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Possibility and Constrains of 1-mcp Application for Optimising Food Chain Management of Papaya Fruit (*Carica papaya* L.)

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Abstract

Papaya (*Carica papaya* L.) is considered one of the most important crops throughout the tropical and subtropical countries with a high consumer demand worldwide. Papaya fruit –consumed fresh, cooked, dried or fresh-cut as convenient product- is known for its rich source of health-promoting phytochemicals, e.g. glucosinolates, carotenoids, dietary fibres. However, papaya fruit has a climacteric ripening behaviour deteriorating rapidly during transport, storage and marketing. Postharvest losses of up to 75 % occur during shipping and distribution showing a range of disorders associated with mechanical injury, chilling injury, undesired ripening by acceleration of ethylene evolution and diseases. Reaching 40 % skin yellow stage, papaya fruit become more susceptible to these disorders. Physiological ageing and softening is influenced by the maturity stage of fruits at harvest, postharvest treatment and storage conditions. The ethylene inhibitor 1-methylcyclopropene (1-MCP) is known to control ethylene-dependent processes and prolong storability and shelf life of various fruits and vegetables. However currently, there is almost no information available on the effect of 1-MCP treatment on papaya fruit.

In the present study two different 1-MCP concentrations (312 and 624 nL L⁻¹) were applied to harvested papaya fruits at two different ripening stages, i.e. colour break and ripe. Thereafter, fruits were analysed for ethylene production and respiration rates as well as for TSS, acidity, dietary fiber, glucosinolates, carotenoids and phenol pattern subsequently during 6 days of storage at simulated commercial conditions. Results presented here revealed an inhibiting effect of 1-MCP at both concentrations on undesired changes of TSS, acidity and carotenoids in colour break fruits only. Ripening pattern of ripe fruits were negatively affected by 1-MCP. Furthermore, results will be discussed in detail with special emphasis on optimising food supply chain.

Keywords: 1-MCP, *Carica papaya*, health promoting compounds, papaya, shelf-life