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A Comprehensive Review on *Musa Paradisica Linn*

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ABSTRACT:

Musa paradisiaca Linn. is a popular Indian medicinal plant belonging to the Musaceae family. This plant commonly known as plantain or banana is highly eating nutritious fruit over the world. It is known by names such as Musa sapientum L., M. paradisiaca L. var sapientum (L) Kuntze, Plantain. Phytochemical analysis showed that Musa paradisiaca contained carbohydrates, reducing sugar, tannins, saponins, alkaloids, glycosides, steroids, phytosterols, phenols, flavonoids, terpenoids and many other secondary metabolites. Musa paradisica cultivated widely and consumed by the majority of the population in India as well as in Tamil Nadu. Tamil Nadu is the largest producer of banana in India. In Tamil Nadu, Theni District holds first position in area under cultivation of banana followed by Coimbatore, Erode and Tuticorin districts. The recent pharmacological reviews revealed that Musa paradisiaca possessed hypolipidemic, antidiabetic, hypotensive, antioxidant, antiulcerogenic, antidiarrheal, antimicrobial, antiparasitic, wound healing, anticancer, anti-angiogenic, hepatic and nephroprotective, reproductive, antiallergic, antiasthmatic, anti-inflammatory, analgesic, antiurolithiatic, galactagogue, and thrombolytic effects.

INTRODUCTION:

Herbal medicines have been used by the mankind since time immermorial. Ayurveda, the oldest traditional system of India, reveals that ancient Indians had a rich knowledge of medicinal value of different plants. India has been endowed with a very rich flora owing to the extreme variations in climate and geographical conditions prevalent in the country. With the advent in science, many of the crude drugs used in traditional system have been investigated scientifically[1]. Medicinal plants are frequently used in traditional medicine to treat different diseases in different areas of the world. This indigenous knowledge, passed down from generation to generation in various parts of the world, has significantly contributed to the development of different traditional systems of medicine as well as helped in exploration of different medicinal plants to find the scientific basis of their traditional uses[2]. Musa paradisiaca (common name: plantain) is an herbaceous, perennial, monocotyledonous plant belonging to the genus Musa along with (dessert) bananas (M. sapientum) in the family Musacaceae[3]. The traditional uses of plant is considered a cooling, nutritional and restorative agent in Ayurveda and various parts of the plant are used to treat gastrointestinal malady, metabolic disorders, inflammation, and skin ailments. The unripe fruits are typically used to treat diarrhea, dysentery, and peptic ulcers due to the high levels of starch and pectin, which form a protective layer of the mucosa and lower irritation of the intestine, as well as phenolic compounds that also help in the treatment of diarrhea, dysentery, and peptic ulcers[4]. The chemical constituents include alkaloids, saponins, tannins, terpenoids, flavonoid, anthraquinone and glycosides, obtained either from synthesized or metabolism products for defense tenacities[5]. It has traditionally been used for antidepressant, antibacterial, antihypertensive, antiulcerogenic, urolithiasis, laxatives, antihelminthics[6]



FIG.NO.1: *MUSA PARADISICA* PLANT



FIG NO.2: *MUSA PARADISICA* LEAF



FIG.NO.3: *MUSA PARADISICA* FRUIT

PLANT BIOGRAPHY:

Taxonomical Classification[7]:

TABLE NO.1: Taxonomical classification of *Musa paradisica Linn*.

Kingdom	**Plantae**
Sub kingdom	Tracheobionta
Super division	Spermatophyta
Division	Magnoliophyta
Class	Liliopsida
Subclass	*Zingiberidae*
Order	Zingiberales
Family	Musaceae
Genus	Musa L.
Species	Musa paradisica Linn

SYNONYMS [8]:

- Musa paradisiaca f. dongila,
- Musa paradisiaca f. funu-nua
- Musa paradisiaca f. kilola.
- Musa paradisiaca f. seluka
- Musa paradisiaca f. tuba
- Musa paradisiaca var. purpurascens

VERNCULAR NAMES [9]:

TABLE NO.2 : Vernacular Names of *Musa paradisica Lin.*

Language Names	**Names**
Scientific Name	Musa paradisica
Name in various global languages	

Language Names	**Names**
French	Bananier
German	Banane
English	Banana
Name in various Indian languages	
Sanskrit	Kadali
Hindi	Kela
Urdu	Bonana
Marati	Kela
Kannada	Baale
Gujrati	Kelphool
Malayalam	Vazha
Tamil	Vazhai

PHYTOCONSTITUENTS: [10,11,12,13]

TABLE NO.3: PHYTOCONSTITUENTS OF *MUSA PARADISICA LINN.*

Phytochemicals	Plant Parts	Isolated / Reported Compounds
Phenolic compounds	Fruit peel	Gallic acid, Catechol, Ferulic acid, Ellagic acid, Salicylic acid, Cinnamic acid, o-Coumaric acid
Flavonoids	Fruit peel	Rutin, Myricetin, Naringenin
Flavonoids	Fruit pulp (unripe)	Leucocyanidin, Quercetin, Quercetin-3-O-galactoside, Quercetin-3-O-glucoside, Quercetin-3-O-rhamnosyl glucoside
Catecholamines	Fruit pulp	Serotonin, Norepinephrine, Dopamine
Indole compounds	Fruit pulp	Tryptophan and other indole compounds
Phenolic compounds	Pseudostem	Gentisic acid, (+)-Catechin, Protocatechuic acid, Caffeic acid, Ferulic acid, Cinnamic acid
Phenolic compounds	Inflorescence (Flower)	Gallic acid, Syringic acid, p-Coumaric acid, Ferulic acid, Catechol
Phytosterols and triterpenes	Fruit / Plantain	Stigmasterol, β-Sitosterol, Cycloeucalenone, 24-Methylene-cycloartanol, 31-Norcyclolaudenone
Other phytochemicals	Leaf	Alkaloids, Saponins, Flavonoids, Tannins, Cyanogenic glycosides
Phenolic compounds and flavonoids	Pseudostem and rhizome	Total phenolic compounds and total flavonoids
Phenolic compounds and dietary fibre	Flower / Inflorescence	Polyphenolic compounds and dietary fibre

