A REVIEW ON BANANA PLANT: A BOON TO HUMANKIND

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ABSTRACT

Traditional uses of medicinal plants are very common to treat variety of diseases in various regions of word. The banana is one of them and cultivated from ancient times. The ripen fruits are used as a rich source of nutrients. The leaves are used to cooked vegetables and other food items. Plant has high antioxidant content which is very useful to treat the various diseases (N Jyothirmayi). Bio-products like fiber to make yarn, fabric, apparel as well as fertilizer, fish feed, bio-chemicals, paper, handicrafts, pickles, candy are manufactured from Banana (*Musa paradisiaca*) wastes. This present review paper highlights the major medicinal values of banana plant and usefulness of banana waste.

KEYWORDS: Banana plant, *Musa paradisiaca*, Medicinal uses, Fiber, Banana waste use.

1. INTRODUCTION

The banana plant referred to as a tree, is the largest herbaceous flowering plant. The banana plat is grown from rhizome called corn[1]. The ripe banana fruit has soft and delicate texture. It has chef life of 5-10 days after its removal from plant[2]. In developed countries 40– 50% of the annual agricultural produce is converted into value added commodities. However, in India it is less than 2% annually. India is the largest producer of banana in the world with a production of approximately 29725 thousand tons from an area of 803 thousand hectare[3]. The enormous Indian population also constitutes the potential consumers of processed foods[4]. However, this abundance of production is not fully utilized and about 25-30% of wastages occur at various stages of fruit handling and distribution[5]. Therefore, it is needless to say that food processing sector in general and fruit processing industry in particular is still
a sunrise area which holds tremendous potential both for revenue generation and for employment opportunity[6].

Fruits and vegetables are an important component of a healthy diet. Fruits like bananas 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. The present review focus on various uses of banana plant to mankind.

1.1 Banana plant

Synonym: Banana plants, Kanaha Beach, Maui

Classification of Banana plant: Banana belongs to plantae kingdom.

Kingdom: Plantae
Division: Angiosperms
Order: Zingiberales
Family: Musaceae
Genus: Musa

It is an herbaceous plant (up to 9 m long). Elongated oval deep-green (up to 365 cm in length and 61 cm in width with a robust tree like pseudo stem crown) with a prominent midrib, each plant produces a single inflorescence like drooping spike, and large bracts opening in succession, ovate, 15-20 cm long, concave, dark red in color and somewhat fleshy. There is a lot more to this humble fruit than meets the eye. This starch-rich fruit doubles as a meal many a time.

Banana is generally consumed as a dessert or cooked as vegetable or made into various confections. In addition to these uses of banana as a highly nourishing delicacy, banana fruits as well as various other parts of banana tree find diverse uses in medicine, fiber making, and religious rituals etc.

Different species of banana are kwon:

Musa sapientum,
Musa paradisiaca,
Musa acuminata, Musa balbisiana etc.
In traditional culture the banana leaf has use as an integral part of village life. Every village has a grove of banana plants and the leaves have been used extensively for cultural, spiritual, medicinal, and practical applications.

Aroma Spa Retreat uses banana leaves in our unique body wrap treatment, which combines the use of banana leaves and green tea clay to rehydrate and replenish your skin.

In addition to their value as food wrappers for cooking, banana leaves contain large amounts of polyphenols such as epigallocatechin gallate (EGCG), which is also found in green tea. EGCG belongs to the family of catechins; it has very strong antioxidant properties.

It is believed this protects our cells from oxidative damage from free radicals. Free radicals are produced by the stressors that our modern life puts on our bodies.

A number of chronic diseases have been associated with free radical damage, including cancer, arteriosclerosis, heart diseases, and accelerated aging. Banana plant and banana leaves are not only food for elephant and other animals but also are of incredible medicinal value for human being.

2. Medicinal uses of banana plant

2.1 Use of banana plant in digestive system and kidney health

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. It is used as a remedy of constipation in children. It forms the part of diets of children suffering from malnutrition.

The extract of core of the stem is considered to be useful in dissolving the stones in the kidney and urinary bladder and reducing the weight. The inflorescence mixed with coconut oil and spices is used for flushing the urinary blocks.

The fruit is believed to reduce the worm problems in the kids\(^{7,8}\).

2.2 Banana plant use in insect bite

Banana leaves also have medicinal properties that can relieve from poisonous insect bites, bee stings, spider bites, rashes, skin irritation. Banana leaves exhibited antibacterial properties\(^{9,10}\).
2.3 Importance of banana plant in skin health

They have many benefits for our health and beauty. It is used as traditional spa ingredients in Bali, which is very good for the skin. High anti-oxidants present in leaves are also known to prevent early aging signs such as wrinkled and dull skin. Many natural treatments include banana leaf body wrap treatments in their program. Banana leaves are high in polyphenols, a type of antioxidants.

2.4 Use of banana plant in Diabetes Mellitus

Diabetes mellitus is the most common metabolic disorder and is a major cause of ill health all over the world.

Treatment of hyperglycemia in diabetes involves diet control, exercise and the use of oral anti-diabetic drugs, insulin therapy or combination of both. In addition, studies have shown that some species of Musa possess antidiabetic

The beneficial effects on the regulation of glucose homeostasis observed for banana leaves and the presence of rutin as the major compound indicate potential anti-diabetic properties, since previous studies have been reported that rutin can modulate glucose homeostasis^{11,12,13,14}.

2.5 Anthelmintic activity

Aqueous extract as well as methanol extracts of banana leaves exhibited anthelmintic activity by inhibiting hatching of eggs of nematodes^{15,16}.

