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Studies on the effect of post harvest treatmets on chemical changes during ripening of banana fruits cv. Grand Naine

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SUMMARY : The present investigation, studies on effect of post harvest treatments on chemical changes during ripening of banana fruits cv. Grand Naine was conducted in Post Graduate Laboratory, Department of Horticulture, B.A.College of Agriculture, Anand Agricultural University, Anand during October 2007. The experiment was carried out in Completely Randomized Design with four replications and six treatments. Treatments were applied with different concentrations of ethrel @ 500, 750, 1000 ppm (2 minutes dip), hot water and ethrel 250 ppm (2 minutes dip), ethrel 250 ppm (2 minutes dip) along with storing in ice and simply dipping in water formed control treatment. The different ethrel concentrations significantly influenced the chemical changes during ripening of banana fruits. Thus, it can be concluded that the banana fruits treated with ethrel at 1000 ppm was found the best for early ripening of fruits up to 8 days of storage.

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Banana occupies a prominent place among the fruit crops grown in India. Since banana is a climacteric fruit, it is highly perishable in nature. Physiological changes occurs during the post harvest storage of banana makes it unfit for consumption. The shelf life of fruits can be effectively increased if such changes are reduced. So efforts to increase the shelf life of banana should focus on decreasing the metabolic rate and reducing the synthesis of ethylene in harvested fruits. The studies on decreasing metabolic rate in banana by different post harvest treatments has been reported by George and Murangaragi (1995). Keeping the above view, the present investigation was undertaken to study the effect of post harvest treatments on chemical changes during ripening of banana cv. Grand Naine.

EXPERIMENTAL METHODS

The present investigation entitled studies on effect of post harvest treatments on chemical changes during ripening gof banana cv. Grand Naine" was conducted during October 2007 at the Post Graduate Laboratory, Department of Horticulture, B. A. College of Agriculture, Anand Agricultural University, Anand. Mature and fully developed fruits of uniform size, maturity and free from injuries were obtained from banana orchard Department of Horticulture, B.A.College of Agriculture, Anand Agricultural University Anand. The experiment was conducted in a Completely Randomized Design with four replications and six treatments *viz.,* T_0- Control (dipping in water for 2 minutes), T_1- Ethrel 500 ppm (dipping for 2 minutes), T_2- Ethrel 750 ppm (dipping for 2 minutes), T_3- Ethrel 1000 ppm (dipping for 2 minutes), T_4- Hot water dipping + Ethrel 250 ppm (dipping for 2 minutes), T_5- Ice + Ethrel 250 ppm (5kg banana+ 1kg ice kept in air tight chamber for 24 hours. Uniform size fruits were randomly selected for each treatment and fruits were dipped in the respective solution for 2 minutes and then dried in shade for 30 minutes under fan. Fruits dipped in distilled water (2 minutes) were treated as control. Treated fruits were covered in gunny bags and were kept at room temperature (25° C to 30° C) under 65-75 per cent relative humidity. Detailed observations were recorded at 2nd, 4th, 6th, and 8th days of storage for all the parameters like total soluble solids (ºBrix), reducing sugar (per cent), total sugar (per cent), titrable acidity (per cent) and ascorbic acid (mg/

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100g). Standard procedures were followed for chemical analysis. The data recorded were analyzed as per Completely Randomized Design outlined by Panse and Sukhatme (1985).

EXPERIMENTAL FINDINGS AND ANALYSIS

The experimental findings of the present study have been presented in the following sub heads:

Effect of treatments on total soluble solids (ºBrix) of banana fruits 'Grand Naine':

Data presented in Table 1 indicates that there was faster increase in T.S.S. content in fruits treated with ethrel as compared to untreated fruits. But after six days, T.S.S. content decreased in treated fruits. It might be due to increase in respiration rate and conversion of starch into sugar, with a loss of moisture content, which increased the juice concentration. Earlier, Nyanjage *et al.* (2000) and Galal *et al.* (2001) also recorded similar observations in banana during storage.

Effect of treatments on reducing sugar (per cent) of banana fruits cv. 'Grand Naine':

Ethrel treated fruits recorded higher reducing sugar up to 8th day of storage as compared to fruits under control (Table 1) . The minimum reducing sugar content of fruits at 2nd, 4th and 6th day was noted (2.06 %, 5.81 % and 6.26 %, respectively) in untreated fruits (T_0) while T_3 treatment exhibited its superiority and recorded the maximum reducing sugar content (6.25%) which remained at par with T_2 (6.08) at 2nd day after storage This might be due to the increased hydrolysis of starch to simple sugars. These results are in close proximity with the findings of Rao *et al*. (1971) and Galal *et al.* (2001) in banana.

