

Tissue Culture Techniques of Banana

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Abstract

The objective of this paper is to decide the folklore contrasts by especially applying arrangement of two procedures for the proliferation of banana plant for ordinary and tissue culture strategies so being the fitting strategy, for their engendering we taken with arrangement of investigations to be applied. By the utilization of various synthetics and cycles the strategy gave many variables of development in the examinations done on banana plant.

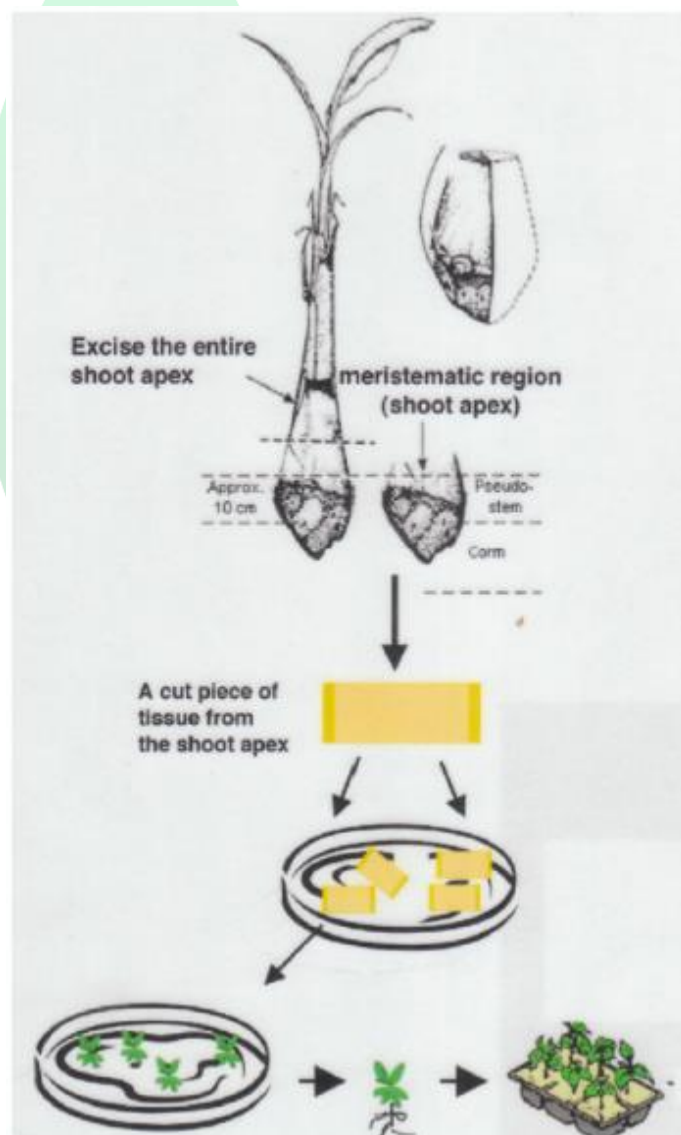
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Introduction

Banana is the oldest and most common fruit known to the mankind. It is one of the important fruit, and constitutes second largest fruit industry in India. It is nutritious palatable and easily digestible fruit. It is available throughout the year. Banana is rich source of carbohydrates, minerals such as calcium, potassium, Mg, Na and phosphorous. Other than fresh fruits, it can be consumed as processed in various forms like chips, powder, flakes, *etc.* Banana pseudostem is chopped and used as cattle feed. Also, the leaves are used as plate. The botanical names of banana are *Musa cavendish* and *Musa paradisiaca*, which belongs to the family Musaceae. The clonal propagation of horticulture important plants was initiated way before the clonal propagation of fruit crops. The tissue culture of banana propagation has gained popularity because of its several advantages over conventional methods which are discussed later in this article.

Plant tissue culture is culturing of any part of plant specifically under some sterile or aseptic conditions so as laboratory methods are used. The methods taken so far depends on the plant sample to be propagated as naturally or at laboratory level, with specific type of salts and chemicals taken in consent to be used regarding the methods.

