

RESEARCH ARTICLE

Effect of different culture media on growth characteristics of *Cercospora beticola* sacc, causing cercospora leaf spot of beetroot

■ Kandhi Mounika and Abhilasha A. Lal

SUMMARY

Beetroot (*Beta vulgaris* L.) is a versatile crop; it can be grown in any season. It is also known as table beet, garden beet, and sugar beet. Beetroot crop is affected by number of fungal diseases. Cercospora leaf spot is the most devastating foliar disease caused by *Cercospora beticola*. Fungi grow on diverse habitat; it requires different specific elements for their growth and development in *in vitro*. In the present investigation three different culture media viz., Beetroot leaf extract agar media, Richards's agar media, and Potato dextrose agar media were tested against cercospora beticola to evaluate the effect of different culture media on growth characters of *Cercospora beticola*. The fungi showed difference in growth development when grown on different cultural media. Results obtained that the best fungal growth was observed in Richard's agar media and the minimum growth was observed in potato dextrose agar media.

Key Words : Beetroot, Cercospora, *In vitro*, Media, Growth, Cultural

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Beetroot is one of the major root vegetable, belongs to the family chenopodiaceae. It is also called as table beet, sugar beet, and garden beet. It produces green tops and swollen roots both used as a vegetable. Red color of beetroot roots is due to the presence of betanine pigment. It produces about 12-14% sugar extraction during recovery process. Beetroot is a versatile crop and it is grown as a cool season annual crop.

Cercospora leaf spot caused by *Cercospora beticola* is the most devastating foliar disease in beetroot. Its main effect is on leaves. The typical symptoms appear as circular to oval shaped, purple to brown border. Due to *Cercospora* leaf spot disease, the photosynthetic process is disturbed and leaves become deformed, resulting in weakened plants, premature defoliation which ultimately lowers the yield and market value. Losses due to *Cercospora* leaf spot have gone as high as a 42 per cent reduction in gross sugar and a 32 per cent reduction in root weight (Shane and Teng, 1992). The pathogen is also able to survive for at least one year in plant debris and soil. Primarily their spores are dispersed by wind and is favored by prolonged rainfall, high relative humidity and temperature up to 25°C to 35°C.

As the living beings, fungi also secure food from their substrate on which they live for their growth and development. All the fungi do not grow on every media, some fungi require specific media in order to culture the fungus in laboratory. So it is necessary to provide essential compounds in the medium for their life process. The fungus shows variation when grown in different nutrient media. Colony characters and pigmentation were different depending upon the each specific nutrient media. In the present study an attempt has been made to evaluate growth characters of *Cercospora beticola* in three different specific nutrient media viz., Beetroot leaf extract agar media, Richard's agar media and potato dextrose agar media were used in this study.

MATERIAL AND METHODS

Isolation of fungus:

Beetroot leaves infected with *Cercospora* leaf spot were collected and identified from the field and isolated using standard tissue isolation technique in aseptic condition. The infected leaves were cut into small bits and surface sterilized with sodium hypochlorite for 2 minutes and then repeatedly washed in distilled water. Then the infected leaf bits were transferred onto the petri plate containing Beetroot leaf extract agar media with help of a sterile forceps, under the flame and incubated at a temperature of 27°C until the fungal growth is observed.

Preparation of media:

Three different culture media were prepared to study the growth characters of *Cercospora beticola* such as Beetroot leaf extract agar media, Potato dextrose agar

media, and Richards's agar media. Media were sterilized in autoclave at a temperature of 121°C, 15 lb pressure for 15 minutes. To study the growth characters, 20 ml of each medium was poured into the petri plate and inoculated with 5mm mycelial disc. Then the petri plates were incubated at a temperature of 25°C. Observations recorded are colony characters (Colony diameter, Texture, surface color, growth).

Observations were recorded when fungus covered the complete petriplate. The colony surface color, texture, growth of margins was recorded. The mycelial discs measuring 5mm was taken from culture plates and inoculated in potato dextrose agar media, Richards's agar media and beetroot leaf extract agar media and the mean colony diameter was calculated.

RESULTS AND DISCUSSION

Results revealed that the growth of *Cercospora beticola* differed on different media. The highest radial growth was observed in Richards's agar media with good mycelial growth and greyish white coloured colony, followed by Beetroot leaf extract agar media with moderate mycelial growth and ash coloured colonies. The fungus grown in Potato dextrose agar has very less growth compared to other media with white to ash coloured colonies (Table 1).

Table 1 : Studies of cultural characteristics of *Cercospora beticola* on different growth media

Medium	Texture
Beetroot leaf extract agar media	Good mycelial growth with raised margin and ash coloured colonies
Richards agar media	Good mycelial growth with smooth margin and greyish white coloured colonies
Potato dextrose agar	Moderate mycelial growth with smooth margins and white to ash coloured colonies

All fungi do not have a specific media for their life processes; all media are not equally good for growth of the fungi. So, it is necessary to provide essential compounds in the medium for their growth. The different media were used to observe the growth characters of the pathogen. Similar findings have been reported by Khare *et al.* (2014); Poornima and Yashoda (2014) and Vijata and Sahera (2017).

Growth of *Cercospora beticola* on three different solid media:

The growth of *Cercospora beticola* has been observed in three different media to find the best suitable

media. Results revealed that the colony diameter has been recorded maximum with Richards's agar media (65.77 mm) compared to beetroot leaf extract agar media (51.41 mm) and potato dextrose agar media (40.54 mm) (Table 2).

Table 2 : Growth of *Cercospora beticola* on three different solid media

Sr. No.	Media	Mean colony diameter (mm)
1.	Beetroot leaf extract agar media	51.41
2.	Richards agar media	65.77
3.	Potato dextrose agar media	40.54
	S.E.±	2.91
	C.D. (P=0.01)	6.01

In conclusion every living being requires food; as well fungi require different compositions with specific elements for growth and development. All media are not equally suitable for all fungi and there is no universal substrate that fungi can grow. One such attempt is to study the growth characters of *Cercospora beticola* on different specific media.

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