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Importance in Curcuma amadaRoxb.

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Abstract - C.amada an explorable member ofZingiberaceae family for its medicinal importance. It shows resembles to turmeric . C. amadacommonly known as mango ginger, because of its raw mango taste and appearance that of ginger. They are used in making pickles in Dakshin Bharat and used as spice in making of household food. It constitutes carbohydrate, terpenes, curcuminoids, volatile essential oils, phenolic acids. In Ayurveda, it is termed as Amma haridra or KarpuraHaridra. Like other Curcuma spp., C. amadaalso has many therapeutic properties. Especially useful in digestive complaints, give relief in abdominal gas, promotes appetite and improves digestive strengths. Moreover C. amada also possesses cancer preventive properties, anti aging, antioxidant activity. The proper management of these underused rhizomes in their original habitat will improve the biodiversity enrichment of these rhizomes and consumption of it minimizes the degenerative diseases. This review summarizes the importance of C. amada in today's burning issues.

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INTRODUCTION

Nature has been source of medicinal plants since time immemorial. The importance of herbs in the administration of human ailments cannot be over emphasising. It is clear that the plant Kingdom nurture inexhaustible source of invaluable in the administration of many intractable diseases1,2,3. These active principles are known as phytochemical. Phytochemical are non-nutritive chemicals that have protected human beings from various diseases4. The International Trade Centre published a study on the market for the some medicinal plants and their derivatives5.

The plants belonging to family Zingeberaceae are found to be a rich source of substances of phytochemical interest. Curcuma is one member of this family. Literature survey specify the presence of multiple chemical constituents in the rhizome6,7,8. Curcuma amada is one specie of this family which is traditionally used as stomachic9, carminative9 and CNS activity10.

The distribution of C.amada is from India to Thailand, Malaysia, Indonesia and Northern Australia. In India, it is distributed in wild part of W. Bengal and cultivated in Gujarat, U.P., Kerala, Karnataka, Tamil Nadu and North East States. They are used in making pickles inCoastayarea. The taxonomy of the specie is a subject of some uncertainty as some authorities considered the name C. mangga as identical, others describe it a well defined species with C. manggabeing found in South India while C. amada is of East India origin11. C. amada is untapped medicinal species of this family. This article explores importance of C. amada.

MORPHOLOGICAL FEATURES AND TAXONOMY

The taxonomical hierarchy of C. amada is as follows12:

Kingdom - Plantae

Super Division – Spermatophyta

Division - Magnoliophyta

Class - Monocotyledonae

Order - Zingiberales

Family - Zingiberaceae

Genus - Curcuma

Species - C. amadaRoxb.

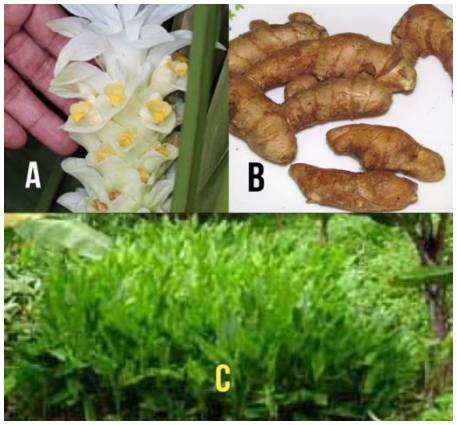

Figure 1: flower ; B: Rhizome; C: Plant of C. amada

Vernacular Name;

Sanskrit : Amradrakam, KarpuraHaridra.

Bengali : AamaaAadaa.

English : Mango ginger.

Hindi : Aamaa haldi.

Kannada : Ambarasini.

Malayalam : Mangayinji.

Marathi : Ambehalad.

Punjabi : Ambiyahaladi.

Tamil : Mankayyinji.

Telugu : Mamidiallamu.

Unani : Daaichob.

C. amada is similar to turmeric (C. longa) . C. amada used for culinary purposes and traditional medicinal use in India and indifferent partof Asia. It is generally known as mango ginger the rhizomes (root) are similar in appearance to ginger and has a profound raw mango taste13.

Morphologically, C. amada is a rhizomatous aromatic herb with a leafy tuft and 60-90 cm in height. Leaves are long, petiolate, oblong-lanceolate, tapering at both ends, glabrous and green on both sides. Flowers are white or pale yellow, arranged in spikes in the centre of tuft of the leaves14.

IMPORTANCE

i. In Ayurveda Medicines15:

A. Relieve pain: C. amada works as a calming agent, which relieves pain.

Formulation:- Mix 25 gm of mango haldi with 100 gms of sesame oil and heat it on low flame till its lukewarm. Use oil to massage body to relieve pain.

b. Treats skin disease: C. amada is a powerful anti microbial and antioxidant. So it is used to treat skin issues. It helps to detoxify the body and inprove skin complexion, get rid of acne and other skin problems. It is used in various cosmetics and skin care products.

