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# Phytochemical Analysis and Nutritional Composition of Musa Balbisiana

## Introduction to Musa Species

Musa species is generally known as banana and plantain, or the sweet or desert banana it is a popular known fruit in the world with a sweet taste and creamy flesh, Musa species is a green plant with about 12- 25 feet except from the dwarf Cavendish which is 10 feet tall. Musa species are grown in tropical regions where soils are always wet and moist. Musa species plant can be affected by lot of factors such as temperature, drought. Musa species plant get to its maturity stage at range of 10-15month to produce their fruit, and there trees is a monocotyledon with a stem consisting a leaf sheaths and underground true stem that is able to produce sucker for the vegetative reproduction of the plant (Inibap 2000).

Which are severally used for food, and other times used as fibers. Musa species can be cooked, fried or eaten raw. Musa species is very abundant in the market to the extent that both the riches and the average earning income people can afford to buy it. Also it is very rich in nutrient and the more they grow to their maturity stages the more the biochemical composition in the fruits (Emagaet al., 2008). No part of the species fruits is a waste, all part of it can be used as medicine to promote healings. Musa species is very abundant in potassium and are prescribed to a patient that has potassium deficiency which helps patient in electrolyte balance and normal flow of fluid in the body.

It is advisable to take banana if not daily at least thrice a week because of its phytochemical activities present in it which helps to reduce human stress, kidney malfunction, constipation, diarrhea and lots of human disease. Banana has carotenoids which is a good source for the protection of chronic disease. Musa species waste which is the peel is not advisable to be dump anyhow because of its effect on human, it is very dangerous if human steps on it which can slip a human to fall. But it is a benefit to animal as source of food and it contain nutrient for the animal or livestock which contain carbohydrate, polyphenol. It can also be used industrially for the production of bio-fuel, paper, organic fertilizer or biotechnology related process (Morton, 1987).

## Classification Based on Taxonomy

The genus of Musa is derived from Arabic name of the plant Mouz which was used to Honor a physician named Octavius Augustus who was the first Rome emperor. And the name banana

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was also derived from the Arabians which means “finger” this was how the name was accepted by the world. Several people have been proposing the grouping of the species. Chessman 1947 proposed the grouping into four sections based on morphological characteristics which was later cancelled because of Callimusa ideals that proposed using chromosome number for the identification of the species. Later on a group of people came together on the advisory of the species by the international network for banana and plantain in the year 2006 for the review of taxonomy and nomenclature status of the species (Wong, 2001, Ploetz et al. 2007).

## Factors that Affect the Growth of Musa Species

Banana and plantain plants are susceptible to a wide range of factors which affect their growth. Some pests and diseases are highly aggressive, very contagious and easily spread. Once they attack the plant they are practically difficult to eradicate (Robinson, 1996; Nelson et al., 2006). These challenges can dramatically reduce the yield and have a deep impact on food availability and economical balance in many developing countries (Teycheney et al., 2007; Heslop - Harrison and Schwarzacher, 2007).

### Biotic Factors

These are living organisms that affect the growth of plantain and banana if it's been affected. These factors give rise to poor growth of the plant which can also lead to the death of the plant. Such factors are:

- Pest effect
- Fungal effect
- Bacterial effect

### Pest Effect

Banana and plantain have several and various pests. These parasites are sometimes sap feeding insects, root knot nematodes and others. They have wide host ranges and may cause a significant damage to crops (Nelson et al., 2006).

The most important insect pests affecting the banana and plantain production are the Banana aphid (*Pentalonia nigronervosa*), Banana weevil (*Cosmopolites sordidus*), Hawaiian flower thrips (*Thrips hawaiiensis*), and sugarcane bud moth (*Decadarchis flavistriata*). Banana aphid has a major pest status because it is a vector of the banana bunchy top virus (Lassoudière, 2007).

The nematodes are other parasites of Musa plants. They are three major species of nematodes;

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the Root knot Nematode (*Meloidogyne* spp.), Reniform Nematode (*Rotylenchulus reniformis*)

and Burrowing Nematode (*Radopholus similis*) which are economically important pests of Banana. However, the burrowing nematode *Radopholus similis* is the worldwide nematode of banana (Nelson et al., 2006). These microscopic roundworms attack the root systems of the plant and impair water and nutrient uptake. In extreme infection, root systems are so weakened that the banana plant cannot support the heavily bunch. In the period of the high wind these infected plants are uprooted (Lassoudière, 2007).

