Sindh Univ. Res. Jour. (Sci.Ser.), Vol 33 (2): 9 – 14 (2001)

LOSSES OF JUICE RECOVERY FROM SUGARCANE BY AFTER HARVESTING TIME AND CLIMATIC CONDITIONS

Aitbar Ali Abbasi, Murlidhar Nebhwani* and Siraj Ahmed Abbasi

Department of Industrial Engineering & Management, Mehran University of Engineering & Technology, Jamshoro.

Abstract

Present research study is carried out to determine the effects of various parameters like climate change post harvesting time etc., on sugarcane juice recovery. The duration of study includes crop cutting to mill crushing and is done on different varieties of sugarcane specially the recovery of sugar from cane.

Keywords: Post harvest, Juice losses of sugarcane

Introduction

Pakistan is the 6th leading producer of sugarcane [1,2]. In other sugarcane growing countries, sugar recoveries are very high as compared to our country Pakistan [3,4]. This study provides data on sugar losses and the ratio of recovery in different parts of Sindh. Three varieties of sugarcane were sampled for post harvest losses in sugar recovery between November & January.

Materials And Method

Three varieties of the sugarcane Viz. BF-162, CPF-147 & L-116, were examined for post harvest losses and samples were taken once a month. The samples were precisely weighed at cutting stage and an interval of 1, 3, 5 & 7 days for each variety in each month (Tables A to C). Fresh cutting weight was taken as the reference value.

TABLE –A POST HARVESTING LOSSES (WEIGHT IN %) NOVEMBER 1995

S. No.	Cane variety	Reference	WEIGHING INTERVAL 1-DAY	3-DAYS	5-DAYS	7-DAYS
1.	**CPF-147**					
	Reference	6.40	6.15	5.95	5.70	5.57
	Sample:	6.40	6.14	5.97	5.69	5.57
	Index	100.00	95.93	93.25	88.87	78.00
2.	**L-116**					
	Reference	5.40	5.14	5.03	4.96	4.92
	Sample:	5.41	5.14	5.02	4.95	4.92
	Index	100.00	95.93	93.25	88.87	87.00
3.	**BF-162**					
	Reference	9.64	9.20	8.95	8.70	8.49
	Sample	9.64	9.20	8.96	8.70	8.49
	Index	100.00	95.43	92.94	90.24	88.06

TABLE –B POST HARVESTING LOSSES (WEIGHT IN %) DECEMBER 1995

S. No.	Cane variety	Reference	WEIGHING INVTERVAL 1-DAY	3-DAYS	5-DAYS	7-DAYS
1.	**CPF-147**					
	Reference	8.15	7.94	7.87	7.71	7.58
	Sample	8.14	7.95	7.88	72.20	7.58
	Index	100.00	97.66	96.76	94.80	93.08
2.	**L-116**					
	Reference	6.82	6.51	6.31	6.22	6.13
	Sample	6.81	6.51	6.31	6.23	6.14
	Index	100.00	95.59	92.63	91.45	90.13
3.	**BF-162**					
	Reference	9.31	9.00	8.91	8.65	8.49
	Sample	9.31	9.01	8.90	8.65	8.49
	Index	100.00	96.77	95.58	92.90	91.18

TABLE-C POST HARVESTING LOSSES (WEIGHT IN %) JANUARY 1996

S. No.	Cane variety	Reference	WEIGHING INTERVAL 1-DAY3-DAYS		5-DAYS	7-DAYS
1.	**CPF-147**					
	Reference	7.17	7.09	6.79	6.59	6.41
	Sample	7.17	7.09	6.79	6.59	6.41
	Index	100.00	98.83	94.65	91.85	89.17
2.	**L-116**					
	Reference	5.19	5.03	4.88	4.75	4.63
	Sample:	5.19	5.03	4.88	4.75	4.63
	Index	100.00	96.87	93.98	91.48	89.17
3.	**BF-162**					
	Reference	9.42	9.19	8.96	8.78	8.55
	Sample	9.42	9.19	8.96	8.78	8.55
	Index	100.00	97.55	90.06	92.94	86.68

Results

Results obtained for post harvest losses are summarized in Tables A to C. Showing weight losses of juice in percentage.

