BIOCHEMICAL CHANGES IN (LAGENARIA SICERARIA STANDL.) BOTTLE GOURD DUE TO FRUIT ROT.

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Abstract: Biochemical changes were observed from healthy and artificially isolated carbendazim sensitive IS5 and resistant IS10 isolates of bottle gourd (Lagenaria siceraria) fruit caused by Alternearia altenata. There was a significant variation between infected and healthy fruit, which showed significant changes with respect to estimation of total sugar, reducing sugar, non reducing sugar, Polyphenol, Starch, crudeprotein, Nitrogen, Phosphorus, calcium, DNA, RNA, Magnesium, Zinc, and Manganese. Among them. Total sugar (36.5 mg/g) was increased in healthy fruits. In Polyphenols (18.201 mg/100 g) it was decreased in healthy fruits followed by starch (16.00 mg/g) and others. Infected fruit of bottle gourd (Lagenaria siceraria) by both resistant and sensitive isolates reduced the content of all parameters. This was more pronounced due to utilization of nutritious compounds of the fruits by fungal pathogen for their growth and metabolism, which causes deterioration of the nutritious compounds of the fruits.

Keywords **- Alternaria alternate, Biochemical Changes, Lagenaria Siceraria, Carbendazim.**

INTRODUCTION:

The bottle gourd (Lagenaria siceraria stand.L); family Cucurbitaceae, is a tropical vegetable of Afro-Asian origin and is cultivated in India throughout the year for its young and tender fruits eaten as popular domestic vegetable called “Lauki” whole parts of bottle gourd plant is valuable in medicine and various preparations which have been mentioned in indigenous system of medicine for skin bronchitis and ayurvadic, unani system of medicine. The plants showed hyhpoglycemic activities. Fruit rot disease in bottle gourd was first reported by Singh and Chouhan (1980) from North India. The infection of the rot pathogen causes extensive decay of the fruits in the form of blackish brown rotting which leads to arrested fruit growth and dropping of fruits at blossom end. This causes great set back to the growers as yield of the crop is affected severely and also the infected fruits lose their market quality. The rot disease in bottle ground is a serious destroyer and disease developments is so fast that whole crop is lost in a few days (Singh and Majumdar, 2004; Singh ete al., 2006).

The whole parts of bottle gourd revealed the presence of carbohydrates, glycosides, oils and fats, proteins, amino acids, saponins, tannins, phytosteral, alkaloids, phenolic compounds, mucilage and flavonoids. The gourd contains vit. ‘A’, B, D, E and is a good source of protein and minerals. The phytochemical screening of the 50% methanolic extract obtained from whole parts of bottle gourd. Application of fungicides formed a new tissue, which has protected the expanding tissue and prevented the fruit infection. A single application of the fungicide reduced the post harvest decay up to 30-50%. The present investigation was made to evaluate the bio-chemical changes observed in bottle gourd due to infected fruit rot caused by Alternaria alternata.

MATERIALS & METHODS:

Total 12 isolates of Alternaria alternate were isolated from infected parts of bottle gourd (Lagenaria siceraria) fruits and maintained on czapek Doagar medium (C2A). Alternaria alternate isolates were tested against carbendazim fungicide by food

poisoning test. Carbendazim sensitive IS5 and resistant IS10 isolates were tested for biochemical analysis. This was studied by inoculating L.siceraria fruits with spore suspension of resistant and sensitive isolates. A (14 mm) deep well was prepared for spore suspension with the help of cork borer (7 mm). After inoculation for 7 days, fruits were dried at 400C in hot air oven and powder was obtained after crushing in grinder. The samples were extracted in ethanol and were analyzed for all the biochemical estimations. Altogether 15 parameters were considered for analysis viz. sugars, crude proteins, Nucleic acids (DNA & RNA), Phenols, Ascorbic acids Nitrogen.

