



Received on 25 December 2017; received in revised form, 19 January 2018; accepted, 13 February 2018; published 01 May 2018

MUSA PARADISIACA – A WONDER FRUIT

Nilofer Sayyed* and Prajakta Jagtap

Department of Pharmaceutics, Allana College of Pharmacy, Pune - 411001, Maharashtra, India.

Keywords:

Musa paradisiaca,
Banana peel, Extract, Phytochemical

Correspondence to Author:

Nilofer Sayyed

Department of Pharmaceutics,
Allana College of Pharmacy, Pune -
411001, Maharashtra, India.

E-mail: sayyednilofer.24@gmail.com

ABSTRACT: Over the past centuries phytochemical and phytopharmacological sciences established the compositions, biological activities and health-promoting benefits of numerous botanical products. *Musa paradisiacal* also known as Musa or banana in common terms are one of the world's most appealing fruits. Banana (*Musa paradisiaca* L., Musaceae) represents one of the most important fruit crops, with a global annual production of more than 50 million tons. Peels constitute up to 30% of the ripe fruit. It is cultivated in all tropical countries of the world. It is originally from India. Bananas are commonly eaten as a healthy snack as they offer valuable nutrients such as the B6 and B12 vitamins. Preliminary phytochemical screening of fruit peels of *Musa paradisiaca* unveils the presence of some glycosides, anthocyanins, tannins, flavonoids as well as carbohydrates. These phytochemicals have been reported to play multiple biological and pharmacological roles. Thus, banana peel which is often ignored and considered as waste could be used for multiple purposes in day to day life.

INTRODUCTION: 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 the exploration of different medicinal plants to find the scientific basis of their traditional uses¹. Banana (*Musa paradisiacal* L., Musaceae) represents one of the most important fruit crops, with a global annual production of more than 50 million tons. Peels constitute up to 30% of the ripe fruit². Fruit contains two vasoconstrictors: norepinephrine (a chemical used to raise blood pressure) and dopamine.

The fruit is rich in vitamin A. Sap of the fruit contains serothine, which has an action on the long muscles. Norepinephrine is good for a weak heart³. Bananas can be used to fight intestinal disorders like ulcers. Bananas are one of the few fruits that ulcer patients can safely consume.

Bananas neutralize the acidity of gastric juices, thereby reducing ulcer irritation by coating the lining of the stomach. Not only can bananas relieve painful ulcer systems, and other intestinal disorders, they can also promote healing⁴. Starch, one of the principal and important constituents in plant materials, is usually in fruits as in the form of granules, partially crystalline. The morphologies, chemical compositions and the molecular structures of starches are unique for each particular plant species, particularly in their quantitative and qualitative nature as well as some of the physicochemical properties.

Furthermore, the methods of starch isolation could have an impact on their chemical compositions as well as properties⁵. Bananas are one of the most popular fruits in the world, and it well is known

	QUICK RESPONSE CODE DOI: 10.13040/IJPSR.0975-8232.IJP.5(5).284-86
	The article can be accessed online on www.ijournal.com
DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.5(5).284-86	

that fruits contain various antioxidants compounds such as gallic catechin and dopamine. The peel could be a potential source of antioxidant and antimicrobial activities ⁶.

1.1 Nutritional Value of Banana Peel: Banana peels are also rich sources of potassium and contain much more soluble and insoluble fiber than their flesh. Dietary fiber promotes digestion and bowel movements and can reduce blood cholesterol levels. Banana peels also contain tryptophan, which increases serotonin levels in the body and affects mood, much like the drug Prozac does. According to "Prescription for Nutritional Healing," researchers in Taiwan discovered banana peel extract could ease depression because of its effect on serotonin, which is a neurotransmitter in the brain responsible for balancing mood and emotions. Others found that eating two banana skins a day for three days increased blood serotonin levels by 16 percent. Further, banana skin contains lutein, a powerful antioxidant that protects the eye from free radicals and harmful frequencies of UV radiation from the sun. Lutein has been proven to reduce the risks of cataracts and macular degeneration, as cited in "Biochemical, Physiological and Molecular Aspects of Human Nutrition." The sweet flesh of a medium-sized banana contains significant percentages of your daily recommended intake of various nutrients, such as:

TABLE 1: DAILY RECOMMENDED INTAKE OF VARIOUS NUTRIENTS

Content	Amount in %	Use
Fiber	12	Helps with digestion and lowers the risk of diabetes
Vitamin C	17	Boosts immune system
Vitamin B ₆	20	Aids the body's ability to convert food into energy
Potassium	12	Helps in the development of cells, tissues, and organs throughout the body
Magnesium	08	Regulation of glucose and blood pressure level in the body

1.2 Pharmacological Activity:

Antidiarrheal Activity: ⁷ Anti-diarrheal activity of the methanolic extract of *M. sapientum* seed (MMSS) has been investigated against castor oil induced diarrhea model, magnesium sulfate induced diarrhea and gastrointestinal motility model in mice. The methanolic extract at the doses of 100 and 200 mg/kg (p.o) significantly ($p < 0.001$)

reduced the total number of feces as well as delayed the onset of diarrhea in a dose-dependent manner. The extract exhibited significant antidiarrheal activity against magnesium sulfate induced diarrhea. The extract at both the dose levels significantly ($p < 0.001$) reduced the extent of diarrhea and also notably delayed the onset of diarrhea in a dose-dependent manner. The methanolic extract, at the doses of 100 and 200 mg/kg, retarded ($p < 0.001$) the intestinal transit of charcoal meal in mice when compared to the control.

Antioxidant Activity: ⁸ Reactive Oxygen Species (ROS), superoxide anion, hydrogen peroxide play an important role in oxidative stress related to the pathogenesis of various important diseases. The production of free radicals is balanced by the antioxidative defense system. The antioxidant properties of extracts of banana peels were determined using four different methods namely DPPH, Reducing power, Fe^{2+} chelating and ABTS⁺ assays.

Antimicrobial Activity: ⁸ The antimicrobial properties of the ethanol and acetone extracts of banana peels were evaluated by well diffusion assay against different microbial isolates. 80% acetone extract inhibited bacterial species at 600 ppm against gram-positive bacteria including *B. utilis* (20.60%), *S. aureus* (19.75 mm), *E. coli* (18.15 mm) and *P. auegino* (19.57 mm). Antimicrobial activity and preservative of banana peel extract are believed to be associated with phytochemical components of the banana peel, like phenolic, tannins.

Anticarcinogenic Activity: ⁹ Banana Peels include effective anticarcinogenic substances which called TNF (Tumor Necrosis Factor) which can combat abnormal cells. The degree of anti-cancer effect corresponds to the degree of ripeness of the fruit, *i.e.*, the riper the banana, the better the anti-cancer quality. In an animal experiment carried out by a professor in Tokyo U comparing the various health benefits of different fruits, using banana, grape, apple, watermelon, pineapple, pear, and persimmon, it was found that banana gave the best results. It increased the number of white blood cells, enhanced the immunity of the body and produced anti-cancer substance TNF.

Wound Healing Activity:¹⁰ The development of a drug from plant to medicine the extracts of banana peel was used for wound healing effect. The banana peel was reported to have wound healing activity through its predominant effects on mucosal defensive factors promoting mucosal cell proliferation and enhanced DNA synthesis. The wound healing activity of both methanolic and aqueous extract of plantain banana (*M. sapientum* var. paradisiacal) in rats. Both extracts were found to increase hydroxyproline, hexuronic acid, hexosamine, superoxide dismutase as well as the wound breaking strength and reduced glutathione level. They also decreased the wound area, scar area, and lipid peroxidation. The effects were attributed to the antioxidant property of the plantain.