November

Table-A shows weight losses in 7 days for November were between 9.08 to 13.0 percent. Lowest loss was observed in variety CPF-147 and highest in the variety L-116.

December

Table-B, indicates weight losses for 7 days ranging from 6.92 to 9.87 percent. Lowest loss was observed in CPF-147 and highest in variety L-116.

January

Table-C, shows weight losses in 7 days between 10.65 to 13.32 percent. Lowest loss was observed in CPF-147 and highest in BF-162.

Factors Effecting The Sugar Losses.

Atmospheric factors not only affect the growth of the sugarcane but also affect the juice content of cane. Sugarcane is considered as essentially. Temperature and moisture are principal climatic factors that control cane growth [5].

After cutting, during the transport of cane to the mills its juice content is affected by temperature, humidity and time.

For the experimental work, 20 Kg of CPF-147 was taken. The experiment was carried out on 15th of each month during the crushing season at three different mills located at different places in Sindh. Data is presented in Table-D.

TABLE-D RECOVERY OF JUICE IN SEASON 1995-96

S.#.	DATE	NAME OF SUGAR MILLS	RECOVERY OF JUICE (IN %)
1.	15.11.1995	Piaro goth	9.78
2.	15.11.1995	Thatta	8.60
3.	15.11.1995	Bawany	8.61
1.	15.12.1995	Piaro goth	10.03
2.	15.12.1995	Thatta	8.85
3.	15.12.1995	Bawany	8.86
1.	15.01.1996	Piaro goth	10.86
2.	15.01.1996	Thatta	9.96
3.	15.01.1996	Bawany	9.28

As temperature over Sindh varies, so does the temperature in crushing season in the areas under study. The study was conducted in the months of November, December and January. When the temperature in upper Sindh is low as compared to lower Sindh. Due to the low temperature, the losses in recovery are less at Piarogoth as compared to Thatta and Bawany.

From the analysis of Table-D, it is observed that the average recovery of juice at Piarogoth Sugar Mills is higher than other mills, i.e, 10.22% whereas lowest recovery is seen in Bawany Sugar Mills, i.e, 8.91% as shown in Table-E.

TABLE-E AVERAGE RECOVERY OF JUICE (IN %)

S.NO.	NAME OF MILL	AVERAGE RECOVERY OF JUICE
1.	Piarogoth	10.22
2.	Thatta	9.13
3.	Bawany	8.91