Formulation:- Add 2 tsp of mango ginger juice to 2 tsp milk or rose water. Mix together apply on face and rinse after 20 min with cold water.

C. Relieve Itching: This root is powerful anti allergic. It helps to relieve itchimng, regardless of the factor causing it.

Formulation:- Mix 2 tsp of C. amadato a little coconut oil and then apply on irritating skin.

D. Corrects metabolic issues: Ayurveda believes this plant helps to rectify all metabolic issues. It helps to soothe all three Doshas in our body, especially Pitta. It has properties that inhibit the growth of triglycerides in the body. Mango ginger prevents further complications if suffering from diabetes.

Formulation:- Mix a tsp of mango ginger powder to a glass of milk before drinking it

E. Relieve Cold and Cough: Mango ginger is expectorant and analgesic. It is often used to relieve cold and cough. It also helps to relieve bronchitis as well as asthma.

Formulation:- Mix a tea spoon of aam haldi powder with water. Drink this mix to get relief.

F. Relieve Digestive Problems: Aam haldi has enterokinase, an enzyme that helps digestion in humans and animals. This enzyme helps in the digestion of proteins. This root also helps to detoxify the body. It helps to relieve gas, improves appetite and promotes digestive strength.

Formulation:- With food.

G. Relieve Inflammtion: It has anti-inflammatory properties that help to prevent swelling in the joints. It is recommended to relieve swelling in the liver, arthritic joint pains, rheumatism as well as swelling caused by injuries, sprains and bruises.

Formulation:- Boil 200gm of mango ginger bark with water to make paste. Mix this paste with 100gm of mango ginger powder and 100gm black pepper powder. Mix all of this together then apply on the joints to relieve pain.

II. Biological Activities:

A Cytotoxicity Activity: C. amada extracts have shown cytotoxic activities on the human cancer cell lines MCF-7 (a hormone dependent breast cell line); KB (a nasopharyngeal epidermoid cell line); A549 (a lung cell line) Ca-Ski (a cervical cell line) and HT-29 (a colon cell line). The extract shows no cytotoxicity against the non-cancerous human fibroblast cell line MRC-516. Glioblastoma multiforme is notable aggressive and lethal form of human malignancies, with a median survival of only 12-15 months. The carbon dioxide extract of mango ginger showed anticancer potential against in human glioblastoma cells. C. amada extract showed significantly higher cytotoxicity than Temozolomide, Etoposide (chemotherapy medicine) 118,19,207. C. amada extract combined with other cancer drugs like Vinblastine, Temozolomide, Etopside and Cyclophophamidesignify synergistic effects for in vitro cytotoxicity in cancer line cells.

B. Immune Modulator: Any components which can alter immunity are considered as immune modulators. In fighting against various diseases immune system plays an important role. Study concludes that ethanol extract of C. amada, posses significant immune modulator effect and this effect mediated through stimulation of phagocytosis activity, β cells and T cells. This test assessed using In-vitro phagocytosis activity, delayed type hypersensitivity and Hem agglutination test. Extraction of plant rhizome was performed using ether, chloroform, acetone and ethanol. Ethanol extract shows maximum immune modulator activity21.

C. Antioxidant activity: The ethanol extract of C. amada was subjected for its antioxidant activity. All observation specify the presence of free radical scavenging action in C. amada (>50%). The activity could be attributed to super reducing power of both phenol and curcumin content, and to essential oil curzerenone22. A study of total phenolic content and antioxidant activity of aqueous acetone and methanolic extract from raw and boiled rhizomes of C. amada is investigated. The present investigation indicates that the processed sample of acetone extract was more fruitful in extraction of bioactive compounds than raw sample of both the extract. The results illustrated that considerable potential as functional food ingredients due to presence of excellent source of starch and fibres, minerals and trace minerals, phenolic compounds etc which possesss high antioxidant activity23.

D. Neurodegenerative: Disease of aging involving the accumulation of protein-aggregates, oxidative damage and inflammation. This results in the loss of functional neurons and synapses. Curcumin has an outstanding safety profile and a number of pleiotropic actions with potential for neuroprotective efficacy including anti-inflammator, anti-oxidant and anti protein aggregate activities. These can be achieving at submicromolar levels. Curcumin has at least 10 known neuroprotective actions and many of these might be realized in vivo. Indeed accumulating cell culture and animal model data show that dietary curcumin is a strong candidate for use in prevention of major disabling age related neurodegenerative diseases like Alzeimers, Parkinsons and stroke24.

