

A REVIEW ON PHARMACOLOGICAL ACTIVITY OF MORINDA CITRIFOLIA L. (NONI) FRUIT
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ABSTRACT:

Morinda Citrifolia L. (Noni) is a vertical or upright, branched trees, shrubs, or sometimes lianas. Morinda Citrifolia L. comes under family Rubiaceae. Noni used as a home remedy or Eastern medicine therapy in many countries to proven health benefits. Phytochemically, this plant contains alkaloids, terpenoids, saponins, carbohydrates, proteins, tannins, flavonoids, steroids, scopoletin, anthraquinones, and ascorbic acid. Pharmacologically, plant shows activities like antioxidant, anti-inflammatory, antifungal, antidiabetic, immunostimulant, antiulcer, antihypertensive, antibacterial, antioxidant activities and effect on lung and colon cancer, effect on breast cancer, effect on Alzheimer's disease. Noni mostly growing in states like Maharashtra, Karnataka, Odisha, Andhrapradesh, Tamil Nadu and Kerala. Morinda Citrifolia L. mainly grown for its beefy fruit. The fruits colour plays a key role to decide it's juice quality. It is available as a juice, powder, flavouring and coloring agent.

Keywords: Morinda Citrifolia L., Phytoconstituents, Phytochemicals Pharmacological.

INTRODUCTON:

Morinda Citrifolia L. an evergreen and small tree grows in tropical region financially known as Noni plant. The Noni obtained from two words "Morus" attributing to mulberry, and "indicus" attributing to India, which comes under family Rubiaceae. It is called by another name Indian mulberry, nona, kura, weipwul, lada, canary wood etc. Noni has 3-7 m height. It contains white knob flowers. The fresh Morinda Citrifolia L. fruit contain moisture 77.54%, amino acid 2-2.9%, Ascorbic acid 90%, pectin 2%, ether extract 1%, carbohydrates 7-8%, crude fibre, ash 1%, calcium 1-1.5%, potassium 2-3%, zinc 1-4%, magnesium 1-2%, iron 1.5-2%, folate 11.5%, aluminium and sodium in little amount, reducing sugars 0.080%, sucrose 0.2%, mucilage, niacin 1-1.5%, anthocyanins. The seed noni fruit include 10.20% moisture, 1.07% nitrogen, 0.70% fatty oil, 17.20%, cellulose, 4.10% protein, and 2% lipids. The Noni is young, glossy (green) with dots, and changes to white with black spots as it ages. The Morinda Citrifolia L. plant is manifest in Fig. 1, the Morinda Citrifolia L. fruit is manifest in Fig. 2, the Morinda Citrifolia L. flower is manifest in Fig. 3 and the Morinda Citrifolia L. seeds is manifest in Fig. 4.


Fig. 1 Morinda Citrifolia L

Fig. 2 Morinda Citrifolia L. ripe and unripe fruit



Fig.3 Morinda Citrifolia L. flower



Fig.4 Morinda Citrifolia L. Seeds

TAXONOMY

Kingdom	Plantae
Subdivision	Angiosperms
Class	Eudicots
Clade	Asteridae
Order	Gentianales
Family	Rubiaceae
Genus	Morinda
Species	M. Citrifolia
Binomial Name	Morinda citrifolia

Table1: Taxonomy

PHYTOCONSTITUENTS PRESENT IN VARIOUS NONI PLANT

Researchers confined 96 volatile compounds from Noni fruit that was at two different states of ripening, the first being ripe and the second being overripe. While methyl ester hexanoic acid, methyl n-octanoate, ethyl n-octanoate, and methyl ester methyl caprylate concentrations were significantly greater in overripe fruit, Caprylic acid and Capric acid concentrations were remarkably decrease. Iridoids and flavonoids are determined to be the two main phytochemicals present in noni blooms. Additionally, research has shown that ripe noni fruit contains volatile substances like acetaldehydes, flavin, ethyl acetate, alcohols, Saponin, and sulphur. In order to change the organoleptic qualities of commercially produced Noni juice, blueberry and grape juice are used to cover up the disagreeable aroma and bitter flavour of Noni fruit juice.

MECHANISM ACTION OF CHEMICAL CONSTITUENTS PRESENT IN SEVERAL PARTS OF NONI PLANT

Damnacanthal

At the tolerated temperature, 3-hydroxy-1-methoxyanthraquinone-2-aldehyde, an anthraquinone, produced biology and cytoskeletal organization in proto-oncogene cells without altering quantity and distribution of Ras. Damnacanthal had reversible effects. The src oncogene claims that Damnacanthal possess no effect on the morphologic of RSVTs-NRK cells. Thus, damnacanthal is a brand-new ras function inhibitor. The findings were strong proof that the activation of p21 and caspase-7 by damnacanthal, which is mediated through p53, caused apoptosis.

Epigallocatechin gallate (egcg)

Epigallocatechin gallate found in the Noni fruit, which has strong antioxidant and anti-angiogenesis properties. Additionally, it blocks the NOX enzyme, which is in charge of tumor activity. Noni aids in the prevention of angiogenesis by preventing NOX.

Alizarin and Limonene

Alizarin and Limonene initiate to hinder the genesis of blood vessels above cancer by anti-endothelial progenitor cell activity. So, Noni juice prohibit development, variations of malignancy and cause apoptosis.

