International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Ethnomedicinal and Pharmacological Properties of Cavendish Banana

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ABSTRACT:
Banana is the common name for herbaceous plants of the genus Musa. Bananas come in a variety of sizes and colours when ripe, including yellow, purple, and red. This review presents information on the phytochemicals and pharmacological studies to validate the traditional use of different parts of *M. acuminata* in various diseases and ailments. *Musa acuminata* is a common name for Cavendish banana is an important plant due to its immense medicinal properties. It is traditional used to treat skin disease, wound healing, swelling, diabetes, allergy, cardiovascular disorder, diarrhea. The scientific information was obtained from various sites such as Google scholar, PubMed, Wikipedia, Google, ChatGPT, and other scientific database. The bioactive components of *Musa acuminata* such as carbohydrates, proteins, fatty acids and minerals.

Keywords: Antioxidant properties, Antimicrobial properties, Phytochemical properties, *Musa acuminata.*

INTRODUCION:

Fruits and vegetables are an important component of a healthy diet. Some fruits like bananas offer great medical benefits. Banana is a common name for a very large tree like herbaceous plants comprising the genus Musa of the flowering plant family Musaceae. It is one of the oldest cultivated plants[1]. All parts of the banana plants have different medicinal applications. Bananas are usually classified under berries. Bananas aid in retention of Calcium, Nitrogen, Phosphorus and other chemicals which help in building healthy and regenerating tissues.

Banana is one of the most nutritious fruits as it as rich in carbohydrates, proteins, fatty acids and minerals. These are originated at the tropical regions of Southeast Asia (Assam, Burma, Indochina, Malaysia, Indonesia) and Africa. Africans are credited to have given the present name, since the word banana is derived from the Arab word Finger. There are thousand varieties of bananas in which these are usually classified mainly three types: Table varieties; Culinary types; Hill bananas. Mainly the table varieties have a commercial importance in the society[2].

Especially *Musa acuminata* is classified by botanists as an herbaceous plant and an evergreen and a perennial. *Musa acuminata* is highly variable and these are further divided into other number of subspecies accepted by different authorities. The most accepted subspecies are as follows[3]:

1. *Musa acuminata burmannica.*
2. *Musa acuminata errans.*
3. *Musa acuminata malaccensis.*
4. *Musa acuminata microcarpa.*

5. *Musa acuminata siamea.*
6. *Musa acuminata truncata.*
7. *Musa acuminata zebrina.*

Health benefits of eating Bananas[4]:

- It helps in release of healthy bowels.
- It helps in maintain of healthy cardiovascular system.
- It prevents the formation of ulcers.
- It improves the blood pressure.
- It protects from the strokes.
- It helps in reducing of water retention.

TOXONOMICAL CLASSIFICATION OF *MUSA ACUMINATA*: [5-7]

Kingdom: Plantae.
Division: Magnoliophyte.
Class: Liliopsida.
Order: Zingiberales.
Family: *Musaceae*.

Every part of the plant consists of its own structure and nutritional value whereas.

ROOT: *Musa acuminata* has a fibrous adventitious root which are strongly influenced by the type of soil and water present. Based on the quality of roots the bunch weight of bananas depend. These roots are present on the upper part of the soil (above 40cm). The suitable temperature for the growth of plant is 18-20*C. The rapid and extent growth of roots helps in good yield.

STEM: The underground stem is known as rhizome. The apparent, unbranched, erect and areal pseudo stem is formed by the long stiff and sheathy leaf bases are rolled on each other to form an aerial pseudo stem. The central axis of pseudo stem is known as shaft which is elongated and penetrated through the pseudo stem at the time of flowering which produces an inflorescence terminal.

LEAF: The leaves of *Musa acuminata* are spirally arranged which consists of a Sheath, a Petiole and a Blade. Leaves are nearly circular and tightly packed into a non woody pseudo stem. The petiole is situated beneath the sheath and above the channelled blade. The veins present on the flat leaf are parallelly arranged.

INFLORESCENCE: It is commonly known as branched "Spadix". The spathes present in the bunch are large, brightly coloured, spirally arranged and have boat shaped bracts which protects the flowers. As the flowers open/bloom the spathes roll back. When the flowers are converted into fruits the spathes fall off.

FLOWERS: The flowers present in the *Musa acuminata* are Polygamous (All three types of males, female and bisexual flowers are present). These flowers are grouply situated. These are present in the bracts and arranged biternately. Each bract consists of 19-20 flowers. Some cultivators retain flowers and bracts.

FRUIT: The fruits present in *Musa acuminata* are developed into vegetative parthenocarpy. The bunch consists of many clusters which are usually knows as hands and fruits are known as fingers. These consists of leathery epicarp, slightly fibrous mesocarp and fleshy endocarp.

