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Effect of Nutrients on Biomass Production of *Helminthosporium Tetramera* A Leaf Spot Pathogen of Sugarcane (*Saccharum Officinarum*)

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ABSTRACT: *Helminthosporium tetramera* was a pathogen of *Saccharum Officinarum*, was isolated from diseased *Saccharum Officinarum*, leaves from Nashik district and used for the present study. Pathogen was grown on the Czapek-Dox liquid medium substituting or adding different carbon, nitrogen to study biomass production. The growth as dry mycelial biomass was observed on the 8th day of incubation period.

A grate extent of growth variation was observed on different carbon, nitrogen. Among the carbon source, fructose shows maximum biomass while glucose with minimum biomass. From nitrogen source cobalt nitrate and barium nitrate shows maximum and control condition with minimum biomass was recorded.

KEYWORDS: *Helminthosporium tetramera*, *Saccharum Officinarum*, Biomass, Pathogen.

INTRODUCTION

Saccharum officinarum is a large, strong-growing species of grass in the genus *Saccharum*. Its stout stalks are rich in sucrose. This plant affected by many fungi as leaf spot. Pathogen *Helminthosporium tetramera* was responsible for the brown spot on the sugarcane leaves. The fungus grows both intra and inters cellular within the tissues. Conidiophores arise as lateral branches from the hyphae and emerge through stomata or wounds. Conidiophores are short, erect, branched only at bases, short, segmented, dark brown to olivaceous at the base and somewhat paler at the growing tip. The points of attachment of successive conidia are marked by scars at regular intervals in the conidiophores. Conidia are olivaceous brown, slightly curved; tapering towards the rounded ends and vary greatly both in size as well as in the number of septa. The disease progresses most rapidly when alternating periods of dry and wet weather occur. Many worker reviewed physiology and biochemistry of fungi (Stall,1958; Rajderkar,1966; sharma et.al.,1985; Sankaran et.al.,1986; Nair and Sumaridi, 2000; Bhanumathi, 2007; Mantri, 1969; Jayraj and Ramabadran, 1998).

MATERIAL AND METHOD

The material used and methods followed during the present investigations were as follows:

The Czapek-Dox solid and liquid medium was used as a common medium for the studies. The composition of media was $NaNo_3$ - 2.00g, K_2HPO_4 - 1.00g, $MgSO_4,7H_2O$ - 0.50g, $FeSO_4$, $7H_2O$- 0.01g, Sucrose - 30g, Distilled water - 1000ml.

Saccharum officinarum leaves affected with different diseases were collected from different locations of Nashik district. Isolation from these affected leaves was carried out on Czapek-Dox agar medium by usual tissue incubation technique. The Petri plates were incubated at room temperature (22-28^{0}C) until good growth of organism was observed. The colonies free from contamination were transferred on Czapek-Dox agar slant and maintained for further studies. Eight days old culture of organism was used for biochemical studies.

The *Helminthosporium tetramera* was grown on the Czapek-Dox liquid medium and dry biomass was recorded at different intervals. Substituting or adding different compounds in the Czapek-Dox liquid medium studied the effect of carbon and nitrogen on growth. The growth as dry mycelial biomass was observed on the 10th day of incubation period.

RESULTS AND DISCUSSION

Helminthosporium tetramera was grown on Czapek-Dox liquid medium and dry biomass was observed for 10 days (Table-1) more rapid growth was observed during early stages and maximum growth was observed on eight day. The growth rate lowers after eight day on word. On second day very less biomass was observed, on fifth day biomass increased by about three times.

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Data in the table - 2 indicates that there was large variation in the growth of *Helminthosporium tetramera* on different carbon compounds. This pathogen shows maximum growth on fructose followed by lactose, dextrose, glucose and control while in absence of carbon source there was no growth.

The five nitrogen compounds studied, Data in the table - 3 indicates that there was large variation in the growth of *Helminthosporium tetramera* on different nitrogen compounds. This pathogen shows maximum growth on cobalt nitrate and barium nitrate. The least growth was observed in control as compared to nickel nitrate and potassium nitrate. In absence of nitrogen source in the medium resulted in lowest growth as compared to other compound.

The great extent of variation was observed in the growth of pathogen on different carbon containing compound, maximum growth was recorded on lactose and minimum on glucose. Of the five-nitrogen compound were studied, maximum biomass was observed on nickel nitrate and least biomass on potassium nitrate.

SUMMARY

The leaf spot pathogen on *Saccharum officinarum* was recorded as *Helminthosporium tetramera*. The growth as dry biomass was observed on 8th day of incubation period. The growth rate of *Helminthosporium tetramera* in culture condition showed rapid growth during early stages and peak growth was observed on the 8th day of incubation period.

The great extent of variation was observed in the growth of pathogen on different carbon containing compound, maximum growth on fructose followed by lactose, dextrose, glucose and control while in absence of carbon source there was no growth.

Effect of the five nitrogen compounds were studied, maximum biomass on cobalt nitrate and barium nitrate. The least growth was observed in control as compaired to nickel nitrate and potassium nitrate. In absence of nitrogen source in the medium resulted in lowest growth as compared to other compound.

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Observation Tables:

Table 1. Growth of *Helminthosporium tetramera* at various incubation periods grown on Czapek-Dox liquid medium.