RESULT & DISCUSSION:

All isolates of Alternaria alternate were tested against carbendasim fungicide. The sensitivity (MIC) of carbendazim resistant (IS10) showed 5100 L/ml, while sensitive (IS5) showed 3000 L/ml. Determined analysis of Biochemicals from fruit of Lagenaria siceraria are shown in (Table 2). It was noted that the content of all parameters in the pathogen varied in sensitive and resistant strains. It was seen that total sugars were reduced in infected fruit of Lagenaria siceraria, when compared with healthy ones.

Total sugars in the fruit infected with sensitive and resistant isolates were variable. Total sugars (36.5 mg/g) was increased in healthy fruits, but reduced in sensitive (26.58 mg/g) and resistant (29.00 mg/g). In case of polyphenol was decreased (18.201 mg/100g) in healthy however, increased to sensitive (12.120 mg/100 gm) and resistant (13.25 mg/100 g) followed by starch. In case of crude protein, Nitrogen, calcium, DNA and RNA were decreased due to infection of both isolates. There was slight increase in polyphenols in fruits inoculated with resistant and sensitive isolates in the healthy fruit. In infected fruit calcium and phosphorus also reduced.

Table 1: Sensitivity (MIC) of carbendazim against Alternaria alternate isolates

Isolates	Invitra (MIC) ug/ml
IS1	3400
IS2	3100
IS3	3300
IS4	4000
IS5	3000*
IS6	3700
IS7	3600
IS8	3400
IS9	4100
IS10	51000**
IS11	3600
IS12	3400

Minimum inhibitory concentration (MIC)

* Sensitive ** Resistant

Table 2: Estimation of Biochemicals analysis of healthy and infected fruits of Bottle gourd.

Sl. No.	Estimation	Healthy	Sensitive (IS5)	Resistant (IS10)
1.	Total sugar (mg/g)	36.5	26.58	29.00
2.	Reducing sugar (mg/g)	10.5	8.24	9.00
3.	Non reducing sugar (mg/g)	26.8	18.24	20.00
4.	DNA (mg/g)	3.2	1.2	1.25
5.	RNA (mg/g)	4.8	2.9	3.24
6.	Starch (mg/g)	16.00	9.3	10.20
7.	Polyphenols (mg/100 gm)	18.201	12.120	13.25
8.	Magnesium (mg/L)	0.801	0.415	0.610
9.	Manganese (mg/g)	0.309	0.120	0.260
10.	Iron (mg/g)	1.110	0.540	1.10
11.	Zinc (mg/L)	0.310	0.123	0.209
12.	Nitrogen (%)	2.5	1.5	1.8
13.	Phosphorus (%)	1.8	1.00	0.590
14.	Calcium (%)	5.2	2.5	4.2
15.	Crude protein (%)	0.8	0.36	0.42

There are reports supporting the characteristic of resistant isolates.

Total sugars were reduced in infected leaves of spinach when compared with healthy one. There was increase in production of amino acids in the isolate of Macrophomina phaseolina resistant to captain and carbendazim Reduction in DNA content due to infection of resistant Puccinia arachidis on ground nut, totalsugars, total amino acids, crude proteins, DNA and RNA contents increase in their quantity due to infection by both the isolates of fruit rot of grapes. The infected bananas showed a decrease in the quantity of total soluble sugar, protein, ascorbic acid and mineral elements when compared with the control of fruit. Total phenols increased in fruits infected by Pestalotipsis versicolar and Rhizopus arrhizus, while revers was observed in fruits infected by other pathogens. Similarly, the investigations carried out and revealed less content of ascorbic acid, total sugar and capsaicin in fruits heavily infected due to dieback. In fruit of cucumis sativus biochemical changes also observed due to infection, there was reduction in Nitrogen, protein, ascorbic acid, DNA and RNA.

CONCLUSION:

Post harvest losses of fruits are very high and diverse. Exposure on consumption of these spoiled fruits may be responsible for serious health problems. The nutritional value of fruits chiefly depends on the quality and quantity of nutritive substances. Various fungi cause rots of fruit of bottle gourd. Bio-chemical changes reduce their nutritive value and market value. Results of study showed the fungal infection brought about nutritional changes in fruits. Due to utilization by fungal pathogens for their growth and metabolism, they deteriorate the nutrition of the fruits in Bottle gourd.

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