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Review

Postharvest physiology and technology of sapote mamey fruit (*Pouteria sapota* (Jacq.) H.E. Moore & Stearn)

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Abstract

Sapote mamey is a tropical tree native from Mexico and Central America that shows potential as an alternative commercial crop for tropical and subtropical regions of the world. Its fruit is a good source of nutrients and it is highly appreciated in Mexico and countries of Central and South America because of its pleasant and sweet flavour and the bright deep orange–red colour of the pulp. A clear demand for the fruit exists in these countries and has been recently reported in other countries such as Australia, Israel, Philippines and Spain. This paper reviews information on postharvest biology and technology of sapote mamey fruit published by several authors in the past 60 years and presents experimental data obtained in the last 10 years by our research group. Topics deal with postharvest handling and physiology; changes of quality attributes during ripening such as colour, total soluble solids, firmness, water content, sugars and carotenoids; diseases, insects and disorders during storage; and responses to low temperatures. The effect of controlled and modified atmospheres on the postharvest life and quality of sapote mamey is also discussed. Other postharvest treatments and technologies that have been evaluated on this fruit are also revised, including the use of ethrel, the application of the ethylene action inhibitor 1-methylcyclopropane and the effect of heat treatments for quarantine purposes and waxing to extend the storage life. Since the preservation and exchange of native material is essential for breeding studies and for making new improved varieties available for commercial production, the creation of a bank of germplasm is an idea also presented in the paper. We believe this review will serve as a useful reference for those studying and investigating postharvest aspects of sapote mamey fruit. Hopefully, it will also encourage future research to preserve the quality, minimize postharvest loses and increase the demand for this pleasant and exotic fruit.

Keywords: Ripening; Respiration rate; Ethylene production; Diseases; Pests; Chilling injury; Controlled and modified atmospheres; Germplasm bank

Contents

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1. Introduction

The fruit of sapote mamey (*Pouteria sapota* (Jacq.) H.E. Moore & Stearn) grows on a native tree from tropical regions of Southern Mexico and Central America including Belize, Guatemala, El Salvador, Honduras and Nicaragua (Campbell et al., 1997). The word sapote derived from the Nahuatl language 'tzapotl' or 'tezontzapotl', a general term applied to all fruit soft in texture and sweet in taste. Martínez (1969) indicated in his book on medicinal plants of Mexico that the meaning of the term in pre-Hispanic times also included 'fruit with rough appearance' which refers to the actual texture of its rind. It is said that before the arrival of Columbus to the Americas, sapote mamey was one of the most important fruit in Central America and it was extensively cultivated. This fruit occurs naturally between 16° and 18° north latitude. In Mexico, sapote mamey is predominately grown in the states of Guerrero, Chiapas, Yucatán, Puebla, Michoacán, Veracruz and Morelos (SIACON, 2003). The tree grows naturally at low elevations and it is cultivated up to 600 m and occasionally, 1500 m above the sea level. The fruit shape varies from round to ovoid or elliptic, its size from 10 to 20 cm in length and its weight ranges from 0.2 to 3 kg. It has a rough, dark-brown, firm, leathery semi-woody rind. Its flesh when unripe shows a pale salmon–pink flesh colour that turns bright and deep orange–red when fully ripe (Fig. 1). Also, the flesh texture changes during ripening from very hard and dry to soft and wet. Fruit can contain one to four seeds depending on the degree of pollinization. Fruit form will depend on number of seeds; 1–2 seeds, a lanceolated shape fruit and more that two seeds a globose shape (Martínez, 1969; Morton, 1987). The fruit is mainly consumed in fresh form, but is also used to obtain processed products such as ice creams and is commercialized as a frozen pulp. Immigrants from Cuba and some Central America countries living in Florida have contributed to the demand of sapote mamey in the United States (Balerdi et al., 1996; Gazel-Filho et al., 1999). This demand explains the exportation of frozen flesh from El Salvador, Nicaragua and Guatemala to the United States (Granados-Friely, 1994). In Florida, the value of this crop has ranged from 1.5 to 4 million U.S. dollars (Lamberts and Crane, 1996; Mossler and Nesheim, 2002; Bünemann and Crane, 2000).

2. Scientific, common names and synonymies

Since its first classification published in 1703, different scientific names have been given to sapote mamey apparently due to the large number of species and genus grouped under

Fig. 1. Sapote mamey fruit showing red colour pulp corresponding to a fully mature stage (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article).