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STUDIES ON SHELF-LIFE OF BANANA AS INFLUENCED BY CHEMICALS

Ripe banana fruits remain edible and marketable for a very short period as they are highly perishable. Post-harvest treatment with chemicals or manipulation through other means have been adopted to extend the shelf-life of many fruits. Fruits kept at low temperature normally have extended storage life while refrigerated storage is quite unsuitable for banana as the fruits fail to ripe properly (Pantastico *et al.*, 1975). Treatment with different chemicals (growth substances, fungicides, Waxol) extended the storage life of banana cv. Basrai (AAA group) up to 16 days when kept in cartons at 30° C (Rao and Chundawat, 1984). The present study was, therefore, undertaken to find the efficacy of different chemicals on the prolongation of shelf-life as well as on the biochemical changes during the period of storage in banana cv. Giant Governor (AAA group).

Table I. Effect of chemicals on physiological loss in weight (per cent) and content of total soluble solids (' Brix) in banana during storage

Treatment	Days after storage					
	7		14		21	
	PLW	TSS	PLW	TSS	PLW	TSS
Waxol 2%	8.8	14.4	7.2	14.0	9.3	17.9
Waxol 4%	8.8	15.6	2.6	19.0	-	-
Waxol 6%	11.9	15.4	3.7	21.0	10.0	21.1
GA, 0.02%	11.5	15.0	4.8	16.2	-	-
Bavistin 0.1%	8.7	15.4	2.0	24.0	11.9	-
Dithane M-45 0.2%	8.5	14.4	4.5	24.2	-	-
Blitox 0.3%,	11.0	17.0	6.2	24.0	-	-
NAA 0.025%	11.8	17.0	9.2	22.6	-	-
Potassium metabisulphite 0.5%,	14.3	17.6	10.7	21.0	-	-
Hot water treatment at 52" C	12.6	17.6	8.8	22.8	-	-
Waxol 6% in hot water	12.8	15.4	13.7	21.0	14.5	21.1
Contol	15.0	15.4	13.2	23.6	-	-
CD (0.05)°	1.44	0.53	0.56	0.76	0.23	0.54

Angular transformed values were used for comparison in the case of PLW.

The experiment was carried out in the laboratory of the Department of Horticulture, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, West Bengal. Fruits with 3/4 maturity from the upper five hands of the bunches were collected from the Horticultural Research

Table 2. Effect of chemicals on total and reducing sugar content (per cent) of banana during storage

Treatment	Days after storage					
	7		14		21	
	Total sugar	Reducing sugar	Total sugar	Reducing sugar	Total sugar	Reducing sugar
Waxol 2%	13.3	0.1	15.4	0.3	18.2	0.5
Waxol 4%	15.3	0.2	18.9	0.3	-	-
Waxol 6%	14.8	0.1	20.0	0.3	20.0	0.7
GA_3 0.02%	14.4	0..2	14.2	5.9	-	-
Bavistin 0.1%	14.8	0.2	16.6	0.3	16.4	3.7
Dithane M-45 0.2%	14.2	0.2	16.3	4.0	-	-
Blitox 0.3%	16.0	3.9	16.6	4.9	-	-
NAA 0.025%	16.0	0.2	18.1	1.9	-	-
Pot. metabisulphite 0.5%	16.7	0.3	15.3	3.5	-	-
Hot water treat. at 52" C	15.4	0.2	14.2	2.8	-	-
Waxol 6% in hot water	14.2	0.2	20.0	0.3	17.9	0.7
Control	14.8	0.2	20.0	3.5	-	-
CD (0.05)	0.15	0.08	0.16	0.10	3.14	0.12

Station of the University. The experiment wits laid out in a randomised block design with 12 treatments and three replications. The treatments consisted of Waxol 2%, 4% and 6%, GA, 0.02%, Bavistin 0.1%, Dithane M-45 0.2%, Blitox 0.3%, NAA 0.025%, potassium metabisulphite 0.5%, hot water treatment at 52 C; Waxol 6% in hot water and control. Fruits were dipped in the chemicals for three **minutes** and kept in **wooden** boxes after drying. The fruits under control were dipped in distilled water. Each box represented one replication and contained twenty fruits. During the period of investigation, temperature and relative humidity varied between 13.78 and 35.64 C and 30.3 and 94.0 per cent, respectively. The observations on the physical and biochemical changes were recorded at seven day interval. The TSS was recorded by hand refractometer and acidity and ascorbic acid as per the AOAC (1984). Total and reducing sugars were estimated following the method of Lane and Eynon (1923) using Fehling's solution.

