.H. J. D. Lalel, Z. Singh, and S. C. Tan, "Aroma volatiles production during fruit ripening of 'Kensington Pride' mango," Postharvest Biology and Technology, vol. 27, no. 3, pp. 323–336, 2003.

15.A. Kozubek and J. H. P. Tyman, "Resorcinolic lipids, the natural non-isoprenoid phenolic amphiphiles and their biological activity," Chemical Reviews, vol. 99, no. 1, pp. 1–26, 1999.

16.C. Engels, M. Knödler, Y.-Y. Zhao, R. Carle, M. G. Gänzle, and A. Schieber, "Antimicrobial activity of gallotannins isolated from mango (Mangiferaindica L.) kernels," Journal of Agricultural and Food Chemistry, vol. 57, no. 17, pp. 7712–7718, 2009.

17.A. Schieber, N. Berardini, and R. Carle, "Identification of flavonol and xanthone glycosides from mango (Mangiferaindica L. Cv. "Tommy Atkins") peels by high-performance liquid chromatography-electrospray ionization mass spectrometry," Journal of Agricultural and Food Chemistry, vol. 51, no. 17, pp. 5006–5011, 2003.

18.https://pubmed.ncbi.nlm.nih.gov/22373836/

19.https://www.sciencedirect.com/science/article/pii/S2211320720300117

20.https://www.ijmmtd.org/article-details/7969

21.https://www.researchgate.net/publication/23689527_In_Vitro_Anti-Adhesive_Activity_of_Green_Tea_Extract_against_Pathogen_Adhesion

22.https://biomedpharmajournal.org/vol12no1/in-vitro-studies-on-antitumour-and-antimicrobial-activities-of-methanolic-kernel-extract-of-mangifera-indica-l-cultivar-banganapalli/

23.. Gondi M, Prasada Rao UJ. Ethanol extract of mango (Mangiferaindica L.) peel inhibits a-amylase and a-glucosidase activities, and ameliorates diabetes related biochemical parameters in streptozotocin (STZ)-induced diabetic rats. J Food Sci Technol. 2015;52:7883–93.

24. Bhuvaneshwari J, Khanam S, Devi K. In-vitro enzyme inhibition studies for antidiabetic activity of mature and tender leaves of Mangiferaindica var. Totapuri. Res Rev J MicrobiolBiotechnol. 2014;3:36–41.

25. Andrew O, Yusuf S, Jangabe LM, Lawal BS, Adamu AA. A-Glucosidase inhibitory potential of selected antidiabetic plants used in North-Western Nigeria. JMPR. 2013;7:2010–8.