3. Nutritional value of banana fruit^{17}

One serving of banana is considered to be about 126 grams. One serving of banana contains 110 calories, 30 grams of carbohydrate and 1 gram of protein. Bananas are naturally free of fat, cholesterol, and sodium.

Table no: 1 Bananas provide a variety of vitamins and minerals.

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Content in One serving of banana (126 grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin B6</td>
<td>0.5 mg</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.3 mg</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>9 mg</td>
</tr>
<tr>
<td>Potassium</td>
<td>450 mg</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>3g</td>
</tr>
<tr>
<td>Protein - 1 g</td>
<td>1 g</td>
</tr>
<tr>
<td>Magnesium</td>
<td>34 mg</td>
</tr>
</tbody>
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4. Usefulness of Banana Waste

4.1 Fiber

Banana fiber is extensively used as blending material in textile industry in countries like Philippines, Malaysia, Japan and Korea. It can be easily blended with other fibers such as jute and mesta being natural fibers. Therefore, lots of industrial products like gunny bags, doormats, carpets, yarn, ropes, geo-textiles, trivialities, luggage carriers and interior decorative crafts paper, tissue paper, paper bag, etc. can be made from this fiber, where great strength is required.

The banana fiber can be extracted manually or by machine. Manual fiber extraction is a cumbersome process. In this process, pseudostem is initially cut into pieces of about 60cm length and 7.5cm width. Then the pseudostem is scraped and the fiber is separated by using scraper or a flat blunt blade.

4.4 Handicrafts

Various handicraft items are prepared using banana fiber. It includes various types of decorative wall hangings, bags, coaster, table mat, pillow, jajim, tosok, sofa sets, dolls, key chains, etc. Especially, women can be involved in this sector to improve their economic and social conditions[18,19].

4.2 Yarn

Rope making from extracted banana fiber is called Banana fiber yarn. Rope making is one of the most basic skills for converting any linear material into a usable stage. The process of fabric and apparel production from banana fiber is as usual as cotton textile. It is also possible to prepare synthetic and laminated fabric by mixing some other fiber like jute or cotton in special ratio[20,21].

4.3 Paper

Banana fiber can be an alternative raw material of paper industries like writing paper, anti grease paper, cheque paper as well as hard board industries[19,22,23] at first, raw paper materials are collected from banana plants and fibers are collected afterwards. The collected

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
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<tbody>
<tr>
<td>Folate</td>
<td>25.0 mcg</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>0.1 mg</td>
</tr>
<tr>
<td>Niacin</td>
<td>0.8 mg</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>81 IU</td>
</tr>
<tr>
<td>Iron</td>
<td>0.3 mg</td>
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fibers are soaked in water prior to make pulp. Later, the extracted fiber is bleached by microbial treatment using Trichoderma and Pythium for 3-5 days[24].

4.4 Microcrystalline cellulose (MCC)
MCC extracted from banana fiber can be made for industrial purpose. It is used in pharmaceutical industries. It has huge application not only in pharmaceuticals but also in bakery, beverages, animal health products, etc.

4.5 Scutcher based production Vermicompost
During fiber extraction from banana pseudostem, huge quantity of scutcher (about 30 to 35 t/ha) is generated. This scutcher is being converted to natural products like vermicompost by adding other essential components in order to value addition in proper way[25,26].

4.6 Market potential
The above review reveals the market potential of banana fiber and its products. Besides, the banana tree, except its fruit, is totally useless and it is considered as waste. The potentiality of banana fiber to partially replace the consumption of cotton and jute fiber in many countries has already been explored[18,19].

If it is possible to implement these techniques in India it would be possible to establish many industries only from banana tree waste like: textile industry (yarn, fabric, apparel, sharee, baby pampers, hygiene pad), paper mill: writing paper, tissue paper, paper bag, paper made products (cards, notebooks, table calendar, paper box etc.), biofertilizer industry (vermicompost, nutrient spray), fish feed industry, dyeing industry, pharmaceuticals, food processing industry (candy, pickles, soft drinks), handicrafts and bed requirements.[23,26,27,28]

4.7 Environmental and Social Impact
Banana fiber could play a vital role in emerging bio-economy. Currently, millions of tones of banana pseudostem are dumped as waste and most of the farmers are facing huge problems in disposing the accumulated banana pseudostem. Therefore, an effective and economic means of reducing the environmental problem by extraction of fiber from pseudostem and production of valuable bio-products from it is crucial[22].

4.8 Employment
Pseudostem based domestic industry could overcome unemployment problems to some extent. It will enhance the interest to the self help group and entrepreneurs.
CONCLUSIONS
Banana fruit ripe as well as unripen is eatable but other parts like leaves, stem flowers, have medicinal value. It is highly nutritious provide great energy. Apart from its health benefits, banana waste is also utilized to make varieties of fibers. The products manufacture from banana waste such as paper handicrafts, cards, notebooks, will survive in market competition. The products from banana fiber or other parts have lots of importance to farmers as well as small entrepreneurs and specially women who wants to start business at home to prepare products like candy, pickle, drink and so many other product, it will definitely improve family income. All varieties of banana can be used for the fiber extraction purpose. Banana fibers are completely biodegradable, recyclable and are more environment friendly than synthetic fibers both in terms of production and their disposal. Therefore; the banana products have export potential. Banana pseudo stem waste provides natural ventilation in soil. Banana vermicompost can be the replacement of the chemical which ensures soil health. It also help to reduce global warming to some extent, It seems that this information will be of immense help to the farmers, entrepreneurs, planners, scientists to take proper initiatives for the betterment of nation.

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