

Quantification of Seroconversion from the Growth Period of Banana by an Interdisciplinary Study

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Abstract: The author aims to explore the quantitative relationship between the growth period and the serotonin content curve of bananas and the influence of influencing factors on serotonin content and practical improvement measures. It was concluded that serotonin content decreases sequentially from green and yellow peel to the appearance of anthracnose in bananas. This idea could provide ideas for serotonin research from a horticultural perspective and could be further explored in the laboratory.

Keywords: Serotonin; Growth Period; Descriptive Statistics.

1. Background and Purpose of the Study

The analysis of these foods in modern research shows that bananas can help the human body to produce happy hormones, reduce psychological stress and relieve depression, because bananas contain a substance that can promote the production of pentothalamine in the human brain, making the mood peaceful and happy, and even reduce pain. The potassium in bananas can maintain the balance of electrolytes and acid-base metabolism in the body, and keep the neuromuscular excitability in the normal state. Coordinating the contraction and diastole function of heart muscle is a good medicine to lower blood pressure, prevent muscle spasm and protect blood vessels. Bananas contain a large amount of magnesium, which happens to be effective in eliminating fatigue and relieving tension. [1]

5-Hydroxytryptophan (5-HTP) is a tryptophan derivative that is catalyzed by tryptophan hydroxylase, which substitutes the hydrogen atom at the 5' position on the phenyl ring of tryptophan with a hydroxyl group. In mammals, 5-HTP can be decarboxylated to 5-hydroxytryptamine (5-HT), also known as serotonin, which is involved in the regulation of mood, cognition, learning, memory, sleep, and other physiological processes. 5-HT can be further converted to melatonin (MT), a hormone released by the pineal gland that has a sleep-regulating effect. 5-HTP is an important precursor of 5-HT and MT, and has important roles in antidepressant, weight loss, insomnia and headache treatment. However, excessive intake of 5-HTP may lead to serotonin syndrome with certain side effects such as restlessness, confusion, tachycardia, sweating and blood pressure fluctuations. [3]

Therefore, the study of how to keep human serum stable from time to time is an essential subject for every individual. The author aims to determine the maximum rate of serum intake in conjunction with the agricultural period and the degree of banana growth period.

2. Research Methods

Cross-sectional research method, literature collection method, Research process.

In mammals, 5-HTP is decarboxylated into 5-hydroxytryptamine (5-HT), also known as serotonin, which is

involved in the regulation of mood, cognition, learning, memory, sleep, and other physiological processes. [2] It is carried out during the growth period.



Fig 1. Graphical variation of banana growth period

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This component was expressed in banana roots, stems, leaves, flowers and fruits, but the expression was higher in flowers and fruits, and the expression was elevated in late fruit ripening, consistent with the change of starch phosphorylase activity and negatively correlated with the change of starch content, suggesting that this gene may be involved in catabolism during banana fruit ripening, but not in fruit ripening initiation.

It can be done by physical measures during the growth period of banana. The crop is made to thrive with a good serotonin capacity.

The growth of bananas can be divided into two phases: the growing phase and the dormant phase. The growing period lasts approximately 280 days and covers the period from seed

germination to fruit ripening. During this period, the banana grows faster, the number of leaves increases and the fruit starts to grow and develop. During the growth period, the serotonin content of the banana peel varies with the growth stage.

The growing period is from 21 leaves to 29 leaves. The growing period of banana is about 150 days long.

2.1. Fertilization

It is important to fertilize the banana tree during the growing period by opening a semi-arc-shaped fertilizer trench, 1.5 m long, 10 cm wide and 8-10 cm deep, on the east and west sides of the banana tree, under the longest leaf and 10 cm retracted. Urea and potassium chloride were used as fertilizers. The two fertilizers were mixed and spread evenly in the fertilizer trench. The ratio of urea to potassium chloride was 1:2. 50 grams of urea and 100 grams of potassium chloride were applied to each plant. Finally, just return the soil and fill the fertilizer in the soil layer. After 20-30 days, use the same method to fertilize the plant again with the same method of trenching and the same fertilizer and amount of fertilizer under the longest leaves on the north and south sides of the plant, and then retract 10 cm. To meet the fertilizer needs of banana trees during the growing period.