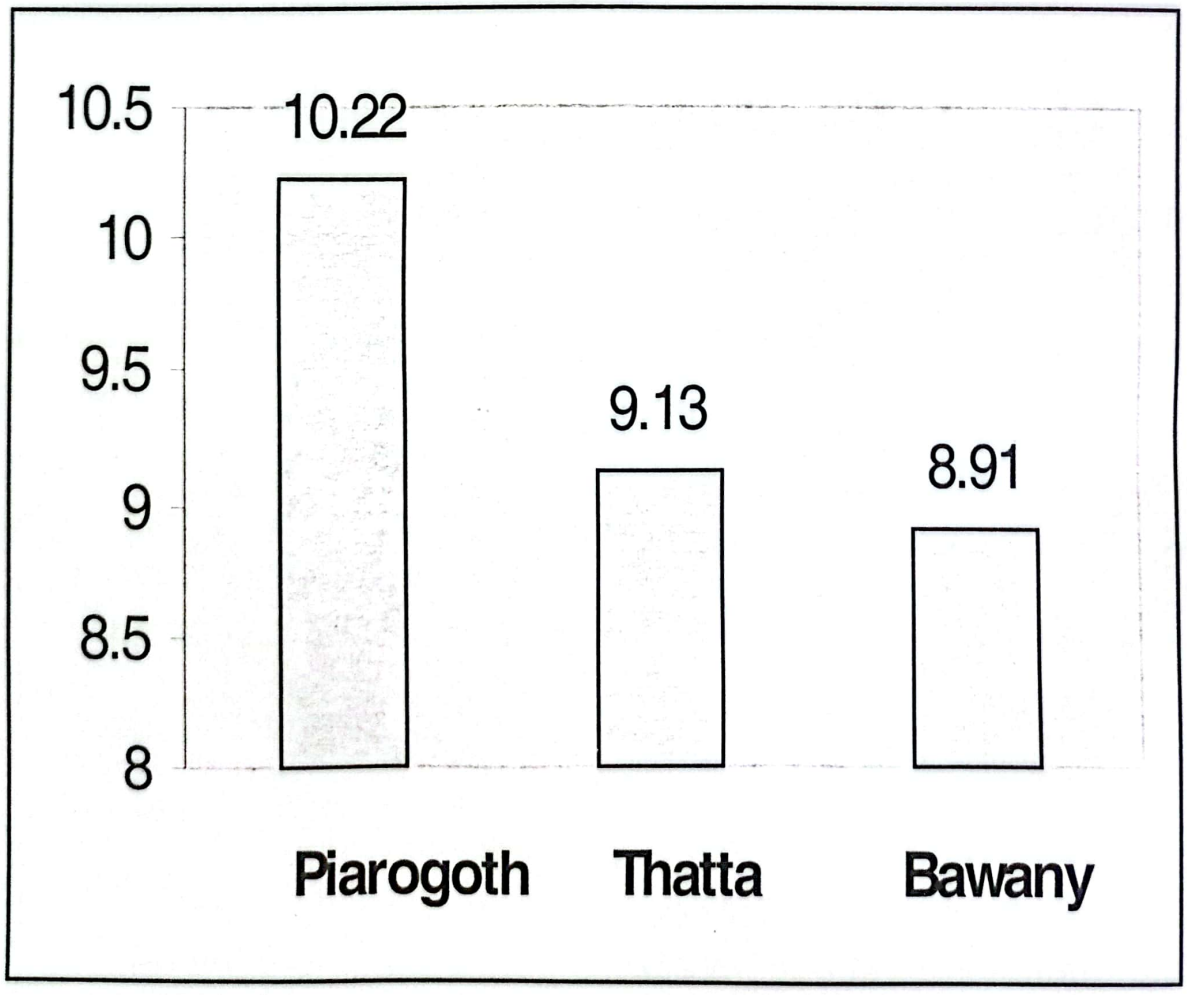


Figure 1: Average recovery of juice (in %)

Conclusion

With the passage of time after harvesting, recovery of juice becomes less and there occur loss of sugar. There is a great impact of climate on juice recovery as well as the growth of sugarcane. In the areas where temperature is low in crushing seasons, we achieve higher recovery of juice as compare to areas of comparatively high temperature. After the cutting of sugarcane, loading and transportation from field to mills, humidity, temperature and time factor affects ultimately on juice recovery from sugarcane.

References:

1. Rukhsana Nawaz, Azizullah Memon, Muhammad Nawaz Chand, A. Ghani Memon. (1992) . "An Analysis of Sugarcane production in Pakistan". A Research Journal Vol.- V Shah Abdul Latif University.

2. Johnson, J.C, (1976) "Specialized Sugar for Food Industry"Noyes, Park Ridge, N.J.

3. Pancost, H.M and W.R. Junk, (1980) "Handbook of Sugars" 2nd. Edition, New York .

4. George T. Austin, (1985) "Shreve's Chemical Process Industry"5th. Edition, London .

5. Honig, P (1962) "Principles of Sugar Technology" 3rd. Edition, Elsevier, New York .