VERNACULAR NAMES OF *MUSA ACUMINATA:*

English: Banana
Kannada : Balehannu

Telugu : Aratipandu
Hindi : Kela
Marathi : Keli
Bangla : Kala
Sanskrit : Kadal
Tamil : Valai

PHYTOCHEMICAL PROPERTIES:[8-9]

The edible part of *Musa acuminata* provide energy, vitamins, minerals and other parts of plants are used in treatment of many diseases in traditional medicine. The phytochemical present in *Musa acuminata* contribute
to their beneficial effects. The flower consists of phytochemicals such as tannins, flavonoids, saponin, alkaloid and phenols. The phenols extracted from the flower are responsible for inhibiting corrosion. The flavonoid present in the flower exhibits antioxidative activity that stop oxidation hence it stops corrosion (Table No.1).

ETHNO-PHARMACOLICAL USES:[10-13]

Over the past few decades, the health benefits of *M. acuminata* have received much attention. All parts of the plant including fruits, peel, pseudo stem, corm, flowers, leaves, sap and roots have found their use in the treatment of many diseases in traditional medicine (Table No.2).

ETHNOMEDICINAL USES:[14]

Bananas are highly nutritious fruit, and they have medicinal properties. The cooked flowers are used in the treatment of diabetes. The flowers are used to treat dysentery, ulcers and bronchitis. The pseudo stem has astringent qualities, and these are used to treat leprosy, hysteria, fever, digestive disorders, haemorrhage, epilepsy, haemorrhoids.

PHARMACOLOGICAL USES

The pharmacological activities of *M. acuminata* include antioxidant, antidiabetic, antidiuretic, wound healing activity, infections, cholesterol lowering effect, antianalgesic, anticancer and antimicrobial.

ANTICANCER ACTIVITY:[15]

Based on *In-Vitro* studies of *Musa acuminata* the aqueous methanol extracts, ethanol extracts show the significant properties of anti-tumour activities mainly MCF-7 breast cancer, cervical cancer, colon cancer, liver cancer, prostate cancer and skin cancer. The *In-Vivo* anti-cancer properties of methanolic and ethanolic extracts of the flower of *Musa acuminata* was tested on male rats. In a study, family history of illness and dietary information of 279 patients suffered from colorectal cancer were studied, a protective effect provided by banana and papaya on colorectal cancer was served. Dietary fibre was found to decrease the colorectal cancer risk.

ANTIMICROBIAL ACTIVITY:[16]

The acetone extracts of the leaves of *Musa acuminata* (IC 50 = 61 microgram/ml) show strong inhibitory activity against gram positive bacteria (*Bacillus cereus, micrococcus luteus, staphylococcus aureus,*

streptococcus faecalis) and against gram-negative bacteria (*Aeromonashydrophila, Escherichia coli, salmonella enterica, shigellasomei*).

DIURETIC ACTIVITY:[17]

The aqueous extracts of *Musa acuminata* show an increase in the Uren volume and other electrolytes such as sodium, potassium and mineral salts excretion are studied phytoconstituents like saponin, flavonoids and terpenoids are responsible for the above-mentioned effect. Bananas promote an overall improvement of the functional efficiency of kidneys. Benefits to the kidneys are again due to the high potassium content of bananas. A normal intake of potassium suppresses calcium excretion in the urine and minimizes the risk of kidney stones. The results of the Swedish population based prospective study (13.4 years) of 61,000 women aged 40-76, show that women eating more than 75 servings of fruits and vegetables per month (which translates into 2.5 per day) cut their risk of kidney cancer 40%. Among the fruits, bananas were especially protective. Women eating bananas four to six times a week reduced their risk of developing the disease compared to those who did not eat this fruit.

ANALGESIC ACTIVITY:[18]

The aqueous and ethanolic leaf extract of *Musa acuminata* significantly increase the reaction time in hot plate method compared to the vehicle-treated group.

WOUND HEALING ACTIVITY:[18]

The aqueous and ethanolic extracts of leaves and peel from *Musa acuminata* was studied on streptozotocin (STZ 60 mg/kg via I.P) induced diabetic rats in Chinese. The application of topical super green ointment obtained from Musa species result in the decreasing of wound area in diabetic rats. These are also of show effective nature for burned wounds.