Antidiabetic:¹¹ The other element of banana peel is pectin (10 - 21%), lignin (6 - 12%), cellulose (7.6 - 9.6%), and hemicellulose (from 6.4 to 9.4%). Pectin is a polymer of D-galacturonic acid linked by - 1, 4 glycosidic bond. A form of pectin extracted is a white powder until light brown. Most of the carboxyl groups on the pectin polymers undergo esterification with methyl (methylation) into a methoxyl group. This compound is called as pektinat acid or pectin. Pectin from banana peel can be extracted in a simple way; the cost is not expensive and can be applied on a small scale. Diabetes is a disease in which blood glucose (sugar) levels are higher than normal. Over time, too much glucose in the blood can lead to increased plaque deposits on the insides of the blood vessel walls. The most typical lipid pattern in diabetes consists of high triglyceride levels, low HDL levels, and small, dense LDL particles, which easily stick to artery walls. This lipid pattern is linked with central obesity and insulin resistance. From thus, banana peel extract that reduces the number of glucose, triglyceride, and total lipid and also has the antioxidant ability can be used as a therapy for type 2 diabetes.

CONCLUSION: The review presents some nutritional value and pharmacological activity of

banana peels. It suggests that banana peel which was a waste of banana fruit have a vast activity. The studies suggest that the traditional uses of the plant in diarrhea, dysentery, ulcer, diabetes, hypertension and cardiac diseases are scientifically valid. The biologically active constituents of banana peel must be isolated and considered for various *in-vitro* and *in-vivo* studies. It is our hope that this review will stimulate further research for elucidating and appreciating the value of this nature's wonder agent.

ACKNOWLEDGEMENT: Nil

CONFLICT OF INTEREST: Nil

REFERENCES:

1. Asp NG, Van Amelsvoort JMM and Hautvast JG AJ: Nutritional implication of resistant starch, Nutrition Research Reviews 1996; 9: 1-31.
2. <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/musa-paradisiaca> Accessed on 6th December 2017.
3. İlky ORHAN, Biological Activities of Musa Species. J Fac Pharm Ankara 2001; 30(1): 39-50.
4. Kumar KPS: Traditional and Medicinal Uses of Banana, Journal of Pharmacognosy and Phytochemistry 1(3): 51-63.
5. Pailumpa N: Compositions, Morphological and Thermal Properties of Green Banana Flour and Starch, Kasetsart J (Nat Sci) 2007; 41: 324-30.
6. Matook SM and Fumio H: Antibacterial and Antioxidant Activities of Banana (Musa, AAA cv. Cavendish) Fruits Peel, American Journal of Biochemistry and Biotechnology 2005; 1(3): 125-31.
7. Sarin RV and Bafna PA: Herbal antidiarrhoeals: a review. International Journal of Research in Pharmaceutical and Biomedical Sciences 2012; 3(2): 637-49.
8. Ahmed M and Aboul-Enein: Identification of phenolic compounds from the banana peel (*Musa paradisiaca* L.) as antioxidant and antimicrobial agents, Journal of Chemical and Pharmaceutical Research 2016; 8(4): 46-55.
9. Haruyoiwasawa and Masatoshi Y: Differences in Biological Response Modifier-like Activities According to the Strain and Maturity of Bananas, Food Sci. Technol. Res 2009; 15(3): 275-82.
10. Agarwal PK: Evaluation of wound healing activity of plantain banana, Indian journal of experimental biology, 2009; 47: 32-40.
11. Annisa F: Antidiabetic activity of Banana peel extract: effect on hyperglycemia, hyperlipidemia and augmented oxidative stress in diabetes mellitus. Journal of Health, Medicine and Nursin 2015; 17.

How to cite this article:

Sayed N and Jagtap P: *Musa paradisiaca* - A wonder fruit. Int J Pharmacognosy 2018; 5(5): 284-86. doi link: [http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.5\(5\).284-86](http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.5(5).284-86).

This Journal licensed under a Creative Commons Attribution-Non-commercial-Share Alike 3.0 Unported License.

This article can be downloaded to **ANDROID OS** based mobile. Scan QR Code using Code/Bar Scanner from your mobile. (Scanners are available on Google Playstore)