## **Fungi Effect**

The Fungal diseases are the main diseases in the banana and plantain plantations. Panama disease or Fusarium wilt, caused by *Fusarium oxysporum* f. sp. *cubense* has devastated the Banana production. It is widely regarded as one of the most destructive plant diseases (Moore et al., 1995; Heslop - Harrison and Schwarzacher, 2007). When Fusarium wilt is established in an area, it cannot be controlled chemically by fungicides, soil fumigants or by cultural practices. The only long term option for continuing a Banana production is a replacement of susceptible varieties with resistant varieties (Hwang and Ko, 2004).

Black sigatoka leaf spot or black leaf streak disease (BLSD) caused by *Mycosphaerella fijiensis* is another fungal disease that has been serious in recent years (Lassoudière, 2007). Its infection commonly leads to 50% crop losses and its control requires environmentally undesirable and expensive fungicides (Heslop - Harrison and Schwarzacher, 2007). Anthracnose caused by *Colletitricum musae*, is postharvest disease of banana that often causes extensive losses. This disease is characterized by sunken brown-black lesions which develop on the banana peel and these lesions lower the quality of the fruit (Alvindhia et al., 2000; Muirhead and Jones, 2000).

## **Bacterial Effect**

Most bacterial diseases of banana and plantain crops can be grouped into two categories; vascular infections caused by *Pseudomonas solanacearum* and related organisms and diseases caused by *Erwinia* species. Among these diseases they are banana bacterial wilt, Blood disease, Rhizome rot, Bugtok, Fingertip rot and Javanese vascular wilt (Jeger et al., 1995).

The Banana bacterial wilt disease (BBW) is caused by *Xanthomonas campestris* pv. *Musacearum*. All banana cultivars in affected areas are susceptible to BBW and the disease is rapidly spread (Heslop - Harrison and Schwarzacher, 2007). It has been found that the BBW is a very destructive disease with an incidence of 70 - 80 % in many plantations and the yield

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losses of 90 % have been reported on some farms (Agrios, 2005).

## **Abiotic Factors**

These are nonliving things that affect the growth of plant and can also lead to the destruction of plant. This deal with the environmental changes and the variability of the soil structure which are (temperature, light, wind, humidity, water supply) (Jeger et al., 1995).

### **Effect of Temperature**

It was proved that temperature changes have two main effects on banana and plantain plants. They affect various physiological processes in the plant and can cause irreversible damages of Tissues and cells when the plants have undergone a long exposure to low or high temperatures (Turner, 1995).

The Banana plant is very sensitive to water deficiency and this is reflected by reduced Greenness of foliage. When the deficiency becomes severe, all the leaves fall prematurely and the pseudo-stem tissue collapses (Stover and Simmonds, 1987). Water deficit severely affects the plant growth and yield, because it deeply reduces the photosynthesis capacity of the Banana plants (Lassoudière, 2007).

### **Effect of Light**

The Photoperiod and the quality of light influence the developmental processes of plants. The leaves use an absorbed light to fix carbon dioxide which in combination with water and mineral nutrient from the soil, plants form the dry matters that are partitioned amongst their different organs (Turner, 1995).

### **Effect of Wind**

The severe winds are common in the major banana growing areas of the world and it was estimated to be a source of yield decrease in the banana production regions. The structure of The Banana plant with large leaves, a heavy bunch of fruit and a shallow root system is Vulnerable to destruction by moderate and high winds. Wind is also responsible for the Exchange of energy, gases and water vapor between the leaves in the canopy and the Atmosphere immediately above the crop. It has therefore, both mechanical and physiological effects on the plants (Turner, 1995).

## **Medicinal Information of Musa Species**

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In the study of Musa species, research look into the medicinal usage of plantain and banana as a source of health treatment and prevention of body disorder. And they came up with several medicinal usage of plantain and banana.( Kumar 2012) . Which helps to?

Banana is one of the best source of potassium which help the in the maintenance of normal blood pressure and heart function. Several researches has been carried out, a medium size of banana contain 350mg of potassium which help body control normal fluid and electrolyte in balance the cells. The study shows that natural compound in banana act as anti-hypertensive drugs and that blood pressure fell by 10% in people who ate two bananas daily for a week ( Kumar 2012).

## **Reduce Risk of Stroke**

The study of banana as a cure of stroke is still on research by scientist but it is been noted that the intake of banana serve as prevention for stroke because of the potassium level in banana which helps in the smooth blood flow and helps in the well function of the heart ( Kumar 2012).

Study shows how banana helps to neutralize the acidity in the stomach which helps in the prevent heart burn and have antacid effect which helps in the prevention of ulcer. The flavonoid in the banana, leucocyanidin, has been found to significantly help increase the thickness of the mucous membrane layer of the stomach.

## **Energy Booster**

Banana contains three (3) types of sugar and fiber which helps in the instant gain of energy which are the sucrose, fructose, glucose. and the help of potassium which helps the muscle not to cramping up. Study shows that just two banana help to provides energy for 90 minute work-out.

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