Effect of treatments on total sugar (per cent) of banana fruits v. 'Grand Naine':

Results in Table 1 indicate that significantly the maximum total sugar 6.25 per cent, 8.04 per cent, 9.53 per cent and 12.20 per cent was noted by T_3 treatment at 2nd, 4th, 6th and 8th days of storage in banana fruits, respectively, However, the minimum total sugar content in fruits was 2.06 per cent, 5.81 per cent, 6.26 per cent and 7.69 per cent under T_0 treatment at 2nd, 4th, 6th and 8th days after storage of banana fruits, respectively. Total sugar content in banana fruits in treatment T_5 and T_0 had noted more or less similar and it increased progressively as the time of storage increased. It was possibly due to increase in the rate of normal change of poly- saccharides to total sugar because of the high rate of respiration and oxidation in treated fruits. Similar observation was also reported by Kohli and

Treatments	Total soluble solids (ºBrix)				Reducing sugar (per cent)				Total sugar (per cent)				Acidity (per cent)				Ascorbic acid (mg/100g)			
	2nd Day	4th Day	6th Day	8th Day	2nd Day	4th Day	6th Day	8th Day	2nd Day	4th Day	6th Day	8th Day	2nd Day	4th Day	6th Day	8th Day	2nd Day	4th Day	6th Day	8th Day
T_0	6.66	16.00	16.99	20.51	2.06	5.81	6.26	7.69	2.06	5.81	6.26	7.69	0.56	0.46	0.39	0.31	7.46	7.23	6.92	6.31
T_1	15.16	21.30	21.90	20.38	5.33	7.06	7.22	10.80	5.33	7.06	7.22	10.80	0.47	0.33	0.25	0.21	7.03	6.89	6.76	5.81
T_2	15.65	21.42	22.61	19.25	6.08	7.43	8.28	11.45	6.08	7.43	8.28	11.45	0.40	0.32	0.23	0.20	7.05	6.88	6.70	5.89
T_3	15.97	22.55	22.71	19.23	6.25	8.04	9.53	12.20	6.25	8.04	9.53	12.20	0.36	0.23	0.18	0.16	6.98	6.84	6.62	5.02
T_4	11.09	20.97	21.13	21.70	4.71	6.17	6.51	8.03	4.71	6.17	6.51	8.03	0.47	0.33	0.27	0.24	7.23	7.02	6.82	6.28
T_5	12.65	17.53	21.63	22.23	4.86	6.80	7.14	7.90	4.86	6.80	7.14	7.90	0.42	0.35	0.26	0.22	7.18	6.93	6.73	6.26
Sem. ±	0.31	0.46	0.28	0.37	0.07	0.12	0.20	0.23	0.07	0.12	0.20	0.23	0.01	0.01	0.01	0.00	0.56	0.05	0.07	0.12
C.D. at 5%	0.91	1.39	0.83	1.11	0.23	0.36	0.60	0.69	0.23	0.36	0.60	0.69	0.05	0.03	0.02	0.02	0.16	0.15	NS	0.37

N.S.= Non significant

Reddy (1983) and Galal *et al.* (2001) in banana.

Effect of treatments on titrable acidity (per cent) of banana fruits cv. 'Grand Naine':

Acidity (per cent) of banana fruits as influenced by different treatments were observed periodically at 2nd, 4th, 6th, and 8th day during the storage and results are presented in Table 1.The acidity of fruits at room temperature decreased with advancement in storage period under all the treatments. Significantly the maximum (0.56%, 0.46%, 0.39% and 0.31%) acidity was observed in T_0 treatment, however the minimum (0.36%, 0.23%, 0.18% and 0.16%) under T_3 at 2nd, 4th, 6th and 8th of storage of banana fruits, respectively. Results revealed that as the storage period increased, the per cent acidity decreased. This showed that as the ripening processes initiates the per cent acidity decreased and it could be converted into carbohydrates form and passed under different biochemical changes. The reduction of acidity might be due to utilization of acids by the rapid respiratory process. In this process the acids utilized in synthesis and conversion into salts and sugars. Increase in concentration of ethrel reduced the percentage of acidity was also noted by Kohli and Reddy (1983), Rao *et al*. (1971) and Galal *et al*. (2001) in banana.

Effect of treatments on ascorbic acid (mg/100g) of banana fruits cv. 'Grand Naine':

Irrespective of treatments there was a continuous decrease in ascorbic acid content of banana fruits with the progress of ripening period (Table 1). At 2nd, 4th and 8th days of storage, significantly the maximum (7.46, 7.23, 6.92 and 6.31 mg/100g,) ascorbic acid content was noticed in untreated fruits (T_0) while it was significantly reduced (6.98, 6.84, 6.62 and 5.02 mg/100g) in fruits treated with ethrel 1000 ppm (T_3), respectively. Results of ascorbic acid content in fruits was found non significant at 6th days after storage.Ascorbic acid is being utilized as respiratory substrate and is required in respiration process. The depletion of ascorbic acid on prolonged storage could be attributed to the rapid conversion of L-ascorbic acid into dehydro-ascorbic acid in presence of ascorbinase enzyme. Similar observation was noted by Kohli and Reddy (1983) in banana.

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