Incubation period in days	**Dry Biomass (mg)**
1st	0
2nd	12
3rd	33
4th	77

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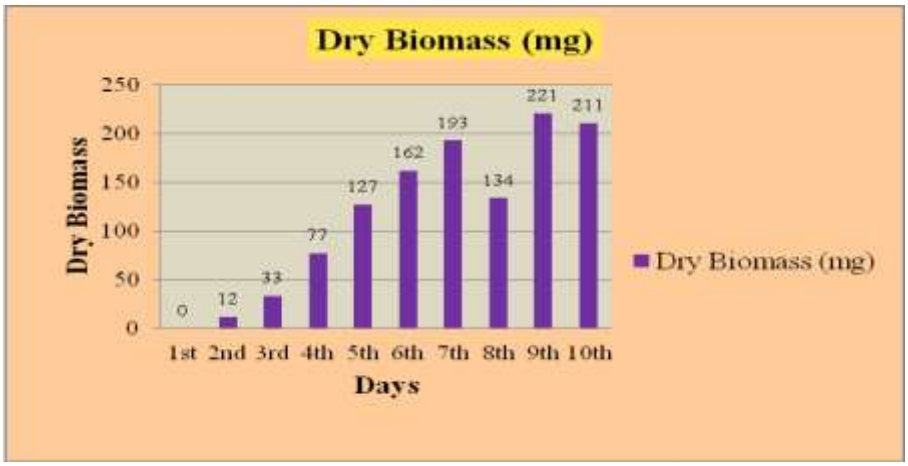
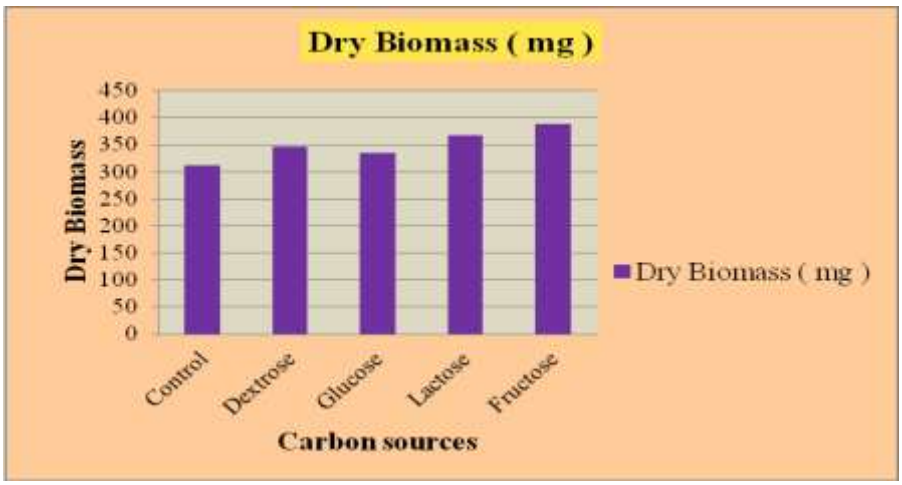
5th	127
6th	162
7th	193
8th	234
9th	221
10th	211



Graph- 1. Growth of *Helminthosporium tetramera* at various incubation periods grown on Czapek-Dox liquid medium.

Table 2. Dry biomass of *Helminthosporium tetramera* grown on Czapek-Dox liquid medium containing different carbon sources at 8th day incubation period.

Carbon Sources	Dry Biomass (mg)
Control	312
Dextrose	346
Glucose	334
Lactose	368
Fructose	388



Graph- 2. Dry biomass of *Helminthosporium tetramera* grown on Czapek-Dox liquid medium containing different carbon sources at 8th day incubation period.

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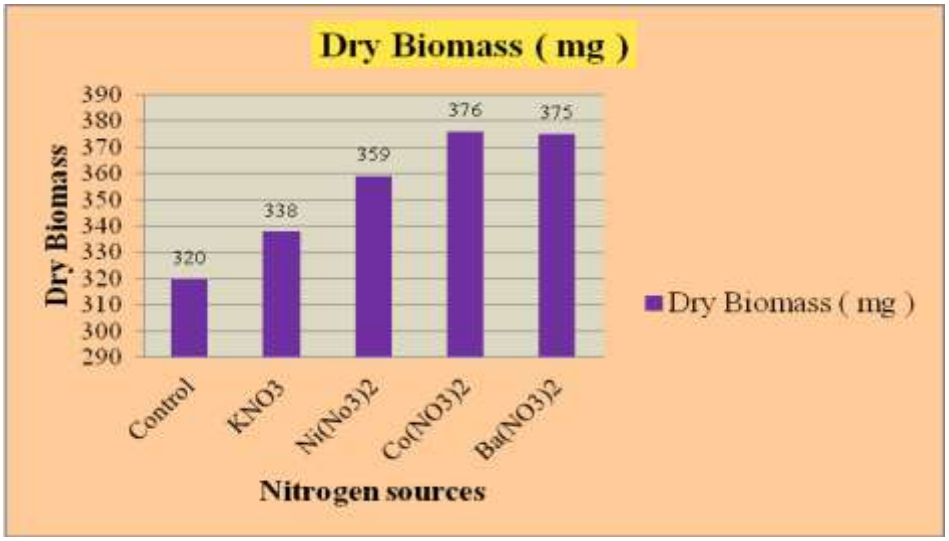
Table 3. Dry biomass of *Helminthosporium tetramera* grown on Czapek-Dox liquid medium containing different nitrogen sources at 8th day incubation period.

Nitrogen Sources	Dry Biomass (mg)
Control	320
KNO_3	338
$Ni(No_3)_2$	359
$Co(NO_3)_2$	376
$Ba(NO_3)_2$	375



Graph- 3 Dry biomass of *Helminthosporium tetramera* grown on Czapek-Dox liquid medium containing different nitrogen sources at 8th day incubation period.

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