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# Isolation, Identification, Pathogenicity, Symptomology, Cultural and Morphological Studies of *Colletotrichum gloeosporioides* of Dragon Fruit

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Dragon fruit (*Hylocereus spp.*) is an emerging high-value fruit crop cultivated widely in tropical and subtropical regions. However, its productivity and fruit quality are significantly affected by fungal diseases, among which anthracnose caused by *Colletotrichum gloeosporioides* is one of the most destructive. The pathogen infects stems, flowers and fruits, causing severe economic losses during both pre-harvest and post-harvest stages. This article describes the isolation, identification, pathogenicity testing, symptomology and cultural and morphological characteristics of *C. gloeosporioides* associated with dragon fruit anthracnose. Understanding these characteristics is essential for accurate diagnosis and effective disease management strategies.

**Keywords:** Dragon fruit, Anthracnose, *Colletotrichum gloeosporioides*, Isolation, Morphology

## Introduction

- Dragon fruit (*Hylocereus spp.*), commonly known as pitaya, is gaining popularity due to its nutritional value, attractive appearance and high market demand. In recent years, dragon fruit cultivation has expanded rapidly in several parts of India, including Gujarat, Maharashtra, Karnataka and West Bengal.
- Despite its increasing cultivation, dragon fruit production is constrained by several diseases, among which anthracnose is considered one of the most serious fungal diseases. The disease is mainly caused by *Colletotrichum gloeosporioides*, a widespread pathogen capable of infecting many horticultural crops.
- The pathogen causes lesions on stems and fruits, leading to fruit rot, reduced yield and poor market quality. Therefore, isolation and characterization of the pathogen are essential for understanding the disease and developing effective control measures.

## Isolation of the Pathogen

- Isolation of *Colletotrichum gloeosporioides* from infected dragon fruit tissues is carried out under laboratory conditions.
- Diseased stem or fruit samples showing typical anthracnose lesions are collected from infected plants. The samples are washed thoroughly under running tap water to remove dust and contaminants.
- Small pieces of infected tissue from the advancing margin of the lesion are cut using a sterile blade. These tissue pieces are surface sterilized in **1% sodium hypochlorite solution for 30–60 seconds** and then rinsed three times with sterile distilled water.

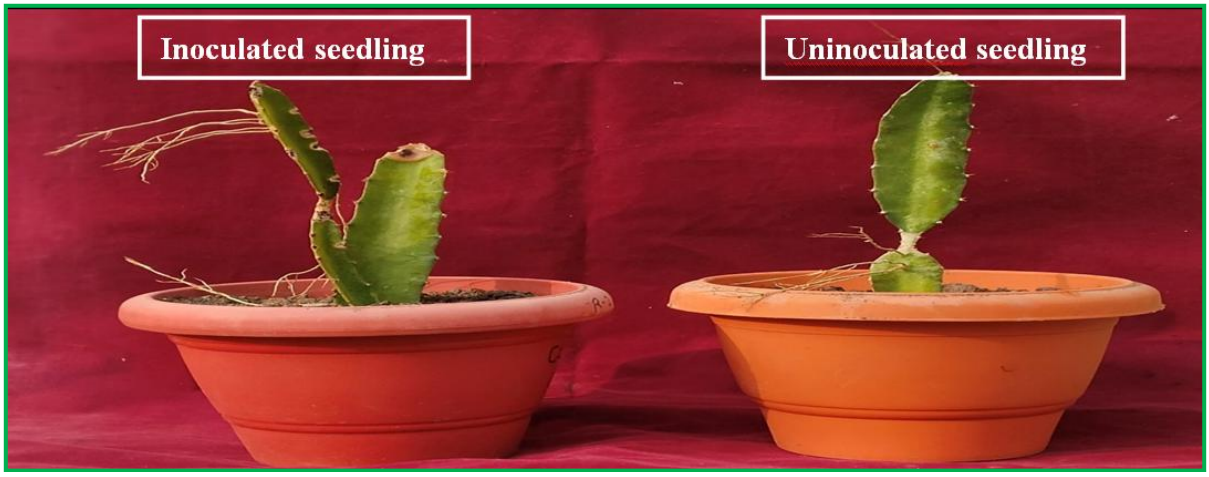
- The sterilized tissues are dried on sterile filter paper and placed on **Potato Dextrose Agar (PDA)** medium in Petri plates. The plates are incubated at **25–28°C** for 5–7 days.
- Fungal colonies emerging from the infected tissues are transferred to fresh PDA plates to obtain pure cultures of the pathogen.

## Identification of the Pathogen

- Identification of *C. gloeosporioides* is based on **colony characteristics and microscopic observations**.
- On PDA medium, the fungal colony initially appears **white to grey**, gradually turning **dark grey or black** as it matures. The pathogen produces **acervuli**, which are small fruiting bodies containing numerous spores.
- Microscopic examination of the fungal structures helps confirm the identity of the pathogen. In advanced studies, molecular techniques such as **PCR-based identification** may also be used for accurate confirmation of the species.

