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## Studies on inactivation profile of polyphenol oxidase (PPO) from custard apple (*Annona squamosa* L.) pulp by heat treatment and its effects of sensorial quality

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### ABSTRACT

Custard apple (*Annona squamosa* L.) fruit pulp has got many food applications as flavour enhancing ingredient in various desserts because of its delicious taste and flavour. However, the pulp has limited shelf-life due to polyphenol oxidase activity which causes discoloration or browning that result in deterioration of commercial quality of pulp. Browning is one of the major constraints responsible of underutilization of this highly valuable dry land fruit. In present investigation, efforts were made to study the heat inactivation profile of polyphenol oxidase in custard apple pulp which was further correlated with changes in sensorial quality (browning and discoloration). Efforts were also made to analyze the effect of ascorbic acid addition on discoloration and organoleptic characteristics of pulp. The heat treatment was given to fruit pulp by steaming, at the range of temperatures with different periods of time. The results revealed that steam heating of custard apple pulp facilitated at linearly increasing temperatures exhibited accelerated inhibition of PPO activity leading to 100 % inhibition at 83°C temperature for 2 minutes while complete inhibition of PPO activity was also observed at the temperature of 82°C for 5 minutes. However, heat treatment resulted in decrease in consumer acceptability of pulp in terms of sensorial characteristics. Addition of 2000 ppm of ascorbic acid without heat treatment showed highest sensorial properties without discoloration compared to heat treated samples.

**Key words :** Custard apple, Heat treatment, Fruit pulp.

### INTRODUCTION

The custard apple (*Annona squamosa* L.) fruit is mostly used as a dessert for its delicious taste and nutritive values. The custard apple pulp has been reported to contain 73.5 per cent moisture, 23.9 per cent carbohydrates, 1.6 per cent proteins, 0.3 per cent fat with calcium, phosphorus and iron to the level of 0.02, 0.04 and 0.01 per cent, respectively. It is also a good source of vitamin A and C (Gopalan *et al.*, 1991). The fruit yields about 40 per cent pulp having 26.4 Brix (TSS), 5.5 pH and 0.5 per cent tannins. Skin of fruits is high in phenols and causes rapid browning and strong off flavour during storage and processing of pulp. The processed products and byproducts of custard apple are nutritionally important. Fruit pulp of custard apple is of pleasant taste, texture and flavour. It is sweet and slightly acidic.

The period of availability of the custard apple fruits commences in August and continues up to December

notifying October and November as peak period. Climatic and highly perishable fruits of custard apple can not be stored for longer period. Cold storage is not promising as the fruits are chilling sensitive at 15.5°C or below. The ripe fruits can be stored for 6 weeks at 4.4°C but the skin becomes brown, black and unattractive and result in lose of market value. Moreover, if fruit is allowed to remain on the tree for prolonged period, the pericarp splits to open facilitating deterioration.

Custard apple fruit pulp can be used in preparation of various value added food products like ice cream, etc. (Bray, 1981). However, the rapid discoloration of fruit during processing and storage is one of the major constraints in utilization of this valuable fruit (Venkatasubbaiah and Mathew, 1970). Due to which custard apples have to be disposed off in local market while glut in market leads to lower prices. If fruits pulp is to be in the form of pulp during seasonal glut without any

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