



Review on *Morinda citrifolia* : An Herbal Medicine

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Abstract

Herbal plants are gaining importance during this times or this generation because of their straightforward convenience and cheaper value and conjointly due to a less adverse result or toxicity .So flavoured medicine are wide used as various medicine. *Morinda citrifolia* (Fam -Rubiaceae) Polynesians plant, usually referred to as noni. In ancient times, it's extremely widespread and commonly employed in the standard medicative methodology over 2000 years back as a herbal remedy. It may be used for various. And for its anti-diabetic and anti-cancer properties, it is widely popular. This review focuses on its ethano medical specialty activities.

Key words

Morinda citrifolia, Chemical constituents , Ethanopharmacological activities.

1. Introduction

Ethnopharmacology is that the study of plants utilized in typical drugs and is therefore extremely passionate about relationships between researchers and endemic communities that have passed on the standard information over generations. Whereas still within the major, Ethnopharmacology focuses on the existence or lack of proof for relevant medicative effects from the utilization of flavoring products. The space of remedies even extends into photochemistry, wherever the goal is the chemical element of the plant or plant extract should be known that's in control of the inherent pharmacologic activities of a Special plant . Over the previous couple of years, there was a forceful growth within the space of ancient medicine, And these medications are gaining quality in each developing and developed countries because of their naturally derived and fewer adverse events. Several of the flavoring remedies in use come back from natural products, minerals and organic matter. WHO has listed 21,000 plants that are used worldwide for medicative purposes. As a result, many researchers have recently assessed medicinal plants as different therapeutic agents with an increasing variety of diseases[1]. *Morinda citrifolia* is that the scientific name of a commercially accepted plant referred to as Noni. The name *Morinda citrifolia* conjointly refers to the biological science name directly derived from the 2 Latin terms "morus" denotes mulberry, and "indicus" denotes Indian, that belongs to the family of Rubiaceae[2]. The herb has been according as ancient drugs by Polynesians and Tahiti for quite 2000 years and has been used for therapeutic purposes. Regarding all elements of the tree are used for one or additional reasons. Fruits are utilized in food recipes and as flavoring products. Numerous parts of the herb, akin to roots ,stems ,and leaves, were conjointly used as medicative things [3]. In distinction to ethnobotanical and customary usage noni, a broad vary of chemical and research project work has been done on this plant for quite a hundred years. Currently, there are 2 proverbial sorts of *M.citrifolia* (*M.citrifolia* var. *Bracteata* and *M.citrifolia* var. *citrifolia*) and one vascular plant

(*M.citrifoliacultivarpotteri*).The most generally known type, *M. citrifolia* var.*citrifolia* is of the best quantity [4].

2. Taxonomy

Kingdom: Plantae Subkingdom: Viridaplantae Phylum: Tracheophyta Subphylum: Euphyllophytina Class: Magnoliopsida Subclass: Asteridae

Order: Gentianales Family: Rubiaceae Subfamily: Rubioideae Genus: *Morinda* Species: *citrifolia*

Botanical Name: *Morinda citrifolia* L[5]

TABLE COMMON NAMES AND LOCAL NAMES.

LANGUAGE	VERNACULAR NAMES
Malayalam	Kattapitalavam, Kakai palam, Mannanatti.
Tamil	Manjanathi, Nuna, Manjanuna
Telugu	Maddicettu, Molugu, Bandamaddi, Mogali
Kanada	Tagatemara, Haladipavete.
Hindi	Achchhuka, Paphanah, Awl, Ach.
Marathi	Salidaru, Mundari, Nagkura, Aseti.
Local names	Indian Mulberry, Nuna, Hog Apple, Nona, Mona, Nono, Wild Pine, Nino, Mora de la India, Pinuela, Pain Bush, Headache Tree, Pain Killer Tree, Forbidden Fruit, Cheese Fruit, Nonu, etc [6].

TABLE MORPHOLOGICAL CHARACTERISTICS

PARTS	DESCRIPTION
Flowers	The flowers give off a sweet fragrance, funnel-shaped, perfect, at the axis of the leaf grouped in small clusters or globose heads. The corolla is 7 to 9 mm long with a greenish-white corollatube with 5-lobed.
Leaves	Stout petioles, 1.5 to 2 cm long, glossy and reticulate opposite pinnately opposite veined, elliptic-ovate blades, which are 20-45cm long, 7-25cm long, membranous, and veins are prominent and glabrous.
Seeds	Edible when roasted and composed of interior and had a conspicuous air chamber, small, oblong-triangular, 4 mm long, reddish-brown. Hydrophobic and buoyant due to air chamber and the fibrous seed coat, durable, water-repellent. The seed coat is cellophane-like parchment layers that are thick and tough. There are about 100-150 seeds present in the single fruit of noni.
Root	Tab root is deep and the lateral root system is very substantial, likely with the citrus and coffee rooting habit.
Fruits	Cheesy aroma, soft, and watery flesh. Over the process of ripening, the fruit becomes progressively pungent and pronounced. It is also called starvation fruit. Aggregate or multiple fruits, annually distinct times, circular scars with 5-7cm oblong, when fully ripe which are fully ripe and when unripe it is green.

