

A Review on Musa Balbisiana Colla

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ABSTRACT : Banana (*Musa x paradisiaca L*) is commonly a fruit but technically, a berry. The genus *Musa* of herbaceous plants produces this universally consumed fruit. It is suitable for consumption by people of any age group and so, is one of the world's most important food produce. Banana offer great medical benefits. This is partly because bananas aid in the body's retention of calcium, nitrogen and phosphorus, all of which work to build healthy and regenerated tissues. It has a rare combination of energy value, tissue-building elements, protein, vitamins and minerals. It is a good source of calories since it is rich in solids and low in water content as compared to any other fresh fruit. *Musa balbisiana Colla* possess various phytochemicals and it is having important pharmacological activity which can help in improving various health problems.

Keywords: *Musa Balbisiana Colla*, Phytochemical, Uses

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I. INTRODUCTION

Plantains and bananas (Musaceae, Zingiberales, *Musa* ssp., 'bananas') are giant monocotyledonous herbs. It is originated in Western Pacific and Southeast Asia. 1 *Musa balbisiana Colla* is one of the most important species which is involved in the origin of cultivated bananas and it is distributed from India to Papua, New Guinea. Earlier it was believed that this species possessed only limited variability. However, recent works have shown *M. balbisiana* also contain good level of infraspecific variability. During the taxonomic revision of Musaceae in India, a wide range of morphological variation in *M. balbisiana* is noticed, especially for its populations distributed in the North-East India, Peninsular India and Andaman and Nicobar Islands. 2 *Musa Balbisiana* (genome group BB) is considered as one of the parent plants with *Musa acuminata colla* (genome group AA) for the evaluation of the indigenous cultivars of *Musa L.* under the section *Musa*. 3 From a botanical point of view, *Musa* genus can be divided into two parts: edible and wild species. Wild species consist of wild diploid and also seminiferous non edible parents, namely *Musa acuminata* (AA) and *Musa balbisiana* (BB), of all consummated bananas. 2,3 The majority of consumed bananas derive from seedless triploid clones. 12

Taxonomy

Kingdom: Plantae

Division: Angiospermae

Class: Scitaminae

Order: Zingiberales

Family: Musaceae

Genus: *Musa*

Species: *M. Balbisiana colla* 3



Figure 1. *Musa Balbisiana Colla*

Phytochemicals Present In *Musa Balbisiana colla*:

Musa Balbisiana colla contain flavonoids, polyphenols, tannins, monoterpenoid and sesquiterpenoids, quinones, and saponins. It is also reported as a source of high potassium 4, Chloride, Calcium and Carbonate. Seed of Musa Balbisiana colla contain ferulic acid, C16, C18 fatty acid and polyphenols 5. According to Kalita et al. root extract of Musa Balbisiana colla contains a calyx[4]arene class of compound may be responsible for the antioxidant properties, which in turn may be partially responsible for its antidiabetogenic and antilipidemic properties. Analysis of metal content conducted by Mudiaretal.(2014) explained that vanadium accumulated in the Musa varieties and at higher rate in M. balbisiana. The Musa balbisiana leaves have rich amount of pentosans and soluble starch along with proteins and chlorophyll. Tin et al.(2016) reported three triterpenes were isolated from M. balbisiana inflorescence. They are 31-norcyclolaudenone, cycloartenol and (24R)-4a,24-trimethyl-5a-cholesta-8,25(27)-dien-3b-ol. Triterpene from M. Balbisiana inflorescence is a new source of natural products for food or pharmaceutical applications in future.22

II. PHARMACOLOGICAL PROPERTIES:

Antibacterial Activity

Flavonoids can form complexes and inhibit the synthesis of extracellular proteins and bacterial cell wall. Tannins have antibacterial activity by damaging components of cell membranes, cell walls, enzymes, genetic material, as well as other protein. (4,8,9). Kusuma et al.(2017) reported that the antibacterial activity of the ethanol extracts of Klutuk banana (M. balbisiana) fruits against S. Dysentery because of the antibacterial content of secondary metabolites, especially flavonoids. Fairuz Fadhilah Mohd Jalani et al (2014) reported that Musa balbisiana (BBB) possess antibacterial activity against gram negative bacteria (P. aeruginosa and E. coli) 11

Hypo-testicular Activity

According to A. Ghosh et al. the results of the investigation highlighting that the composite extract of T. chebula and M. balbisiana named as 'Contracept-TM' has most promising hypo-testicular activity compared to the standard antitesticular drug like CPA. Oxidative stress additionally affects the sperm motility and sperm viability. Above hypo-testicular activities by the phytomolecule present in above plants may be due to the presence of ferulic acid, C16, C18 fatty acid and polyphenols in M. balbisiana seeds 24 and gallic acid, ellagic acid, chebulinic acid, ethyl gallate, punicalagin, luteolin and tannic acid present in T. chebula fruit .5, 25