E. Neutraceutical: The ssequential extract of mango ginger rhizomes powder carried out using hexane, chloroform, acetone, ethyl acetate, methanol and water. The phenolic content presence in methanol extract was highest, followed by acetone, ethtyl acetate and water extract. Out of these, chloroform extract exhibit high lipid per oxidation inhibitory action and metal chelating action, where ethyl acetate extract showed high DPPH radical scavenging activity and super oxide radical scavenging action. These extracts also showed potential platelet-aggregation inhibition activity and cytotoxicity properties. These action of C. amada extracts can be correlated with their phenolic content and other bioactive constituents25.

F. Antimicrobial activity: C. amada rhizome is antibacterial with aqueous and organic solvent butanol, chloroform, ethanol, methanol extract against four bacteria Escherichia coli, Staphylococcus species, Streptococcus species, Pseudomonas species. All four pathogens were isolated from clinical sample and identified by biochemical characterisation. Microbial susceptibility assays was done by agar dilution method. The extracts were operative against all four pathogens, but chloroform extract exhibited highest anti bacterial activity compare to other solvent and aqueous extract26. In the same extent rhizomes subjected to hexane, chloroform and methanol extract. These extract tested for the bacteria Ralstroniasolanacearum, in 5,10,25,50 and 100 mg/ml. The essential oil in 1%, 5%, 10%was also tested. The testing performed agar well diffusion

method. All the extracts exhibited almost similar level of antimicrobial activity with a zone of ranging from 3-9mm. The essential oil exhibited 3-7mm. Zone of inhibition. The major constituents of essential oil are β-myrcene and β-pinene27. C. amada rhizome different extracts like acetone, hexane, chloroform, ethyl acetate and methanol also have highly antibacterial against Bacillus cereus, B. Subtilis, Micrococcus luteus, Staphylococcus aureus, Listeria monocytogenes,enteroccusfecalisand Salmonella typhi. Chloroform extract was most effective in comparison to other organic solvent extracts28,29. The essential oil C. amada rhizome was antibacterial against Staphylococcus aureus, Escherichia coli, Klebsiella pneumonia, Pseudomonas aeruginosa, Salmonella paratyphi, Vibrio cholera, Enterobacter aerogenes, Streptococcus pneamoniae, Bacillus subtilis, Bacillus cereus, Proteus mirabilis, Proteus vulgarisand Serratiamarcescens30.

G. Anti-inflammatory activity: The crude extract of rhizome of C. amadashowed presence of multiple chemical constituents with hydroxyl, ester, carboxyl and olefinic groups. The extract exhibited dose dependent anti-inflammatory action in Albino rats using acute carrageeran paw oedema and chronic granuloma pouch model, which was found to be statistically significant at higher concentration31.

H. Hypertriglyceridemic activity: Mango ginger extract exhibithypotriglyceridemic activity and influences-on both liver synthesis and blood clearance. They reported hypotriglyceridemicbenefit on triton-induced hyperlipidemic rats32,33.

I. Antifungal activity: The volatile oil from mango ginger rhizomes antifungal in nature. Myrcene and pinene are the considerable components of volatile oils responsible for antifungal activity against the fungi viz. Curvularispalliscens, Aspergillusniger, A. Terreus, Fusarium moniliformeand F. falcatumand also essential oil showed antifungal activity against sugarcane pathogenic fungi such as Physalosporatucumanensis, Sclerotium rolfsii, Helminthosporium, Saccariand Cephalosporiumsacchar35.

CONCLUSION

In today's, adverse environmental condition multi drug resistant pathogens are widely distributed and increasingly being isolated from community. In the tenure of multi drug resistant strain pathogens, there is a drastic need of novel antimicrobial. Researches giving awareness to herbal products, to evolve better drug against multi drug resistant microbes strains. These products are basically have no side effects. Spices, like clove and cinnamon exhibited antimicrobial in 1880's. In the same step C. amada (mango ginger) become important due to their potential activities like anticancer, anti-inflammatory, antidepressant, antimicrobial, antioxidant and active in neurodegenerative diseases like Alzheimer, Parkinson, stroke etc. It also has synergetic property i.e. enhancing the another chemical activity. It has many therapeutic importance in Ayurveda and Unani traditional trends of medicines. Very little information available for aerial part of the plant. It consists of various bioactive photochemicallike starch, phenolic acids, volatile oils, curcuminoids and terpenoids. Essential oil, have shown numerous beneficial effects for health maintenance and treatment of disease Therefore their is need to untapped this species for its bioactive numerals..

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