Different techniques are established to propagate bananas in a lab environment, including the shoot and meristem culture, callus culture, somatic embryogenesis, cell suspension, and protoplast cultures includes the step-by-step procedure of tissue culture of banana propagation and its advantages and disadvantages.



Procedures of Tissue Culture Propagation of Banana

- Select a suitable sucker for the experiment and excise it to obtain 4 inches of inner pseudostem, exposing banana meristem. Check the plants for any diseases.
- Wash the obtained pseudostem under running water.
- Immerse the pseudostem in bleach containing 5.25% NaOCl for 30-45 minutes.
- Drain the bleach and place the pseudostem in a different sterilized container.
- Peel off the leaf sheath and trim the pseudostem to the size 1 mm × 1 mm with thin corm tissue.
- Again, cut the shoot tip into quarters and transfer them into the culture medium.
- Keep the cultures for the 16-hour photoperiod.
- Keep an eye on the contamination of the cultures and observe the growth of the tissue.
- Subculture the shoot tips when the growing shoot is almost 2 cm tall.
- Subculture the tissue (in the sterile conditions) in half strength of MS media supplemented with 5mg/L BAP and 100ml/L coconut water.
- Repeat the procedure of subculturing for 5 cycles.
- Count the number of grown shoots.
- Separate individual shoots from the clusters and transfer them to a rooting medium.
- Incubate the cultures for 3-4 weeks to form the root.
- When you observe the cultured plants with broad, expanded leaves and well-grown roots, you can transfer the plantlets to the soil.



Figure: Different stages of banana tissue culture.

Advantages of Tissue Culture Propagation of Banana

The tissue culture propagation of the banana caters many benefits to the cultivars, some of which are mentioned below.

- The plant can be exactly cloned like its mother plant without any variations.
- The plants grown from tissue culture method can be grown disease free in large numbers and it can help farmers to get disease-free seedlings.
- It can be grown throughout the year. So, getting a sample of banana tissue will not be a problem for tissue culture practices.
- The uniform maturity of the banana fruits makes the harvesting process easy and reduces the labour cost.
- The unique feature of tissue culture propagation of bananas is the maturity of the crop earlier in the season.
- High profit because of the high benefit to cost ratio.
- 95% to 98% of the plant bear fruit bunches.

Disadvantages of Tissue Culture Propagation of Banana

The understanding of the disadvantages of banana propagation is as important as understanding its advantages to help you to make the right decision for your propagation. So, below are a few points on the disadvantages of banana tissue culture.

- The tissue culture experiment is expensive because of the costly equipment and reagents used in the experiments.
- The procedure is complex.
- The experiment or procedure of culturing is required to be performed by an expert or highly trained person.
- The genetic diversity and variability is reduced because of the genetic similarity of the crop.
- If a plant is susceptible to disease, all of the plants of this cloned stock will share this undesirable trait and be susceptible to that particular disease.
- Large-scale production of banana propagation is very expensive.

- The culturing procedure of the plant differs from species to species. So, to establish a culture of a new species, several experiments and trial and error methods will be required.
- Precautions are required to protect the culture from any kind of contamination, which takes a lot of effort.
- If any sample of the plant is infected, it will produce all infected progenies. So, a careful examination of the stock is required to avoid culturing the infected plants.

The tissue culture propagation of bananas is a popular tissue culture practice. It has the potential to help the framers to get disease-free seedlings and grow several plants by this method. However, the expensive procedure and risk of contamination always create a dilemma for the cultivators. So, the area opens a door of research opportunity for young scientists to develop techniques that can help to overcome the drawback of the methods.

Conclusion

It is so concluded that banana can be grown *in vitro* as well as *in vivo* in case to get some potential, banana are so far most consuming product through the globe so its importance has given rise to the alternative methods of propagation that is so called micro propagation. the give bolster to the banana production to peak of its best quality round the world and will available round the year to all country or even non producing countries as well just by using the conventional method of propagation.

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