TRADITIONAL USES:

***Leaves*:**

Leaves, at their tender stage, can be used to make poultice for treating burns and astringent ashes of unripe peel and leaves are effective for preventing the growth of malignant ulcers and are suitable to treat diarrhea and dysentery. The juice of banana leaf is useful in case of cough, cold, breathing problem, dropsy constipation, dysentery, acidity, high BP, blood disorder or poisoning and also for liver problem.[14]

Sap:

Chemically, banana sap has astringent qualities. In traditional medicine, the sap is used to treat a wide variety of ailments, including leprosy, hysteria, fever, digestive disorders, hemorrhage, epilepsy, hemorrhoids, and insect bites.[15]

Roots and Rhizomes:

A fresh extract of the roots and rhizome of the 'Nendran' or "Monthan' variety of plantain (found in Kerala) is given internally and few drops dropped into the vagina to induce abortion by the traditional midwives. The extract of the banana rhizome to treat piles, the extract is applied locally. It is also given internally to treat food poisoning.[16]

Stem:

The banana stem pith of a local variety of plantain as a good diuretic to cleanse the kidney and to dissolve kidney stones. The raw pith is given to eat. The juice pressed from the pith is given liberally to treat persons bitten by poisonous snakes.[16]

Fruit:

Fruit is considered to be the stomach conditioner and is recommended for all those having a delicate stomach. Raw fruit in treating blood dysentery.[16]

PHARMACOLOGICAL ACTIONS:

Antihypertensive activity

There are some evidences that M. paradisiaca has been used in traditional medicine to treat or prevent hypertension. We were able to evaluate the antihypertensive potential of the extracts by first characterizing the interaction of the aqueous extract of the peels with ACE, an enzyme that is believed to be effective in therapeutic approaches to the control or treatment of high blood pressure. Peels may have had therapeutic benefits because of highly inhibitory effects of water-extractable phytochemicals. These phytochemicals were found in the peels. In addition, the

hypotensive effects of deoxycorticosterone enanthate (25 mg/rat) and ripe banana pulp (50gm/rat/day) were investigated in rats that had become hypertensive as a result of the administration of deoxycorticosterone enanthate. From that point forward, M. paradisiaca could be incorporated into the investigation and manufacture of nutraceuticals related to hypertension[17].

Antidiabetic Activity:

Methanolic extracts of mature green fruit of Musa paradisiaca in normal and Streptozocin treated diabetic mice using Chlorpropamide as antidiabetic agent. MEMP (100-800 mg/kg, p.o) showed significant dose related ($p<0.05$–0.001) reduction in the blood glucose concentration in normal and diabetic mice. Chlorpropamide (250 mg/kg p.o) also produced significant ($p<0.01$ and $p<0.001$) reduction in the blood glucose concentration in normal and diabetic mice[18].

Antioxidant Activity:

In assessing scavenging potential of M. paradisiaca, methanolic, ethanolic, aqueous, and ethyl acetate extracts of M. paradisiaca was able to scavenge over 50% of 2,2-diphenyl-picrylhydrazyl radicals at specific concentrations, showing that extract of the plant displayed strong antioxidant activity. Extracts of M. paradisiaca contain significant amount of cyanidin rutinoside-a substantial antioxidant. Extract of M. paradisiaca significantly reduced plasma oxidative stress[19].

Anti-snake venom activity:

Plantain juice is used as an antidote for snake bite. The roots can arrest hemoptysis and possess strongly astringent and anthelmintic properties. The phospholipase A2 (PLA2) and hemorrhagic activities induced by the venom was inhibited by the extract as it forms unspecific complex with the venom protein. However, the in vivo activity of the extract in mice was not significant to protect against the venom[20].

Antidepressant Activity:

The fruit of the banana that contains high concentration of serotonin, norepinephrine, and dopamine. The peel of fruit contains serotonin (47-93g/g), norepinephrine (122g/g), and dopamine (700g/g). Banana also contains tryptophan that helps in restoration of essential neurotransmitters. Also, banana is a rich source of various nutritional elements that can help in treatment of mood disorders. Bananas are a rich source of several nutrients, including those that can assist in the treatment of mood disorders[21].

Anti-inflammatory Activity:

Nitric oxide (NO) is a potent mediator causing inflammation in many organs. NO synthesized in high amounts by activated inflammatory cells possesses cytotoxic properties for killing bacteria, virus or tumor cells[22].

Antimicrobial Activity:

Ethanol (0.5 g/100g), which has a microbe-killing effect, is present in Musa paradisiaca L. at a concentration of 0.5 g/100g. Secondary metabolites such as flavonoids, tannins, phlobatannins, alkaloids, glycosides, and terpenoids have been found to be present in banana peel. Although banana peel is regarded as waste, peel extracts can be utilized to create antibiotics[23].

CONCLUSION:

This review highlights the remarkable therapeutic potential, pharmacological properties, and diverse bioactive compounds found in *Musa paradisica* (Linn), emphasizing its importance for human health. It stresses the need for continued research and clinical studies, urging researchers and industry professionals to explore its potential applications in the nutraceutical and pharmaceutical sectors.

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CONFLICT OF INTEREST: Nil

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