

POST-INFECTION CHANGES IN ASCORBIC ACID CONTENT IN FRUITS OF CITRUS RETICULATA L. INDUCED BY CLADOSPORIUM SPHAEROSPERMUM PENZ. AND FUSARIUM MONILIFORME SHELDON

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A LARGE number of fruits and vegetables (citrus fruits, guava, 'amla' tomato and raw cabbages) are known to be rich sources of vitamin C. Biosynthesis of ascorbic acid in plants has been extensively reviewed by Mapson⁵. Tandon *et al.*⁹ reported wide variations in vitamin C content of healthy and diseased fruits and vegetables.

During post-harvest phase, *Cladosporium sphaerospermum* and *Fusarium moniliforme* cause rot in oranges. It was, therefore, felt desirable to study the influence of these two pathogens on the ascorbic acid content of oranges. A set of three fruits of nearly the same age and size was inoculated separately with each pathogen by the method recommended by Granger and Horne³. Another set of uninoculated fruits treated in a similar manner simultaneously served as the control. All the sets were incubated at 25° C. At intervals of 5 days, one fruit from each set was picked up for estimation of ascorbic acid content. For this, 2 g of the fruit pulp from inoculated and uninoculated fruits were crushed with 25 ml of 5% metaphosphoric acid in a ground glass homogenizer and filtered. The residue was washed twice with 10 ml of metaphosphoric acid and the volume of the total filtrate was finally raised to 50 ml. This was titrated against a previously standardized solution of 2,6-dichlorophenol indophenol as recommended by Bessey and King¹ and the quantity of ascorbic acid in each sample was calculated. The results are summarized in Table I.

The data reveal that the ascorbic acid content of the fresh oranges was as high as 47 mg/100 mg of fruit tissue. There was a gradual loss in the ascorbic acid content and on 15th day of incubation it came down to 35.1 mg/100 g. This shows that the loss of vitamin C in uninoculated fruits was 25.3%, which was due to over-ripening during storage. The loss in the ascorbic acid content on the 15th day of incubation in the fruits inoculated with *C. sphaerospermum* and *F. moniliforme* was 93.6 and 92.1% respectively.

Although in both healthy and diseased fruits there was a gradual loss of vitamin C with the increase in the incubation period, the rate of decrease was much faster in infected fruits. Obviously, the two pathogens must have hastened the rate of loss of the ascorbic

TABLE I
Ascorbic acid content (mg/100 g of fruit pulp) of healthy and infected fruits of oranges

	Ascorbic acid content				Ascorbic acid during 15 days of incubation (%)
	Days of incubation				
	0	5	10	15	
Healthy (control)	47.0	44.4	42.5	35.1	25.3
Infected with <i>Cladosporium sphaerospermum</i>	..	11.1	3.7	3.0	93.6
<i>Fusarium moniliforme</i>	..	9.2	5.5	3.7	92.1

acid content. Similar results were reported by Singh⁷, Tandon⁸, Jamaluddin *et al.*⁴ and Prasad⁶.

As suggested by Fruton and Simmonds² the ascorbic acid gets oxidized to dehydro L-ascorbic acid by the enzyme ascorbic acid oxidase or certain other oxidative enzymes like polyphenol oxidase, cytochrome oxidase or peroxidase.

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