3. Distribution Of *Morinda*

The species is normally found up to 400 m above from sea level, even though it adjusts more to coastal regions. *Morinda citrifolia* is an evergreen plant and is often found to thrive near volcanic flows. The majority of the crop is wild, adapting to the soil's harsh environment and nature. Naturally, it can be found in pastures, fallow areas, forests, wastelands, open areas close to the shorelines, alien grasslands, coastal forests, and coconut plantations. With 80 species reported so far the *Morinda* genus is distributed worldwide, mainly in tropical countries. This exists in India, Polynesia, Vietnam, Raratonga, Fiji, Hawaii, Cuba, Java, Barbados, Africa, the Cayman Islands, Australia, El Salvador, Florida, West Indies, Cambodia, Thailand, French, Guam, Philippines, Seychelles, Dominican Republic, Jamaica, Trinidad, Samoa, Tonga, Marquesas Islands, Islands, Guadeloupe, St. Croix, Haiti, Laos, Tobago, Malaysia, Puerto Rico, Solomon the Caribbean, Southeast Asia, Suriname, and Tahiti. It is commonly grown in the Nicobar and Andaman Islands under natural conditions in India. Due to its broader adaptability to the harsh environment, it can be seen in the coastal area along fences and roadsides. It is located along the coastlines of Tamil Nadu, Karnataka, and Kerala many other places in the mainland of India. 12 varieties of Noni are covered in Kerala and Tamil Nadu suggested by the survey of Noni in southern India. As the study conducted in Tamil Nadu *M. Citifolia L.* Has not been yet reported. The plant is available in different regions of Kerala and Karnataka (Mangalore region) [6].

4. Medicinal Use

The entire plant of MC is used for natural remedies by Polynesians. Fruit juice is in increased demand in alternative therapies for various forms of disease such as AIDS, cancer, headaches, asthma, heart failure, senility, diabetes, arteriosclerosis, mental depression, gastric ulcers, menstrual issues, high blood pressure, problems with the blood vessels, muscle pains and aches, sprains, impaired digestion, and drug addiction. There is no evidence proved scientifically for the benefits of Noni fruit juice, although there is some anecdotal evidence of effective influenza and old treatment. Noni also was a traditional remedy used to bruises, sores, wounds, heal broken bones, and deep cuts. Polynesians have also been reported to eye problems and treat breast cancer [6].

5. Nutritional Value Of Noni

The fruit comprises 90% water and soluble solids, proteins, and dietary fibers tend to be the important compounds of dry matter. The content of protein in fruit is remarkably greater, comprising 11.3 percent of the dry matter of the juice, and glutamic acid, isoleucine, and aspartic acid are the main amino acids. Minerals comprise 8.4% of the dry matter and primarily calcium, sulfur, phosphorus, traces of selenium and potassium have been recorded in the juice. Rhamnose galacturonic acid (Galap), arabinose (Araf), and galactose (Galp) were the most plentiful monosaccharides found (Rhap). The ascorbic acid (dry matter 24 to 158 mg/100 g) and provitamin is the major vitamins reported in the fruit [7].

6. Chemical Constituents

Roughly about 200 phytochemicals have been detected and isolated from various parts of noni [7]. A variety of major compounds such as acubin, amino acids, potassium, rutin, caproic acid, caprylic acid, vitamin C, alkaloids, putative proxeronine, octanoic acid, β -sitosterol, flavone glycosides, ursolic acid, scopoletin, carotene, terpenoids, vitamin A, linoleic acid, Alizarin, L-asperuloside, and anthraquinones (such as anthraquinone glycoside, morindone, rubiadine, nordamnacanthal, and rubiadine-1-methyl ether) have been identified in Noni plants. A variety of metabolite groups, including flavonoids, iridoids, sterols, nucleosides, phenols, alcohols, esters, lignans, ketones, carotenoids, acids, lactones, triterpenoids, and several minor compounds have been identified to date [8].

TABLE : PHARMACOLOGICAL ACTIVITIES

SL.NO	PHARMACOLOGICAL ACTIVITIES	PARTS/EXTRACTS	MODEL/METHOD	INFERENCE/CONCLUSION
1	Antidiabetic activity	Fruit powder fermented by Cheonggukja ng, ethanol extract	KK-Ay/ tajcl mice	For type 2 diabetes Mellitus <i>Morinda citrifolia</i> can be used as a functional health food [9].
		Fermented fruit juice Aqueous extract	Healthy Sprague-Dawley male rats (Streptozotocin Induced model)	FMC juice may possess hypoglycemic. It can be assumed that <i>M. citrifolia</i> either increases peripheral tissue sensitivity to the storage hormone or that it potentiates the action of insulin directly [10].
		Fresh fruits (seedless) Aqueous extract	Healthy Sprague-Dawley male rats (Streptozotocin-induced model)	In the subchronic study, MC extract showed a lowering of blood glucose level in diabetic and normal rats. The glucose level in the blood for diabetic and normal rats did not change remarkably as compared to their relative controls in the acute hypoglycemic study [11].
		Freeze-dried aqueous fruit extracts	Healthy Sprague-Dawley male rats (Streptozotocin-induced model)	Freeze-dried aqueous fruit extracts have substantial hypoglycemic properties [12].