The physiological loss in weight (PLW) was higher during the earlier period of storage (0 to 7 days) as compared to the periods thereafter (Table 1). The PLW was maximum (15.0 per cent) in the control followed by 14.3 per cent with potassium metabisulphite 0.5%. Fruits treated with GA_3 0.02%, fungicides (Blitox, Bavistin and Dithane M-45) and Waxol showed minimum PLW on the 14th day of storage (Table 1). The reduction in weight loss in Waxol treated fruits might be due to less dehydration as a result of less transpiration. Reduction in PLW was also

Table 3. Effect of chemicals on acidity (per cent) and ascorbic acid (mg/100 g pulp) in banana during storage

Treatment	Days after storage					
	7		14		21	
	Acidity	Ascorbic acid	Acidity	Ascorbic acid	Acidity	Ascorbic acid
Waxol 2%	0.35	21.8	0.41	23.4	0.44	18.0
Waxol 4%	0.28	18.1	0.38	24.8	-	-
Waxol 6%	0.25	16.3	0.38	24.4	0.47	19.3
GA_3 0.02%	0.30	17.2	0.48	12.7	-	-
Bavistin 0.1%	0.22	18.1	0.51	10.6	0.38	15.2
Dithane M-45 0.2%	0.28	20.0	0.64	12.7	-	-
Blitox 0.3%	0.27	10.9	0.32	10.6	-	-
NAA 0,025%	0.34	18.1	0.60	8.5	-	-
Pot. metabisulphite 0.5%	0.32	16.3	0.48	12.7	-	-
Hot water treat. at 52° C	0.22	18.1	0.60	11.7	-	-
Waxol 6% in hot water	0.28	17.2	0.38	22.3	0.63	16.8
Control	0.28	15.5	0.67	12.7	-	-
CD (0.05)	0.09	0.84	0.09	0.55	0.07	0.39

reported by Pool *et al.* (1972) with GA_3 in grapes. The total soluble solids (TSS) in the pulp of fruits increased steadily as the storage period progressed (Table 1). Fruits treated with fungicides showed higher TSS content (24.0 to 24.2° Brix) after 14 days of storage. Fruits treated with Waxol 2% and 4% and hot water treatment showed minimum TSS content on the 14th day of storage. The increase in the TSS content with the advancement of storage period was due to the dehydration of fruits. These findings are in agreement with the observations made with grapes cv. Pertlette (Randhawa *et al.*, 1976) and with cv. Himrood (Dhillon et al., 1975). A continuous increase in both total and reducing sugar content was recorded with the prolongation of storage period. Similar observations for total sugar was recorded by Bal *et al.* (1978) in ber. The total sugar content in the pulp of banana fruit was found maximum (20.00 per cent) with Waxol 6%. Unlike total sugar content, the reducing sugar content was found maximum (5.9 per cent) with GA_3 0.02% after 14 days of storage. Waxol treated fruits exhibited minimum reducing sugar content during the storage period (Table 2). The acidity of the fruits increased as the storage period progressed and it was maximum with Bavistin 0.1% and hot water treatment on the 7th day of storage (Table 3). The fruits under control always exhibited higher acidity content during storage period. Initial increase (0 to 7 days) and subsequent decrease (7 to 14 days) in ascorbic acid content was noted in the present study under all the treatments except with Waxol treated fruits (Table 3). The ascorbic acid content was recorded maximum (24.8

mg/100 g pulp) with Waxol 4% on the 14th day of storage. It is apparent from the study that fruits of banana (*Musa,* AAA group) cv. Giant Governor could be kept for 14 days after harvest without affecting the quality if treatment is done with GA_3 0.02%, Blitox 0.3%, Bavistin 0.1%, Dithane M-45 0.2% or Waxol 6%.

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REFERENCES

AOAC 1984. *Official Methods ofAnalysis.* Association of Official Agricultural Chemists. Washington D.C.

Bal, J.S., Singh, P. and Singh, R. 1978. Preliminary observations on the storage behaviour of ber at room and refrigerated temperature. *J. Res. (PAU).* 15 : 396-99

Dhillon, B.S., Randhawa, J.S. and Mann, S.S. 1975. Effect of growth regulators on the storage of Himrood grapes. *J. Res.* (PAU) 13 : 267-72

Lane, J.H. and Eynon, L. 1923. Determination of reducing sugar by Fehling's solution with methylene blue as indicator. *J. Soc. Chem. India.* 42 : 32

Pantastico, E.B., Matto, A.K., Murata, T. and Ogata, K. 1975. Physiological disorder and diseases. *Post Harvest Physiology, Handling and Utilization of Tropical and Sub-Tropical Fruits and Vegetables.* (Ed. Pantastico, E.B.), The AVI Publishing Co.

Pool, R.M., Weever, R.J. and Kliewer, W.M. 1972. The effect of growth regulators on changes in fruit of Thompson seedless grapes during cold storage. *J. Am. Soc. hot. Sci. 11* : 67-70

Randhawa, J.S., Dhillon, B.S. and Mann, S.S. 1976. Effect of pre-harvest application of CCC and kinetin on the cold storage life of Perlette grapes. *J. Res.* (PAU) 13 : 267-72

Rao, D.V.R. and Chundawat, B.S. 1984. A note on retardation of ripening of Basrai bananas stored in cartons. *Prog. Hort.* 16 : 295-97