https://doi.org/10.29321/MAJ.10.A01694

Madras Agric. J. 80 (10) : 547 - 551 October 1993

POST-HARVEST DETERIORATION IN WEIGHT AND JUICE QUALITY OF CANE VARIETIES

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ABSTRACT

Harvested canes of sugarcane varieties viz., CoC 85061 and CoC 671 were stalled in open sun light, under tree shade and in open sunlight covered with cane trash. Loss in cane weight and juice quality was estimated at 24 hours interval. The cane stored under tree shade and stored upto 48 hrs. recorded significantly minimum loss of cane weight and juice quality. The CoC 85061 recorded lesser loss in cane weight, sucrose content, purity and commercial cane sugar and higher gain in reducing sugar content.

Key words: *Commercial Cane Sugar, Reducing Sugar*

INTRODUCTION

In the peak period of cane crushing, the sugar factories have to transport large quantities of cane from the fields. The farmers find it difficult to transport the cane immediately after harvest due to non-availability of vehicles in time. They have to store the cut canes till the vehicle is made available for transport. The cane weight and juice quality go down and loss occurs proportionate to the hours of stalling. The important factors influencing the deterioration of harvested canes are temperature, humidity, storage time, variety and method of storage. The deterioration in cane juice quality is influenced by storage time and variety (Balasundaram and Bhagyalakshmi, 1976). All the above factors ultimately enhance the invertase activity resulting in significant loss of sucrose recovery. Hence to study the weight loss and quality deterioration in CoC 85061 and CoC 671 varieties under different methods of stalling, this research was undertaken.

MATERIALS AND METHODS

Two popular varieties viz., CoC 85061 and CoC 671 were harvested on sixth April 1986 when the crop was 12 months old. The canes were randomly selected from the field and bundles of 10 kg each in both varieties were prepared and the bundles were labelled and weighed immediately after harvest.

Seven bundles in each of the two varieties were stalled in the three stalling methods viz., open sunlight, under tree shade and open sunlight but covered with cane trash. The treatments were replicated thrice in RBD. Samples from the weighed bundles were drawn at intervals of 0, 24, 48, 72, 96, 144 and

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168 hours after harvest and crushed in the electrically operated vertical type crusher and the juice extracted.

To determine the juice brix, sucrose and purity, the method of Spencer and Meade (1945) was adopted. Reducing sugars were estimated by Lane-Eynon's general volumetric method (A.O.A.C; 1975). Commercial Cane Sugar (CCS%) was calculated using Winter and Carp's formula. (Parthasarathy et al; 1979).

RESULTS AND DISCUSSION

The influence of varieties, storage methods and hours of storage on various traits of cane juice quality and their interactions are furnished in tables 1 to 3. Increase in hours of storage significantly affected the quality in both the varieties.

Cane weight and sucrose content

Significant difference was observed in the loss of weight among the varieties (Table 1). Loss of weight in variety CoC 85061 was lesser (13.87%) than CoC 671(16.99%). This might be due to the differences in stalk rind character of the varieties. Stalling under the shade upto 24 h. resulted in the least loss of cane weight in both varieties. The loss of weight of cane under all the three storage methods and in both varieties increased steadily with hours of storage upto 168 h. But the loss was minimum upto 48 h. of storage in both the varieties and under all storage methods. Beyond 48 h. of storage the loss was rapid upto 42.25% under open Sunlight stall and 22.37% under tree shade stall at 168 hrs.

The loss of sucrose content in the juice of CoC 85061 (4.0%) was significantly lesser than CoC 671(4.6%) under prolonged storage of harvested Canes. Among the storage methods, stalling in shade recorded the lowest loss of sucrose (1.54%) followed by open stalling (5.36%) and open trash cover (6.89%). The sucrose content of stored cane was increasing upto 48 hours of stalling followed by steady fall upto 168 h. The appreciation in sucrose upto 48 h of storage was significantly less in stalling in shade than the other methods. The gain in sucrose may be due to loss of moisture content of cane during 48 h without deterioration of sucrose due to inversion. The same trend of appreciation in sucrose in the first 48 h of stalling was also observed by Gaur and Desai, (1988).

Juice purity and commercial cane sugar (CCS%)

Juice purity was not affected by the time of stalling upto 48 h. There was a steady increase in loss of purity beyond 72 h. (Table I). Loss of purity was the highest in open trash cover (8.1%) followed by open stalling (7.27%) and stalling in shade (5.39%). Highest loss in juice purity in open trash cover may be due to increase in temperature inside the cane bundles due to trash cover in open sunlight. Loss of purity was the least in variety CoC 85061 (0.30%) while the loss was 3.68% in CoC 671.

The variety CoC 85601 recorded minimum loss in commercial cane sugar (CCS) due to stalling. The loss of CCS% in stalling the Cane bundles in tree shade was the least (1.83%) followed by open storage (2.47%) and open trash cover (2.91%). Significant appreciation in CCS% due to storage was observed upto

Table 1. Effect of variety and method of storage on cane weight and quality

Character	Method of storage									SE(d)	CD(0.05)
	Open			Trash cover			Shade				
	CoC 85061	CoC 671	Mean	CoC 85061	CoC 671	Mean	CoC 85061	CoC 671	Mean		
Loss of weight	20.53	23.52	22.02	11.64	17.70	14.67	9.46	9.89	9.67	0.183	0.369
Loss of surose	5.59	5.11	5.35	5.09	8.75	6.92	3.73	4.49	4.11	0.430	0.868
Loss of purity	9.72	10.55	10.13	10.13	11.95	11.04	7.00	9.61	8.30	0.970	N.S.
Loss of CCS%	5.02	3.62	4.32	4.71	4.47	4.59	2.36	3.13	2.74	0.552	1.110
Increase in RS%	67.53	67.10	67.35	68.35	69.13	68.74	65.27	66.21	65.74	0.047	0.090

