

Effects of pollination techniques and harvesting stage on the physico-chemical characteristics of jackfruit

ABSTRACT

Pollination techniques could affect fruit size, whereas optimal maturity stage during harvest could affect postharvest life and the eating quality of fruit. Therefore, the right pollination technique and timing to harvest fruit is an important factor in reducing postharvest losses. The objective of this study was to determine the physico-chemical changes of jackfruit harvested at four different maturity stages and produced from natural and assisted pollination. This study was conducted at a jackfruit commercial farm in Bukit Beruntung, Selangor, Malaysia. For assisted pollination, the selected female inflorescences were covered with bags before anthesis. Hand pollination was performed by gently rubbing mature male inflorescences over the surface of receptive female inflorescences. For natural pollination, female inflorescences were left to develop into syncarps by themselves. Syncarps at the age of 12, 13, 14 and 15 weeks after anthesis (WAA) were used in this study. For each maturity stage, four syncarps were harvested and allowed to ripen naturally at 27 ± 2 °C and 70–80% relative humidity until a sweet aroma was detected. Physico-chemical characteristics such as colour, firmness, pH, titratable acidity, β -carotene, lycopene content, sugars, organic acid content and antioxidant activity were evaluated. In this study, the pollination technique did not affect the eating quality of jackfruit flesh. However, the physico-chemical quality of jackfruit flesh was affected by ripening level and WAA. The initial stages of syncarp maturity, the L^* , C^* and h_0 values, remained unaffected. However, the L^* , C^* and h_0 decreased significantly from 14 WAA onwards when the syncarp rind turned fully yellow. This indicated that the rind and bulb colour became lighter and less intense with a green colour changing to yellow during ripening. Rind and flesh firmness decreased as ripening progressed due to cell wall modification and starch hydrolysis when ripening occurred. The β -carotene content of fleshy syncarps harvested at 14 and 15 WAA was higher than those harvested at 12 and 13 WAA. Sugar content such as glucose, fructose and sucrose increased as syncarps ripened. Total phenolic, flavonoid and antioxidant content were higher after syncarps ripened compared to before ripening. The ripe edible parts of jackfruit contain high levels of antioxidant and thereby signify the nutritional value of jackfruit for human health. In conclusion, harvesting stages affect the nutritional quality of jackfruit cv. Tekam Yellow, and it is recommended that the optimal harvesting stage of jackfruit is 14 WAA for local markets and 12 WAA for long-distance markets.

Keyword: Antioxidant; Colour; Harvest stage; Jackfruit; Sugars; Pollination