

Post Harvest Physiology of Mango

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Mango is considered one of the choicest fruit of the world, because of its attractive colour, delicious taste, and excellent nutritional properties. It is the largest subtropical fruit crop grown in India, where it occupies with an area of 2.31million hector, with a production of 15.02 million tons (NHB 2015). The world fruit trade is expanding but mango sales are restricted by improper handling and inadequate transport facilities, because of its high perishable nature around 25-40% of post harvest losses occurs in total produce of mango (NHB 2015). To minimize these post harvest losses and for prolong shelf life of fruits we have to thoroughly know about post harvest physiology of mango. Ripening is part of the natural senescence of mango fruit. It is an irreversible process that contributes changes in chemical constituents, flavour and texture. Mango is a climacteric fruit and ripens quite rapidly after harvest. Several physiological changes occurs in association with fruit ripening of mango those were: flesh colour from greenish yellow to yellow to orange in allcultivars, chlorophyll decreases and carotenoid content increases flesh firmness decreases and juiciness increases; starch is converted into sugars, total soluble solids (TSS) content increases; titratable

acidity decreases; CO₂ production rate increases from 40-50 to 160-200 mg/kg/h at 20°C; and ethylene production rate increases from 0.1-0.2 to 1-3 µl/kg/h at 20°C (Gowda and Huddar 2000).

Luiz Carlos de Oliveira Lima *et al.*, 2001 concluded that mango fruit affected with spongy tissue exhibited much lower amylase activity and reducing and non-reducing sugars, but exhibited much higher starch content during storage at 12 ± 2°C and 90 ± 5% RH for 28 days, when compared to healthy tissue of 'Tommy Atkins'. characterization of an expansin gene, MiExpA1 that is correlated with softening in mango and MiExpA1 expression is ethylene dependent and its expression increases with the progression of ripening (Vidhu A. *et al.*, 2005). Mamiro Peter *et al.*, 2006 reported that smoked pit ripening method shows significantly higher ripening percentage, PLW(%) and pulp yield percentage compares to other treatments in case of mango cv. Dodo. Hot water treatment, in combination with the high CO₂ concentration (CA3), served to synergistically improve external fruit quality and extend shelf life by inhibiting ethylene biosynthesis in mango fruits (Youngmok Kim *et al.*, 2007).

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Cardboard packing mango cv. Samar Bahisht Chaunsa fruits showed significantly lower fresh fruit weight loss and better shelf life compared with Wooden Packing fruits treated with or without CaC₂ (Raheel Anwar *et al.*, 2008). Calcium carbide treated mango fruits shows lesser Sugar content, Total acidity, ascorbic acid, TSS and protein content compares to control (Pandarinathan *et al.*, 2010). Brown paper wrapping treatment shows maximum shelf life and highest TSS (%) compares to other treatments in case mango cv. Langra (Roy *et al.*, 2011).

Mango being a highly perishable fruit possesses a very short shelf life and reach to respiration peak of ripening process on 3rd or 4th day after harvesting at ambient temperature. The shelf life of mango varies among its varieties depending on storage conditions. It ranges from 4 to 8 days at room temperature and 2-3 weeks in cold storage at 13°C. This short period seriously limits the long distance commercial transport of this fruit. Usually after harvesting, the ripening process in mature green mango takes 9-12 days. The ripening process of mango fruit involves a series of biochemical reactions, resulting into increased respiration, ethylene production, change in structural polysaccharides causing softening, degradation of chlorophyll, developing pigments by Carotenoids biosynthesis, change in

carbohydrates or starch conversion into sugars, organic acids, lipids, phenolics and volatile compounds, thus leading to ripening of fruit with softening of texture to acceptable quality. Fruit sensitivity to decay, low temperature and general fruit perishability due to the rapid ripening and softening limits the storage, handling and transport potential. On the other hand, application of modified atmosphere (MA) or controlled atmosphere (CA) is not always compatible with this fruit. Although CA storage has been shown to extend the shelf-life of mango, it is cost prohibitive. MA storage was also reported to slow mango ripening, but was often accompanied by high CO₂ and off flavor

Mango is a climacteric fruit which ripens by ethylene mediation, during the time of ripening several physiological changes occurs like, polyphenol content of mango is high at the early part of growth which decreases during ripening process, increase in antioxidants activity by advancement in ripening, enzymes activity (PME & Amylase) increases, conversion of starch into sugars and reduction in tannins percentage takes place. Lesser quality of fruits observed by artificial ripening (calcium carbide) compares to natural ripening by ethylene action. Natural ripening is the best for half life of the fruits and full life of the person.