Antioxidant Property

The results of the present study indicate that the RE is capable of exhibiting significant antihyperglycemic activities in STZ induced diabetic rat by improving parameters like water intake, body weight, TAA, antioxidant enzyme and lipid profile as well as regeneration of pancreatic islets of Langerhans, hepatic structures. The presence of a calyx[4] arene class of compound in RE may be responsible for the antioxidant properties, which in turn may be partially responsible for its antidiabetogenic and antilipidemic properties. RE showed highest antioxidant activity by scavenging DPPH radical (IC₅₀ 32.96 mg/ml) and inhibit 30% glucose movement in vitro. The methanol extract of root showed the presence of calyx [4] arene category of the compound. Furthermore, RE treated rat revealed a reduction in fasting blood glucose (62.5%), serum total cholesterol (36.2%), triglyceride (54.5%), and low-density lipoprotein (50.94%) after 15 days as compared to STZ treated animal. 6. Fresh ripe pulp of M. balbisiana fruit has antiperoxidative and antioxidant properties which can prevent oxidative stress related diseases 13,14. Revadigaret al. studied that the ethanolic extract of inflorescence of Musa balbisiana Colla possess moderate antioxidant activity and promising cytotoxicity on HT-29 and HCT-116 colorectal human cancer cell lines, while moderate cytotoxicity on MCF-7 breast cancer cell line. This activity may be due to its high total phenolic and steroidal contents.23

III. USES

Biodiesel Production

The peels of Musa balbisiana Colla furnished 100% conversion of waste cooking oil into biodiesel. Low cost, renewable heterogeneous catalyst from banana (Musa balbisiana Colla) peels can be developed for fatty acid methyl esters (FAME) production providing a new route for sustainability of fuels.15 The cause for the excellent conversion is attributed to the strong base sites generated after calcination of the Banana peel. 26 The catalytic activity is largely attributed to the presence of high percentage of potassium in calcined burnt peel ash (CBPA) which facilitated the formation of active species.27,28

Kolakhar or Kolkhar

Khar is one of old and popular ingredients of many of the food dishes of Assamese cuisine. It is prepared from the ash of the fruit peels of Bhimkoland that's why it is widely known as kolkhar and kolakhar in different parts of Assam.16 Kolakhar has been found to be an excellent renewable source of potassium carbonate for commercial exploitation as it is rich in K, Na, CO₃, and Cl along with few other trace elements.3,16

Pectinase production

Banana peels, which is a waste product and was used as substrate for production of crude pectinase from *Aspergillus niger*, may be an efficient carbon source and has good potential as a substrate for pectinase production as they are cost effective, renewable and available in large quantities.¹⁷ Pectinase is a general term for enzymes, such as pectin lyase, pectin methylesterase and polygalacturonase, commonly referred to as pectic enzymes. Most pectic enzyme preparations are used in the fruit processing industry and pectic enzymes alone account for about one quarter of the world's food enzyme production.²⁹ Application of enzyme in fruit juice clarification and extraction has been known widely in fruit processing industries. Enzyme is an essential tool in juice processes, both in terms of quality improvement and cost saving.³⁰ The cloudiness in the juices is mainly caused by the presence of polysaccharides such as pectin and starch. Therefore, enzymatic treatment by using pectinase is an effective way to reduce the pectin in the fruit juices because pectinase has the ability to hydrolyze pectin and cause pectin– protein complexes to flocculate which could be easily removed by filtration or centrifugation.^{31,32,33}

As a natural filler in Polyvinyl Chloride (PVC) Polymer

Improved thermal stability and moisture resistance of the waste banana pseudostem biomass (WBPB) polymer composite suggests that waste *Musa balbisiana Colla* fibre could be used as a reinforcing agent in PVC composites, finding applications in structural components like window profiles, window, table tops, partition walls.³⁴ Banana pseudostem is a false stem Composed of folded leaf blades and sheaths engulfing the growing point and is a potential cellulosic biomass source.^{35, 36}

Medicinal uses

Borborah et al. (2016) reported that exudates deposited from pseudostem of *M. balbisiana* were used to expel intestinal worm infection and to treat infertility in women.^{20,21} Furthermore, *M. balbisiana* had higher accumulation level of potassium and chloride causing high alkalinity in the plant which justified their medical uses.³⁷ The inflorescence was used to treat jaundice. The fruit bark was used to treat gout. The dried peels were used to heal gastritis and cough or as health tonic. The fresh peel of ripe banana was used to heal dysentery.²⁰ The paste of fresh or dried seeds of *M. balbisiana* was used as contraceptive in Tripura, India. The tablets were prepared from the paste of fresh or dried seeds weighing 5 g and taken orally twice a day in empty stomach for 7 days.³⁸

IV. CONCLUSION

Bananas and plantains are widely consumed all over the world for medicinal Purposes and as food staples because they are interesting sources of bioactive secondary metabolites. Pharmacological and Phytochemical studies of bananas and plantains have obtained much interest because it has been indicated that presence of pharmacological activities in *Musa spp* extracts, attributed to their phenolic, amine and carotenoid constituents.

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