Polysaccharides

Noni contains the polysaccharides GlcA, glucose lactique, Arabinopyrinose, rhamnosy and oligosaccharides fatty acid ester. They had immunostimulatory, immunomodulatory, antibacterial, antitumor, and anticancer properties. 6-D-glucopyranose. This aids in preventing metastasis by preventing mutant cells from adhering to new cells. Aucubin glycosides, epoxy-8-epislenoside, Americanin, narcissosides, cytidine showed anti-oxidant activity in DPPH and NO₂.

Quercetin

There have been reports of meletin in therapy reducing cell viability and time sensitive way in low and high metastatic cell line (ACC-2 and ACC-M). Through a mitochondrial dependent mechanism that shown a strong link to low regulation of the PI3K/Akt/IKKalpha/NF-kappaB pathway, meletin dramatically reduces the apoptosis in ACC cells.

Scopoletin

Scopoletin reduces irishmoss increased iNOS and COX-2 appearance in fluid retention. It's anti-inflammatory mechanisms of Scopoletin associated to the decreased the level of MDA by inducing the activities of SOD and CAT in the fluid retention.

Xeronine

Xeronine is an extremely effective component responsible for all medicinal characteristics of noni. Noni fruit have Proxeronine which unite with enzyme proxeroninase to form xeronine. Alkaloid Xeronine is difficult to identify. It may assist to increase the size of the tumor cells and permits entry of anti-cancer drug simply. Further, Xeronine induces absorptivity of potassium ions and also

inhibit the 2-hydroxy propanoic acid develop from simple sugar.

Ursolic acid

It consists anticarcinogenic consequences externally and internally. Ursolic acid obstruct development of carcinoma cells and induce programmed cell death by regulating immune process in the body.

Monoterpene

Other cancer like mammary, liver, lung is prevented by monoterpene, limonine available in the noni fruit. Limonene restorate thymus gland for TCL secretion which destroy cancer cells.

PHARMACOLOGICAL ACTIVITY REVIEW

Antidiabetic activity

Absolute insulin insufficiency or impaired cell sensitivity to insulin are two characteristics of the hypoglycaemia condition known as diabetes mellitus. Diabetes is a metabolic condition brought on by insufficient insulin. The medication is administered orally. After the induction of diabetic serum glucose, there was no scientifically symbolic change in hemoglobin level, however there was a scientifically symbolic reduce in total cholesterol, HDL, LDL concentrations.

Anti-inflammatory activity

In the south pacific, noni fruit was frequently used to cure inflammatory conditions like arthritis. The inflammatory activity was identified in an in vivo investigation. The study's objective was to determine M. Citrifolia's potential effectiveness as a natural antiinflammatory. Age, over or under weight (BMI), discomfort, menses, haemoglobin, hematocrit and ESR were some of the variables this study looked at both before and after treatment.

Antioxidant activity

A nucleophile performs an important function in stopping oxygen-mediated deterioration. Antioxidant compound stop side reaction occurs due to ROS and RNS. Find out the favorable effect

of noni juice on antioxidant and biochemical interchanges by N Methyl-N-Nitrosourea (NMU) increased mammary oncogenesis (rats). Result shows noni therapy rise anti-oxidant catalyst level and reduce lipid peroxidation level from NMU. Noni juice also reveals a preventive effect opposite to Iron poor blood, lymphocytosis neutrophilia contrast NMU control group.

Antihypertensive activity

This study determines the consequence of Noni on high blood pressure in the elders. Since long time this fruit is used for treatment of high blood pressure. This research is an experimental study. The research contains 30 people. The reduced systolic blood pressure before and afterwards consumption of Noni abstract capsules is a statistical analysis test.

Antifungal activity

The antifungal test employed noni juice extract. The dried noni fruit's methanolic abstract showed the highest percentage of hindrance (79.3%) against *Trichophyton mentagrophytes*, while *penicillium*, *fusarium*, and *rhizopus* species showed about 50% activity. In vitro tests were conducted to identify the effectiveness of *Morinda Citrifolia L.* fruit abstract antifungal capabilities adverse *Candidiasis* at various doses and times. By using a culture and broth dilution test, the prohibitory activity of *Morinda Citrifolia L* abstract on *candidiasis* recognized.

Effect on cervical cancer

Noni juice and Cisplatin, as well single or in amalgamation is unable for produce programmed cell death by the mitochondrial pathway on HeLa and SiHa cells. Although, Cisplatin result in increased cell death after analyzed *Morinda Citrifolia L* when their amalgamation result in cumulative activity. Those outcomes recommended; Noni juice used as chemo ancillary to treat cervical cancer.

Smooth muscle stimulatory activity

Noni fruit possess involuntary muscle stimulatory activity and histaminergic activity. Those effects

are controlled for physiological activities in animals and anti-microbial evaluation.

CONCLUSION

M. Citrifolia is a phytomedicine called as Noni. *Morinda Citrifolia L* have multiple phytoconstituents associated to beneficial components like alkaloids, carbohydrates, tannins, micronutrients, steroids, flavoand thioglycosides. So, Noni possesses pharmacological characteristics like, antidiabetic, antifungal, antioxidant, immunostimulant, antiulcer, antihypertensive, antibacterial, effect on breast cancer, effect on Alzheimer's disease and effect on lung and colon cancer. Researcher have showed noni is pharmacologically active and they can counter cancer.

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