

Research Article

Changes in Biochemical Characteristics and Activities of Ripening Associated Enzymes in Mango Fruit during the Storage at Different Temperatures

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Received 25 April 2014; Revised 27 June 2014; Accepted 7 July 2014; Published 22 July 2014

Academic Editor: Eugénio Ferreira

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As a part of the study to explore the possible strategy for enhancing the shelf life of mango fruits, we investigated the changes in biochemical parameters and activities of ripening associated enzymes of Ashwina hybrid mangoes at 4-day regular intervals during storage at -10°C , 4°C , and $30 \pm 1^{\circ}\text{C}$. Titratable acidity, vitamin C, starch content, and reducing sugar were higher at unripe state and gradually decreased with the increasing of storage time at all storage temperatures while phenol content, total soluble solid, total sugar, and nonreducing sugar contents gradually increased. The activities of amylase, α -mannosidase, α -glucosidase, and invertase increased sharply within first few days and decreased significantly in the later stage of ripening at $30 \pm 1^{\circ}\text{C}$. Meanwhile polyphenol oxidase, β -galactosidase, and β -hexosaminidase predominantly increased significantly with the increasing days of storage till later stage of ripening. At -10°C and 4°C , the enzymes as well as carbohydrate contents of storage mango changed slightly up to 4 days and thereafter the enzyme became fully dormant. The results indicated that increase in storage temperature and time correlated with changes in biochemical parameters and activities of glycosidases suggested the suppression of β -galactosidase and β -hexosaminidase might enhance the shelf life of mango fruits.

1. Introduction

Mango (*Mangifera indica*, L) is the most important fruit of Bangladesh because of special characteristic flavor, pleasant aroma, taste, and nutritional value. Both ripe and raw fruits are also used to make a variety of products such as juice, chutney, and jelly. For these reasons, traditionally it is called the king of fruits in Bangladesh. Mango has medium calorific and high nutritional values especially carbohydrate [1]. Among the cultivated fruits in Bangladesh, it is the highest in terms of acres and second highest in terms of production. The cultivation area and the estimated production of mango per year in Bangladesh were 79066 acres and 1047849 metric tons,

respectively [2]. Its local market sale generates about Tk. 52.39 billion. In a globalized economy, the control of fruit ripening is of strategic importance because excessive softening limits shelf life and storage. Softening plays an important role in cost implication, consumer acceptability, shelf life, and postharvest disease resistance. A considerable quantity (30–35%) of fruit turned waste through postharvesting process [3]. A survey was conducted on the softening of 18 mango varieties in 161 temporary storages of whole sellers and retailers at 20 spots in six districts of Bangladesh and found that the postharvest loss was 12.5% [4]. An effective strategy for enhancing the mango fruit shelf life is still lacking and, as a result, it is an economic loss for Bangladesh.