CHANGES IN PHENOLIC CONTENTS OF SAPOTA PULP (*ACHRAS SAPOTA* L.) DUE TO DIFFERENT ISOLATES OF *ASPERGILLUS NIGER*

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ABSTRACT

During storage conditions *Achras sapota* gets infected by several fungal diseases like sour rot (*Geotrichum candidum)*, *Cladosporium* rot, (*Cladosporium* oxysporum), Blue mould rot (*Penicillium itallicum*), Rhizopus rot, *Aspergillus niger* rot etc**.** Among these diseases *Aspergillus niger* rot is very serious disease and it causes changes in biochemical contents of sapota pulp. Phenols are said to offer resistance to diseases and pests in plants. In present investigation spore suspension of *Aspergillus niger* isolates were inoculated in same aged and surface sterilized ripened sapotas of two ultivars i.e. Cricket ball and Kali patti from Thane district of Mahahashtra state. After seven days change in phenolic content was estimated with the Folin-Ciocalteau method. Phenolic content was found to be decreased significantly due to all 5 isolates of *Aspergillus niger* in three sapota cultivars.

Key words: *Achras sapota*, phenol*, Aspergillus niger*

INTRODUCTION

Sapota fruit is rich source of sugar, protein, ascorbic acid, phenols, carotenoids and minerals like Fe, Cu, Zn, Ca and K (Kulkarni *et al.,* 2007). Diseases are the major constraints in the decreased productivity and post harvest deterioration of fruit plants. The post harvest losses are high in tropical countries particularly in India and it ranges between 25-30% (Sudha *et al.,* 2007). At postharvest stage, many diseases greatly reduce the storage life, fruit contents and quality of sapota. Postharvest diseases of fruits represent a very important source of wastage and mainly economic losses. Roughly 70% of all the major crop diseases are caused by fungi (Deacon, 2006).Storage and post harvest deterioration of the fruits cause considerable revenue loss During storage conditions sapota gets infected by several fungal diseases like sour rot (*Geotrichum candidum*), *Cladosporium* rot (*Cladosporium* oxysporum), Blue mould rot (*Penicillium itallicum*) (Mickelbart, 1996). *Rhizopus* rot, *Aspergillus niger rot* (Baker and Karim, 1990) etc. During storage sapota severely attacked by *Aspergillus niger.* Manoharachary and Rao (1989) isolated *Aspergillus niger* Van Tiegh from sapota fruits and proved the pathogenicity. Black mold rot caused by *Aspergillus niger* occurs during hot summer on injured and over-ripe fruits Mandal and Dasgupta (1981).

Among these diseases *Aspergillus niger* rot is very serious diseases due to which serious loss of contents of chikoo fruit was observed. . Being soft textured sapota fruits are highly sensitive to exogenous agencies specially fungi, that affects physiology, morphology and biochemistry of fruits and thus ultimately causes loss to the fruit seller. Several reports have been reported that fungal diseases cause changes in biochemical composition of sapota pulp (Srivastava, 1969; Gadgile *et al.,* 2010). The quantity of phenol decreases during storage of healthy fruits, but it decreases to the maximum when the fruits were infected by *Aspergillus niger.*

MATERIALS AND METHODS

Aspergillus niger were isolated from fruits of 2 varieties (cultivars) of chikoo collected from different regions of Thane District of Maharashtra state. Spore suspension of *Aspergillus niger* isolates ere separately inoculated in same aged chikoo fruits of 2 varieties i.e. 'Cricket ball' and 'Kali patti' in aseptic condition. After 7 days of incubation pulp was collected in separate sterilized containers. Fruits of each variety without inoculation served as control. After 7 days, changes in phenol were estimated (Malick and Singh, 1980).

RESULTS AND DISSCUSSION

Changes in phenol contents in pulp of chikoo varieties due to different isolates of *Aspergillus niger* shown in Table no.1.It was observed that all the fungi reduced the phenol contents in two varieties as compared with control. Phenol content was found to be decreased significantly from 123.33mg/100ml to 119.20mg/100ml out of control 134.6mg/100ml pulp of cricket ball cultivar. Phenol content was found to be significantly decreased from 122.52mg/100ml to 118.24mg/100ml out of 135.0mg/100ml pulp of Kalipatti cultivar. Table 1 also shows that maximum decrease in phenol content was observed in Cricket ball cultivar due to *An* $_4$ isolate as compared to other four isolates. Maximum decrease in phenol content was observed in Kalipatti cultivar due to *An* $_5$ isolate as compared to other four isolates.

Table 1: Changes in phenol (mg/100ml) of sapota fruits due to different isolates of *Aspergillus niger.*

Isolates of *Aspergillus niger*	Cricket Ball cultivar*	Kali Patti cultivar*
A n $_1$	122.1	120.20
A n $_2$	123.33	122.52
A n $_3$	120.20	119.62
A n $_4$	119.20	121.22
A n $_5$	121.22	118.24
Control	134.6	135.0
SEm± C.D.at 0.05%	4.971 12.775	5.089 13.078

*Values expressed in mg/100ml Chikoo pulp
An_1= *Aspergillus niger* isolate on Gholwad variety from Gholwad market
An_2= *Aspergillus niger* isolate on Dahanu variety from Dahanu market
An_3= *Aspergillus niger* isolate on Palghar variety from Palghar market
An_4= *Aspergillus niger* isolate on Safale variety from Safale market
An_5= *Aspergillus niger* isolate on Vasai variety from Vasai market

Mahattanatawee *et al.* (2006) reported that the phenolic composition of mango, sapodilla and longan pulp have been previously reported to contain hydrolysable tannins and conjugated hydroxycinnamic, allagic and other phenolic. In this study mangiferin and galloyltannins, catechin and ellagic acid conjugates and flavones glycosides were detected in mango, sapodilla and longan pulp respectively. Couture *et al.* (1971) reported that phenolic compounds have long been correlated with resistance of plants to infection agents. Schovánková and Opatová (2011) reported that the apples inoculated with *Monilinia fructigena* demonstrated higher concentration of total phenols in the healthy pulp than in the area surrounding the rotten part. On the contrary there is considerable increase in total phenols in infected banana fruits (Sawant and Gawai, 2011). Recently, Bhale and Kamble (2007) reported that the phenolic content increased their quantity due to infection by both the isolates of wilt of spinach. According to Beniwal *et al.* (2008), among three varieties of wheat plants infected with flag smut, the resistant variety WH 283 had higher quantity of phenolic constituents at all the stages. Changes in concentrarion of phenols due to *Aspergillus niger* were observed in coffee beans by (Tharappan and Ahmad, 2006).

Hence, it is concluded that *Aspergillus niger* isolates decreases phenol contents in sapota pulp. Overall result indicates that variable results are due to varieties and isolates of *Aspergillus niger isolates*. It is therefore concluded that *Aspergillus niger* rot is responsible for reduction in phenol content of sapota fruits which revealed that fungi might have utilized it as a substrate.

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