Table 2. Effect of variety and hours of storage on cane weight and quality

Character	Variety	Hours of storage							SE(d)	CD(0.05)
		24	48	72	96	120	144	168		
Loss of weight	CoC85061	3.16	6.25	10.08	13.75	17.83	22.83	30.75		
	CoC671	2.00	6.41	11.66	15.16	19.25	24.83	32.16		
	Mean	2.58	6.33	10.87	14.45	18.54	23.83	31.47	0.280	0.565
Gain(+)or Loss(-) of sucrose	+3.62	+2.50	-3.84	-8.16	-10.69	-12.54	-10.81			
	CoC671	+5.29	+2.04	-9.95	-8.00	-8.58	-9.66	-8.10		
	Mean	+4.45	+2.27	-6.89	-8.08	-9.63	-11.10	-9.45	0.660	N.S.
Loss of purity	CoC85061	1.71	2.35	6.68	8.98	15.62	11.68	14.90		
	CoC671	1.62	2.94	10.69	12.45	13.56	14.54	15.91		
	Mean	1.66	2.94	8.68	10.71	14.59	13.11	15.91	0.640	1.292
Gain(+)or Loss(-) of CCS%	CoC85061	+1.54	+0.96	-1.89	-6.95	-10.71	14.59	6.38		
	CoC671	+2.01	+1.08	-1.15	-7.64	-10.16	10.49	6.87		
	Mean	+1.77	+1.02	-1.52	-7.29	-10.01	-9.55	-6.62	0.844	N.S.
Increase in R.S%	CoC85061	39.02	48.97	50.98	59.01	70.23	83.55	77.67		
	CoC671	34.21	46.80	58.33	58.33	67.94	82.75	78.63		

Table 3. Effect of storage method and hours of storage

Character	Method	Hours of storage							SE(d)	CD(0.05)
		24	48	72	96	120	144	168		
Loss of weight	Open Trash	3.5	9.5	16.75	21.12	27.75	33.12	42.25		
	Cover	2.75	5.5	9.87	14.00	17.50	23.62	29.75		
	Shade	1.5	4.0	6.00	8.25	10.87	14.75	22.37		
	Mean	2.58	6.3	10.87	14.45	18.70	23.83	31.45	0.343	0.692
Gain(+) or Loss(-) of sucrose	Open Trash	+1.92	+4.32	-5.37	-3.87	-9.12	-11.81	-18.48		
	Cover	+4.81	+3.30	-1.98	-8.96	-7.29	-8.57	-10.41		
	Shade	+1.98	+3.30	-1.98	8.96	-7.29	-8.57	-10.41		
	Mean	+2.90	+3.71	-7.01	-8.72	-10.41	-10.47	-12.56	0.810	N.S.
Loss of purity	Open Trash	2.85	4.74	10.35	17.61	19.14	18.51	17.65		
	Cover	2.85	7.64	14.29	19.23	21.61	19.19	18.62		
	Shade	2.71	6.14	8.22	14.29	19.23	21.61	19.19		
	Mean	2.80	6.17	10.95	17.00	19.47	18.74	16.86	0.520	1.050
Gain(+)or Loss(-) of CCS%	Open Trash	+1.21	+4.24	-4.08	-6.62	-11.02	-14.34	-9.97		
	Cover	+1.21	+12.02	-7.91	-9.37	-12.58	-12.08	-3.85		
	Shade	+1.21	+12.84	-1.15	-6.47	-8.35	-9.17	-6.30		
	Mean	+1.21	+9.70	-4.38	-7.48	-10.65	-11.86	-6.70	1.034.	N.S.
Increase in R.S.%	Open Trash	35.89	46.80	52.83	56.14	68.75	83.10	77.87		
	Cover	35.89	50.98	58.33	57.62	70.93	83.44	77.87		
	Shade	35.89	45.65	54.54	60.93	67.94	82.99	78.81		
	Mean	35.89	47.81	55.23	58.23	69.20	83.17	78.18	0.089	N.S.

48 h which might be attributed to loss in cane moisture content. The loss of CCS was steadily increasing due to prolonged stalling upto 144 h of storage. The deterioration had commenced after 48 h and increased from 72 h and the loss of CCS was steadily increasing due to prolonged stalling upto 144 h. Loss of CCS in CoC 85061 was the lowest (2.36%) in shade stalling and highest in open stalling, while the effect of both the above methods were the same in CoC 671 (Table 2).

REDUCING SUGAR

Among the storing methods, the lowest increase in reducing sugar was recorded in stalling in shade (32.89%) followed by open stalling (34.21%) and open trash cover (37.5%). The variety CoC 85061 recorded the least increase in reducing sugar in stalling in shade and in open steep upto 144 h. of storing. Heavy loss of sucrose due to inversion by the endogenous acid and neutral invertase activity in the harvested cane may be attributed to increase in reducing sugar (Jeyaseelan, 1970 and Choudappan, 1971).

CONCLUSION

Harvested canes can be stored upto 48 h. after harvest without much loss of weight and juice purity and with appreciation in sucrose content and commercial cane sugar content. Prolonged storage beyond 48 h results in loss of weigh and deterioration in juice quality, Stalling cane bundles under tree shades was superior to open trash cover and open stalling in minimising the loss of cane weight and deterioration of juice quality. The variety CoC 85061 was superior to CoC 671 as it recorded lesser loss of cane weight and lower deterioration in juice quality due to storage after harvest.

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