2	Antitumour	Fruit juice Ethanol-precipitation (Noni-ppt)	S180ascites tumor cells (i.p.) In DBA/2 mice. C57BL/6, DBA/2, or BALB/c strain	The invivo effect of MC has shown Th1 predominant immune status.Results showed significant antitumor activity against the allogeneic S180 ascites tumor. This study displayed synergistic effects against various anti-cancer drugs [13].
		Noni fruit Ethyl acetate extract	MCF-7, MDA-MB-231 (HEK-293)	In vitro study showed anticancer properties against breast cancer cells [14].
		Noni fruit Fermented Noni Exudate	Beige KO mice (C57BL/6J-Lyst<bj-J/J) Nu/B6 nude Female C57BL/6J	FNE is capable to reject tumor cellsby stimulating the adaptive immunessystem and the innate immune system [15].
		Noni FruitJuice	Normal BALB/3T3and NIH/3T3 cell lines Sarcoma 180cells, Lewis lung carcinoma cell line Human KB carcinoma cell line	It showed anti-tumor activity so it can be considered as an immunostimulator (plant food origin) [16].
3	Liver Protective Effects	Noni juice fruit	Female Sprague-Dawley (SD) rats Carbon tetrachloride (ccl4)	This study revealed the hepatoprotective effect of NJ against ccl4 (extrinsic toxin) exposures [17].
		Noni Juice Fruit	Ccl4-inducedmodel Female Sprague Dawley (SD) rats.	Noni juice showed liver protective effects against ccl4 exposures [18].

		Fermented noni juice	Thioacetamide-induced liver fibrosis in male Wistar rats	Via the enhancement of antioxidant capacities, MMP-9/MMP-2 activities, and decreasing endoplasmic-reticulum stress fermented noni juice demonstrated Liver Protective Effects on thioacetamide-induced liver fibrosis [19].
4	Antiulcer Activity	Fruit Ethyl acetate extract	Aspirin-induced gastric lesions Alcohol-induced gastric lesions Pylorus ligated rats cysteamine hcl induced duodenal ulcers	Results of the studies showed that the ethyl acetate extract of MC significantly protects the experimental ulcer models and this effect might be due to the strengthening of duodenal mucosa and gastric with the enhancement of mucosal defense or cytoprotective action of the drug [20].
		<i>M. Citrifolia</i> fruit aqueous extract	Male New Zealand white AMFE phytosome	For oral ulcers, 10% AMFE-P gel has been implied as an effective and safe conventional therapeutic drug [21].
		Noni leaves Ethanol extract	<i>Rattus norvegicus</i> put hot burnisher on lower labial mucosa	Compare to negative control and positive control it has no significant effect on the wound healing percentage of traumatic ulcer [22].
5	Anti Epileptic Activity	Fruit extract	Maximal ElectroShock (MES) Adult Wistar albino rats	For the treatment of epilepsy, the use of MC crude drug is justified by significant results [23].
6	Wound-healing activity	Fruit juice	STZ-induced diabetic rats	When compared with the diabetic controls <i>morinda citrifolia</i> fruit juice extract reduced the wound area by 73% [24].
7	Antipsychotic activity	Fruit Ethanol extract	GC-MS analysis In-silico docking analysis	By inhibiting D3 and D2 dopamine receptors the MC extract exhibiting antipsychotic activity [25].
8	Vas Deferens Contractility	Methanolic extract	Sprague-Dawley male rats	In the isolated rat vas deferens preparation it showed an antidopaminergic effect, dopaminergic agonistic effect, and antiadrenergic activity [26].

9	Antinociceptive activity	Noni seeds	Old Swiss male mice Formalin-induced pain assay field test Acetic acid-induced writhing method	The acetic acid-induced writhing effect is inhibited by mcltp1 (lipid transfer protein from noni) and in formalin-induced pain assay, it also decreased inflammatory and neurogenic phases of nociception by its central effect, dependent on opioidergic involvement [27].
10	Immunomodulator effect in poultry	Noni crude fruit extract	Old chicks	While comparing with the control group the humoral immune response of the <i>morinda</i> group is considerably larger [28].
11	Antidiarrhoeal activity	Hydro ethanolic extract	Castor oil-induced model Wister rats	<i>Morinda citrifolia</i> reduced the number of animals exhibiting diarrhea.

Conclusion

In India, natural drug treatments are not unusual place in rural regions and are a part of their diet. It isn't used for exceptional illnesses because of the shortage of medical understanding approximately natural drugs. Traditionally maximum of the medication are utilized by the ayurvedic practitioner (Vaidyar). This article makes a speciality of the noni medicinal plant and exceptional literature are already cited its diverse pharmacological activities. It may be used as a wholesome feature meals in keeping with the ones articles. It is rather wealthy in dietary beliefs and may be utilized in severa approaches in our fitness care system. So many formulations are to be had available in the marketplace already however in its formulation, it wishes in addition standardization to boom its portions and value.

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