

HOT ETHRAL DIP TO REDUCE POSTHARVEST LOSSES OF 'KARUTHACOLOMBAN' MANGOES

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Among the popular mango varieties, 'Karuthacolomban' is placed at the top due to its characteristics flavour, taste and attractive colour. Fungal rot at the stem-end and black patches on the skin (Anthracnose) are the two major diseases that cause severe postharvest losses in variety 'Karuthacolomban'. Fungi cause both these diseases. Infection takes place when fruits are attached to trees and symptoms develop when fruits ripe. Heavy postharvest losses are an important cause for the high market prices of 'Karuthacolomban' mangoes.

If 'Karuthacolomban' mangoes are harvested at fully matured stage, fruits undergo normal ripening resulting delicious ripe fruit with minimum disease incidence. Due to practical difficulties in identifying exact stage of maturity at harvest, a greater proportion of under mature fruits are also harvested. Under mature fruits take relatively longer time for natural ripening than fully matured fruits. This period often exceeds 10 –14 days for under mature fruits. During this period, disease symptoms development can be observed. If the ripening period can be shortened, there is lesser or minimum time for disease development. Thereby, post harvest losses due to diseases can be reduced. The reduced post harvest losses may help to bring down the price gap between grower and consumer while maintaining the quality of fruits.

ARTIFICIAL RIPENING METHODS

Of the artificial ripening methods tested, exposing fruits to ethylene gas released from diluted ethral solution in the presence of sodium hydroxide proved to be the best method for mango ripening (Sarananda *et al.*, 2000). Although the ripening process of mango can be induced, the peel colour development was remained similar to that of naturally ripened fruits. Consumers consider external appearance of the fruits as one of the most important criteria

during purchasing. Consumer attractiveness can further be increased if the ripening induction process also improves the peel colour development.

MATERIALS AND METHOD

Fully mature "Karuthacolomban" mangoes were handpicked from Mango orchard. Fruits were divided into four groups. One group of Mango was dipped in ethral solution at ambient temperature for 3-4 minutes and treated fruits when taken out. Then Ethral solution was then heated to 52°C. The second group of mango was put in a net bag and was dipped in that solution for 3-4 minutes. The 3rd group of fruits was dipped in hot water (52°C) for 3-4 minutes and taken out. The remaining group of fruits were served as untreated control.

RESULT AND DISCUSSIONS

Mangoes induced to ripe by dipping in hot ethral ripened earlier than those induced by all other methods tested in this experiment (table 1). Fruits were of eating ripe stage 5 days after the induction. Fruits induced by cold ethral and hot water took 7 and 8 days for ripening, respectively. Untreated fruits took 11 days, which was the longest time period taken to complete ripening process.

Table 1. Time taken to ripening and percentage weight loss of ripened 'Karuthacolomban' mangoes as affected by method of ripening induction

Treatment	Time taken (Days)	% Wt. Loss
Hot Ethral dip (52°C)	5 d	12.01 c
Cold Ethral dip (ambient temperature)	7 c	12.07 c
Hot water dip (52°C)	8 b	16.05 b
Untreated fruits	11 a	17.43 a

Treatment means in a column having common letter(s) are not significantly different at DMRT 5%.

These results show that treating mangoes with hot ethral increases the efficiency of action compared to the same concentration used at ambient temperature. This may be due to the fast penetration of ethral into the peel tissues at 52° C, which induces autocatalytic ethylene production by the fruit tissue. This process may be slow due to lesser penetration of ethral in the fruits treated at ambient temperature.

The higher percentage weight loss in untreated and hot water treated mangoes may be due to the longer time taken for the completion of ripening process (table 1). However, hot and cold ethral treated fruits lost almost similar weight during the ripening period and it was the least weight loss.

The total soluble solids contents of mangoes did not vary with the ripening methods used (table 2). Both ethral treatments and hot water treatment increased the total soluble solids of mangoes like in the naturally ripe fruits. Similarly, no difference in pH was observed with different methods used for ripening. However, a slight increase in acidity in ethral treated fruits was recorded compared to that in hot water dipped and naturally ripe fruits.

Table 2. Percentage total soluble solids (TSS), percentage acidity, pH, visual quality rating (VQR) and disease index (DI) of fruits ripened by different methods

Treatment	% TSS	% Acidity	% pH	%VQR	% DI	Overall acceptability
Hot Ethral dip	15.6 a	0.27 a	4.83 a	9.0 a	1.0 b	9.0 a
Cold Ethral dip	14.4 a	0.25 a	4.76 a	9.0 a	1.0 b	8.0 b
Hot water dip	15.2 a	0.19 b	4.97 a	8.0 b	1.5 a	7.2 c
Control	13.3 a	0.17 b	5.13 a	7.5 b	2.2 a	5.0 d

Treatment means in a column having a common letter(s) are not significantly different at DMRT 5%

VQR: 9 = excellent, 7 = slight defects, 5 = moderate defects, 3 = high defects cannot be sold, 1 = not edible.

DI: 1 = 1 – 10% surface affected, 2 = 11 – 20% surface discoloured, 3 = 21 – 30% surface discoloured and 4 = over 30% of the surface discoloured.

Overall acceptability: 9 = excellent, 7 = slight defects, 5 = moderate defects, 3 = high defects cannot be sold and 1 = very high defects not edible.

Visual quality rating (VQR) was higher in all ethral treated fruits compared to those of hot water dipped and untreated fruits (table 2). Reduction of VQR in hot water dipped and untreated fruits were due to poor external appearance resulting from disease development. Longer time taken for ripening in hot water treated and untreated mangoes predispose the fruits for disease development.

Overall acceptability values showed mangoes treated with hot ethral had the highest overall acceptability. The major reason for higher overall acceptability of hot ethral treated fruits was the excellent peel colour. Untreated fruits showed least overall acceptability due to poor peel colour development and disease development during ripening.

Based on these observations, the best method of inducting the ripening process of 'Karuthacolomban' mangoes is treating with hot ethral. This method develops the best peel colour, better quality while reducing disease development during its postharvest period.

METHOD OF HOT ETHERAL APPLICATIONS

Harvest well-mature mangoes and dip it in diluted ethral solution (1ml/L of water) heated to 52°C. Dip the fruits in hot ethral solution for 3-5 minutes and take them out. When surface moisture disappears, pack the fruits in boxes for 3 days for ripening process to complete.

REFERENCE

Sarananda, K.H, W.P. Hettiarachchi, S.J.M.V.L. Samarakoon and J. Eeswara (2000). Use of Ethral to induce ripening process of banana. ASDA, 2: 277 – 283