

## ABSTRACT

*Diospyros digyna* or also known as Black Sapote is considered as an exotic-climacteric fruit that is harvested when still unripe. However, black sapote consumption rate is still very low as it is deemed as an uncommon fruit. The ripening of black sapote can take up to 10 days, which is deemed as uneconomical in a fast-moving industry. To shorten the ripening period, ripening using calcium carbide and natural ripening was performed and development of black sapote wine using different inoculation concentration (0%, 0.5%, 1%). The ripe fruit was subjected to physicochemical analysis that includes pH, titratable acidity, total soluble solids for both the fruit & wine samples. Moisture content and texture analysis were also done on the fruit sample. The results showed that between unripe and two treatments, there is no significant difference found on the brix index and TA of ripe black sapote. However, significant differences can be found on the pH, with fruit ripened with calcium carbide having a higher pH value, and the firmness of the treated fruits were significantly reduced. Fruits ripened naturally in this research require 12-18 days to ripen, whereas the ones ripened using calcium carbide only took 5-6 days. Two principal components that affect the fruit ripening were ethylene production represented by brix index, pH, and firmness of the fruits, whereas the second component is the fruit's perishability indicated by the moisture content and acidity. The resulting brix index, TA, and pH of wine inoculated with 0.5% yeast inoculum is  $13.89 \pm 1.63$  °Brix,  $0.25 \pm 0.12\%$  citric acid, and  $3.56 \pm 0.09$  respectively. For 1% variable, the TA value is  $0.20 \pm 0.04\%$  citric acid, with a brix index of  $14.61 \pm 0.46$  °Brix, and final product pH of  $3.83 \pm 0.04$ . The changes in physicochemical properties of each inoculated sample showed a significant decrease ( $p < 0.05$ ), indicating a successful fermentation process. All in all, this study shows that there is a possibility to optimize the development of black sapote into wine products.

**Keywords:** *black sapote, Diospyros digyna, calcium carbide, wine, inoculum concentration, physicochemical properties*