INFECTIONS: [17]

The Ethanol extracts of *Musa acuminata* flower stop/inhibit the growth of bacteria such as *Bacillus subtilis, Bacillus cereus* and *Escherichia coli*. The ethanolic extracts also helps in wound healing and prevent infections. These also inhibit the growth malarial parasite *Plasmodium falciparum.*

ANTIOXIDANT ACTVITY: [17]

Methanol extracts of *Musa acuminata* flowers possess antioxidant properties and thereby stabilize the free radicals formed because of various metabolic processes in the body. If the free radicals are not neutralized, their unstable electrons react with the DNA and proteins of human cells and alter their properties. This can lead to several chronic conditions, including cancer and heart disease. The authors of a study published in October 2010 issue of the journal "Food Science and Biotechnology" recommend the use of banana flower extracts to make health supplements due to its antioxidant potential.

CHOLESTEROL-LOWERING EFFECT:[17]

Animal studies have shown that banana has the potential to lower cholesterol. It was suggested that the dietary fibre component in banana pulp was responsible for its cholesterol-lowering effect. The amount of dietary fibre in banana is relatively constant during banana ripening.

ANTIDIABETIC ACTIVITY: [17]

Oral intake of 0.15 to 0.25 g per Kg of body weight of chloroform extracts of *Musa acuminata* flowers for 30 days may significantly reduce the blood sugar levels and increase the total haemoglobin level in rats, as per the results of a study published in the March 2000 edition of the journal "Phytotherapy Research." However, as with antimicrobial activity, the hypoglycaemic effects of banana flowers have not been proved clinically. It is important to talk to a doctor determine the dosage that is right for you.

ANTI DIARRHEA PROPERTY:[14]

It has been thought that the banana pectin (a soluble polymer) can help normalize bowel movement and ease constipation. However, intake of banana may benefit people suffered from diarrhea. In a study, 31 patients with diarrhea and receiving enteral feedings were randomized to receive either banana flakes or medical treatment for diarrhea. The researchers found that the banana flake group had less diarrhea clinically, with 57% of the subjects diarrhea free on their last study day as opposed to 24% of the medically treated subjects.

NUTRITIONAL PROPERTIES:[4]

- Hundred grams of ripe Banana provides approx. 116 KCal energy that makes it a supplementary staple food.
- Banana has relatively less proteins compared to cereals, absence of other protein rich foods in the diet can cause protein deficiency in people depending mostly on banana as a staple food.
- Cooked or ripe Bananas are easily digested.
- Banana is a fair source of Vitamin B and Calcium.
- Banana contains about 20% sugar.

CONCLUSION:

Musa acuminata is widely distributed throughout various tropical regions. The fruit part of *M. acuminata* is highly nutritional and most widely consumed fruit throughout the world. The plant appears to have a broad spectrum of activity on several aliments various part of the plant has been explored for Anti-cancer activity, Diuretic activity, Analgesic activity, Anti-microbial activity, Wound healing activity, Anti-infective activity, Antioxidative property, Anti diabetic activity, reproductive activity, Anti-malarial activity, Anti ulcerative activity, and many other activities. These are also reported in containing Carbohydrates, Proteins, Flavonoids, Sterol glycoside, Vitamins and Minerals. The plant is preclinically evaluated to some extent.

Table No. 1: Phytochemical constituents present in *Musa acuminata* bract extracts.

Phytochemical compounds	Petroleum ether	Chloroform	Ethyl acetate	Methanol	Water
Carbohydrates	-	-	-	-	-
Reducing sugar	-	-	-	-	-
Alkaloids	+	-	-	+	-
Saponins	-	-	-	+	-
Tannis	-	-	-	++	++

Flavonoids	-	-	+	+	-
Terpenoids	-	-	-	+	-
Phlobotannins	-	-	-	-	-
Coumarins	-	-	-	+	+
Cycloglycosides	+	-	-	+	-
Total phenols	-	-	-	+	+
Quinones	-	-	-	-	-
Anthraquinones	-	-	-	-	-
Steroids	-	-	-	+	-

Key: "++" active compound copiously present, "+" active compound present, "-" active compound absent.

Table No. 2: Phytochemicals of the genus Musa with their ethnopharmacological use.

Phytochemicals	Ethnopharmacological use
Tannic acid	Used for the treatment of burns
Catechin	Enables LDL to oxidation
Gallic acid	Antioxidant and hepatoprotective
Cinnamic acid	As sweetener
coumaric acid	Antioxidant and reduce the risk of stomach-ache
Quercetin	Promote cardiovascular health by encouraging blood flow
Ferulic acid	Antioxidant, antimicrobial, anti-inflammatory, antiallergic, and anticancer
Carotene	Reduce the risk of Cardiovascular Disorder and cancer
Violaxanthin	Used as a food colorant
Cryptoxanthin	Reduce the risk of lung cancer
Serotonin	Increase wellbeing and happiness
Catecholamines	Used to increase blood pressure, glucose level, heartbeat rate
Sitosterol	Used in the management of benign prostate hyperplasia
Campesterol and stigmasterol	Used for the reduction of cholesterol absorption

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