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## Variation in total reducing and non-reducing sugar contents in different parts of two tomato cultivars (Pusa Ruby & S-22) infected with *Alternaria solani*

Mitali Mukherjee\* & Ramesh Kumar Pandey<sup>b</sup>

<sup>a</sup>Department of Botany, Jamshedpur Women's College, Jamshedpur, Kolhan Univ., Jharkhand.

<sup>b</sup> University Department of Botany, Ranchi University, Ranchi, Jharkhand, India.

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**Abstract :** A study of total sugars (T.S), reducing sugars (RS) and non-reducing sugars (NRS) of the infected tissues of tomato cultivars Pusa Ruby and S-22 was carried out during 2<sup>nd</sup> day to 14<sup>th</sup> days pathogenesis by *Alternaria solani*. In this research it is investigated by taking the fruit extract of fixed volume of tomato pulp of two cultivars at definite intervals, till 14 days pathogenesis. Reducing and non-reducing sugars were estimated by colorimetric method and rate of decrease in sugar contents after infection of *Alternaria solani* was found out.

**Keywords :** *Alternaria solani*, tomato, sugars, Early Blight.

### INTRODUCTION

Tomato is a popular vegetable used by Indian people as well as in abroad. It belongs to the family Solanaceae. Botanical name of tomato is *Lycopersicon esculentum* MILL. Study of Early Blight disease is very important for all as it decreases important essential constituents of tomato after infection, which is very helpful for humans health.

Present paper deals with the changes in total sugar, reducing and non-reducing sugar contents in the fruit tissues of two cultivars, Pusa Ruby and S-22, during 14th days pathogenesis by *Alternaria solani*.

### MATERIAL AND METHODS

The ripe fruits of tomato cultivars (Pusa Ruby and S-22) were inoculated with the fungus *Alternaria solani* which was collected from the "National Center of Fungal Taxonomy", Ref No - 1420.08 for comparison of fresh isolates of *Alternaria solani* inoculated in two cultivars.

The method involved quantitative analysis by colorimeter. Common laboratory equipments were also used for experimental work.

Various types of chemicals were also used for chemical analysis. Potato, Dextrose and Agars were used as basal cultural medium for preparing the pure culture.

5 gm of fruit pulps were taken from infected portion and healthy portion of infected tomato and also from healthy tomato as control of both the cultivar and samples were prepared, keeping two days interval till 14<sup>th</sup> days pathogenesis with *Alternaria solani*.

For quantitative analysis at first standard glucose solution was made. After preparing fixed volume of stock solution, 5% phenol and 96% H<sub>2</sub>SO<sub>4</sub> of known volumes were added. Fixed volume of different concentration were made and kept at 25-30°C for 20mints after shaking and optical density were measured. Calibration curve was drawn against optical density and concentration of glucose.

Each sample made from tomato pulps were taken and heated after adding phenol and H<sub>2</sub>SO<sub>4</sub> in 25-30°C. After cooling optical density were measured. Weight of total sugar was estimated in ppm by

\*Corresponding author :

Phone : 09308628218

E-mail : mukherjee.mitali3jan@gmail.com

comparing with standard graph.

**RESULT AND DISCUSSION**

**REDUCING SUGAR**

5gm of healthy and diseased pulp (infected portion and healthy portion) of Pusa Ruby and S-22 cultivars were taken, keeping 2 days interval till 14 days pathogenesis by *Alternaria solani*, for preparing the samples.

Tissues were cut into small pieces and crushed using mortar and pestle. After boiling with alcohol homogenized and filtered through Whatman No- 41 filter paper. Residue was washed several times with 80% ethanol and after heating the filtrate, distilled water was added and centrifuged at 2000 rpm for 25 minutes and samples were prepared.

In known volume of sample, 2ml of Di nitro salicylic acid reagent was added and heated. Then known volume of 40% Rochelle salt was added in that. After cooling absorption was noted at 575 nm in the colorimeter.

Amount of reducing sugar was calculated comparing with standard calibration curve of glucose solution.

**NON-REDUCING SUGAR**

The difference in amount of total sugar and reducing sugar, amount of non-reducing sugar was estimated.

After the experiment it was observed that at first the amount of reducing sugar in infected portion of Pusa Ruby cultivar was very less. In 4<sup>th</sup> days pathogenesis, it was doubled and then gradually decreased due to the consumption of sugar by the pathogen till 14<sup>th</sup> day. In S-22 cultivar, infected portion showed 8 times more than that of Pusa Ruby in 2<sup>nd</sup> day. On 8<sup>th</sup> and 10<sup>th</sup> day after synthesizing, the amount again gradually decreased till 12<sup>th</sup> and 14<sup>th</sup> day. Non-reducing sugar of S-22 cultivar in infected portion was more than that of Pusa Ruby in 2<sup>nd</sup> day and increased on 4<sup>th</sup> and 8<sup>th</sup> days pathogenesis. On 10<sup>th</sup> day it decreased and continued gradually till 14<sup>th</sup> day.

Healthy portion of Pusa Ruby cultivar showed very less amount of reducing sugar which decreased gradually till 14<sup>th</sup> day. S-22 cultivars showed three times more than that of the Pusa Ruby cultivar on 2<sup>nd</sup> days pathogenesis. Amount of reducing sugar of S-22 cultivar decreased gradually till 14<sup>th</sup> days pathogenesis but on 8<sup>th</sup> & 10<sup>th</sup> day little more sugar was synthesized due to the host parasite interaction. Ultimately it was concluded that the amount of reducing and non reducing sugar present in S-22 cultivar was more than that of the Pusa Ruby cultivar.

**TABLE - Changes In The Labels Of Total Sugar , Reducing Sugar And Non- Reducing Sugar In Different Parts Of Two Tomato Cultivars(Pusa Ruby And S - 22) After The Infection Of *Alternaria solani*.**

Days after inoculation	Part of tomato	Pusa Ruby cultivar			S-22 Cultivar		
		Amount of total sugar	Amount of Reducing sugar	Amount of non reducing sugar	Amount of total sugar	Amount of Reducing sugar	Amount of non reducing sugar
2 <sup>nd</sup> day	C	118	12	106	200	23	178
	I	58	3	55	92	24	68
	HI	118	11	107	208	33	175
4 <sup>th</sup> day	C	207	24	183	214	14	200
	I	80	6	74	166	20	146
	HI	142	18	124	160	20	140
6 <sup>th</sup> day	C	182	22	160	206	23	183
	I	54	3	51	180	6	174
	HI	80	6	74	68	7	61

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8 <sup>th</sup> day	C	96	10	86	206	22	184
	I	24	5	19	128	22	106
	HI	60	6	54	72	21	51
10 <sup>th</sup> day	C	176	15	61	168	22	146
	I	8	2	6	120	22	98
	HI	72	6	66	78	21	57
12 <sup>th</sup> day	C	80	6	74	144	19	125
	I	16	2	16	76	16	60
	HI	8	2	6	56	14	42
14 <sup>th</sup> day	C	60	5	55	168	22	146
	I	6	1	5	10	2	8
	HI	20	2		HI	-16	-34

C = Control      I = Inoculated      HI = Healthy Part of Inoculated Fruits

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