## Pathogenicity Test

- The pathogenicity test is conducted to confirm that the isolated fungus is responsible for causing anthracnose disease in dragon fruit.
- Healthy dragon fruits or stem segments are first surface sterilized using 70% alcohol or sodium hypochlorite solution. A small wound is made on the fruit surface using a sterile needle.
- A suspension of fungal spores obtained from the pure culture is inoculated onto the wounded area. The inoculated samples are then kept in a moist chamber to maintain high humidity.
- After a few days, **typical anthracnose lesions** appear on the inoculated tissues. The pathogen is then re-isolated from the infected tissues and compared with the original culture to confirm Koch's postulates.



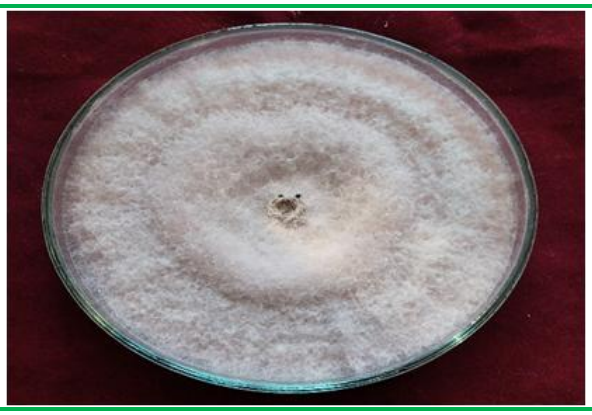

## Symptomology

- Anthracnose symptoms caused by *C. gloeosporioides* in dragon fruit appear on stems, flowers and fruits.
- Dragon fruit stem samples infected with anthracnose disease exhibited characteristic symptoms, including reddish-brown lesions with chlorotic halos on the stem. These lesions developed brown centers, which later transformed into mature necrotic patches containing prominent black acervuli, the fruiting bodies of the pathogen, reported by Masyahit *et al*. (2009) and Vijaya *et al*. (2015).

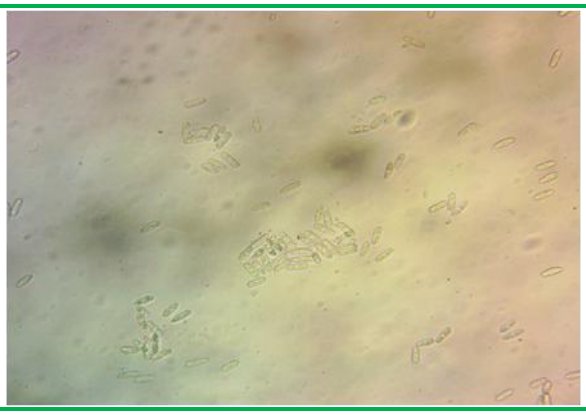
## Cultural and Morphological Characteristics

- The grown-up fungal colony shows initially profuse cottony white aerial mycelium which gradually turn creamy white and attained a growth of 90 mm in 9 to 10 days of incubation at 28 ± 1°C. On back side of Petri plate reddish-brown pigmentation observed.

- The fungus produces hyaline, one- celled, ovoid to oblong, slightly curved or dumbbell shaped conidia, 10-15 µm (average) up to 20 µm in length and 5-7 µm in width. The waxy acervuli produced in infected tissues are subepidermal, typically with setaeand simple, short, erect conidiophores. Globus oil body is produced by *C. gloeosporioides*. Keuete Kamdoum *et al*. (2016).



**Fungal colony showing profuse cottony white growth**



**Photomicrograph of *C. gloeosporioides* spore (A), Globus oil body(B)**

## Conclusion

Anthracnose caused by *Colletotrichum gloeosporioides* is an important disease affecting dragon fruit cultivation. Isolation, identification, pathogenicity testing and cultural and morphological characterization of the pathogen are essential for confirming the causal organism and understanding its biology. Knowledge obtained from these studies helps researchers develop effective disease management strategies and ensures sustainable production of dragon fruit.

## References

1. Masyahit, M. (2009). The first report of the occurrence of anthracnose disease caused by *Colletotrichum gloeosporioides* Penz. and Sacc. on dragon fruit (*Hylocereus* spp.) in Peninsular Malaysia. *American Journal of Applied Sciences*, 6(5): 902-912.
2. Vijaya, S. I., Anuar, I. S. M. and Zakaria, L. (2015). Characterization and pathogenicity of *Colletotrichum truncatum* causing stem anthracnose of red-fleshed dragon fruit (*Hylocereus polyrhizus*) in Malaysia. *Journal of Phytopathology*, 163(1): 67-71.
3. Keuete Kamdoum, E., Tsopmbeng Noumbo, G. R. And Kuiate, J. R. (2016). Cultural and morphological variations of *Colletotrichum* spp. associated with anthracnose of various fruits in Cameroon. *International Journal of Environment, Agriculture and Biotechnology*, 1(4): 238622