Effect of 1- Methylcyclopropene on Ripening-Related Changes in Dessert Type Banana Cultivar 'Kolikuttu'

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Among the dessert type bananas, cultivar 'Kolikuttu' (*AAB* genome) is one of the highly prized fruits in Sri Lanka which has a high export potential. Early and rapid ripening, finger-shedding and the subsequent development of anthracnose spots on the peel limit the export potential of this cultivar. This cultivar can easily be introduced to the export market if the ripening process can be delayed. 1-methylcyclopropene (1-MCP) is a relatively a new GRS chemical to the agriculture industry. Past studies have shown that 1-MCP can delay ripening of fruits including Cavendish banana (*AAA* genome) by blocking ethylene binding sites in membranes. This chemical has not been tested adequately on fruits in Sri Lanka. Thus, the present study was conducted to ascertain the possibilities of using 1-MCP to delay ripening in cultivar 'Kolikuttu'.

Freshly harvested, physiologically matured 'Kolikuttu' bananas were kept in glass chambers and exposed to different concentrations of 1-MCP (0, 300, 500 and 1000 ppb) for 24 hours at 28 ± 2°C. After 24 hours of exposure, the glass chambers were emptied so that residues of 1-MCP do not remain. Thereafter, treated bananas were kept back in the chambers with the tops open and stored at 28 ± 2°C and at 65% RH. Pulp firmness, peel colour index, total soluble solids and weight loss were measured at three days intervals. Sensory evaluation using a descriptive testing approach was performed at the ready-to-eat stage.

Pulp firmness in bananas in the control (0 ppb) started to decrease by the third day after the treatment and reached the lowest values (0.23 kg) by 9th day. Treated samples maintained pulp firmness until the 9th day irrespective of the concentration of 1-MCP, and reached the lowest values (0.3 kg) by 15th day. Untreated bananas showed *ca.* 10% weight loss by day 9 of treatment and by the end of day 12, it was *ca.* 16%, whereas treated samples lost only about 8%. In the current study, peel colour index of control bananas significantly ($P<0.05$) increased by day 6 while in all treated groups it remained almost unchanged until day 9. Although the treated samples reached the ready-to-eat stage by day 15, they showed an uneven skin colouration when ripe, which could be due to random formation of new ethylene binding sites in the fruit peel. Moreover, results of sensory evaluation showed that the sweetness, aroma and flesh colour did not significantly differ ($P>0.05$) among treatments. Apparently, finger-drop was also not observed in 1-MCP treated bananas even at the table-ripe stage. In addition, the occurrence of spot anthracnose on the peel at table-ripe stage was considerably lower in 1-MCP treated bananas compared to the control group.

According to the above results, we can conclude that 1-MCP at a concentration of 300 ppb can be used to delay the ripening process in banana cultivar 'Kolikuttu' by at least 6-9 days. Further research is needed to clarify the effect of 1-MCP on peel colour development.