J. Indian bot Soc. **64** : 85—87, 1985.

DETERIORATION IN TOTAL SUGAR AND STARCH CONTENTS OF TWO MEDICINAL FRUITS BY THREE FUNGI[1]

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ABSTRACT

Two medicinal fruits viz. *Terminalia bellerica* ((Roxb.) and *Terminalia chebula* (Retz.) were infested artificially with three dominant fungi viz. *Aspergillus flavus* Link ex Fries, *Curvularia lunata* (Wakker) Boed and *Fusarium monitiforme* Sheldon. Changes in total sugar and starch contents were estimated during infestion at regular intervals. All fungi were found to degrade the sugar as well as starch contents.

INTRODUCTION

The medicinal value of *Terminalia bellerica* (Roxb.) and *Terminalia chebula* (Retz.) are well established. The active constituents of these fruits get degraded due to faulty storage technique and fungal invasion.

The present communication deals with the quantitative changes in sugar and starch contents of the two fruits by three dominant fungi.

MATERIALS AND METHODS

20 gms of fruit pieces (both *T. bellerica* and *T. chebula*) were surface sterilized with 2% NaOCl (sodium hypochlorite) solution. The sterilized fruit pieces, taken in conical flasks, were inoculated separately by spore suspension of *Aspergillus flavus* (Link ex Fries), *Curvularia lunata* (Wakker) Boed. and *Fusarium moniliforme* (Sheldon), isolated earlier from the fruits by blotter method (ISTA, 1966). Subsequently, the flasks were incubated at room temperature (25 ±2°C) for 30 days. In each case control was maintained. Quantitative estimation of sugar and starch was done at regular intervals, of 10 days, by the method suggested by Dubois *et al.* (1956) and Snell *et al.* (1961) respectively. The results are tabulated in tables I and II.

RESULTS AND DISCUSSION

Fruits of *T. bellerica* and *T. chebula* contained good amount of starch and sugars and their concentrations remained almost constant throughout the inocubation (Tables I, II) period. A gradual depletion of starch and sugar contents in both the fruits was recorded under pathogenesis by the three fungi. The maximum loss in starch and sugar contents was recorded during infestation by *A. flavus* which was followed *F. moniliforme* and *C. lunata*. Similar observations were made by Sinha and Prasad (1977) and Bilgrami *et al.* (1979). Reduction in starch contents under pathogenesis has been suggested to be mainly due to involvement of α-amylase enzymes (Man-

1. Accepted for publication on June 27, 1984.

The authors are grateful to Professor K. S. Bilgrami, for providing laboratory facilities. The senior author is also thankful to U. G. C. for finanacial assistance.

TABLE I

SHOWING DETERIORATION IN STARCH CONTENTS (MG/100 MG) IN *T. CHEBULA* AND *T. BELLERICA* DURING INFESTATION BY THREE FUNGI

Nature of samples	*T. chebula*				*T. bellerica*			
	Incubation period				Incubation period			
	0 d	10 d	20 d	30 d	0 d	10 d	20 d	30 d
Control	1.90	1.90	1.90	1.89	3.10	3.10	3.05	3.05
Infested with *A. flavus*	—	0.9	0.9	0.2	—	0.6	0.4	0.1
Infested with *C. lunata*	—	1.2	0.8	0.7	—	1.9	1.9	0.7
Infested with *F. monilijorme*	—	1.0	0.7	0.7	—	2.0	1.7	1.0

d=Days

TABLE II

SHOWING DETERIORATION IN SUGAR CONTENTS (MG/100MG) OF *T. CHEBULA* AND *T. BELLERICA* DURING INFESTATION BY THREE FUNGI

Nature of samples	*T. chebula*				*T. bellerica*			
	Incubation period				Incubation period			
	0 d	10 d	20 d	30 d	0 d	10 d	20 d	30 d
Control	19.4	19.4	19.4	19.2	45.2	45.2	45.1	45.0
Infested with *A. flavus*	—	17.8	15.6	11.8	—	31.9	14.6	10.5
Infested with *C. lunata*	—	18.3	16.7	15.4	—	38.5	37.0	24.2
Infested with *F. moniliforme*	—	18.7	15.3	14.1	—	36.3	35.0	30.1

d=Days.

ners, 1974). Vidyasekaran and Kandaswamy (1972) as well as Wu (1973) have reported fall in starch level with corresponding increase in α-amylase activity in the infected tissues of different hosts. Wadji and Deshpande (1977) have reported secretion of α-amylase enzyme by seed borne fungi while working on sorghum. Variable loss of startch contents in the present experiment might be due to different ability of organism to secrete α-amylase enzyme. Reduction in sugar contents in the present study might be attributed to one or more of the following factors, operating during host parasite interactions :

i. splitting of carbohydrate fragments by fungal enzymes.
ii. ehnanced respiration in the infected host tissues.

iii. utilization of host carbohydrates for the synthesis of various metabolites in vivo.

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