2.2. Flooding

When we enter the growing period, we should pay attention to the dryness and humidity of the soil in the banana plantation and turn on the irrigation system when needed to irrigate the whole plantation once. The principle is to irrigate thoroughly. Banana is a warm and water-loving crop, the water content in the field should not be less than 25%. Sufficient water is needed to meet the needs of the root system and leaves.

2.3. Weed Control

Weeds still have more room to grow, so we need to weed in time to ensure the fertility to supply the growth of plants.

2.4. Prevention and Treatment of Pests and Diseases

During the growth period of banana, the main diseases that are prone to occur are banana bunchy top disease and leaf spot disease. We will introduce the bunchy top disease and its control methods first.

2.4.1. Bunchy Top Disease

The pathogen of bunchy top disease is bunchy top virus. It comes from virulent seedlings in banana production. The virus can be transmitted by banana seedlings and banana aphids. Once the diseased plant is found, it cannot be controlled.

Disease symptoms: Newly emerged leaves are shorter and narrower than one another, the plant is dwarfed, and the leaves are stiff and grow together in bundles. The old leaves of the diseased plant are yellow in color, and the leaves are hard and brittle, easily broken. Some of the leaves turn from green to yellowish and obviously crinkled. Most of the root's rot or turn purple-black and no new roots develop. Generally, cannot draw buds.

Prevention and treatment methods: once the disease plant is found to immediately dig out, and the lower part of the ground to dig the bulb clean, preferably burned to reduce the source of infection. Then apply lime disinfection in the cavity of the diseased plant to control virus transmission. Select land

in reasonable rotation, preferably with rice water and dry crop rotation. Fertilizer management, increase the application of phosphorus and potassium fertilizer. Then use 40% leuconazole to spray to destroy the cross-veined aphid in the banana plantation.

2.4.2. Leaf Spot Disease

The incidence of banana leaf spot disease is 40%-100%, which is harmful to the leaves in the growing period and bud differentiation period. The pathogen is banana tail-holding fungus, infected leaves by wind transmission, the disease is mostly born in the front of the leaf, fusiform, light yellow. High temperature and rainy season, in the low-lying wet plots are most likely to attack.

Symptoms of damage: Banana leaf spot disease is a most common disease; every banana plantation is prone to occur. When a large number of spots appear, the leaves decline rapidly and die partially or completely early.

Prevention and treatment: Leaf spot disease is very difficult to control, and to achieve good results, integrated control must be carried out from the cultivation period. First, make sure the banana plantation is drained quickly and not densely planted when constructing the banana garden to ensure air circulation. Second, cut off diseased and dead leaves with sickle in time. Try to remove all diseased leaves in the dry season so that the plantation will be clean when the rainy season comes. Third, in between sunny days and rainy days, carry out spraying to control the disease by choosing 1500 times of propiconazole or 1200 times of 20% triadimefon emulsion for spraying the whole garden. Spray once every 10 days, 3 times in a row.

2.5. Remove Buds

In the late stage of growth period, some mother plants with good growth and strong stems grow the first way of suckering buds. These suckers should be removed. Just cut the roots from the roots with a sprout remover. The sucking buds that are too close to the mother plant are closely related to the mother plant and affect the normal flower bud differentiation and buds of the mother plant.

2.6. For the Reuse of Banana Peels

In practical terms, banana peels can be crushed into crumbs for reuse. Banana peel pomace is a health resource.

(1) Crushing. Banana peel is initially screened. During the crushing process, the crushed banana peel is added to the right amount of beverage to achieve the best condition and the nutritional value is enhanced by stirring and soaking.

(2) Microbial fermentation is used to extract the active ingredients from the raw material residues. The proportion of banana deep processing and related chemical products in the domestic market is increasing year by year. Due to China's large population, high labour costs and seasonal production, resulting in a large number of fruit and vegetable resources are not effectively treated and cause serious waste and the factors that make environmental pollution increasingly serious.

3. Research Results

Banana has the most 5-hydroxy acid content when it is greenish-yellow. The content of 5-hydroxy acid decreases when the banana is golden yellow. When the banana peel was black, it was due to the anthracnose produced by the banana and the 5-hydroxy acid could not be used effectively.

There was a significant non-linear relationship between the skin serotonin content at different stages of the growth period of banana.

In conclusion, the quantitative study of banana peel serotonin during the growth period of banana has provided us with a new way of thinking and method to help us better understand the growth status and hormonal effects of the plant. In the future, with further research, we hope to further explore the role of banana peel serotonin in plant growth, stress response and plant protection.

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