

AN EXPERIENCE OF SUGAR LOSSES REDUCTION IN FINAL MOLASSES % CANE IN JDW-III GHOTKI

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ABSTRACT

Alhamdulillah we are achieving Highest Recovery in Pakistan from last 4 years in JDW-III Ghotki (Except last year). This Highest Recovery was based on Sugar Cane quality & Sugar extraction by mean of milling & processing. Highest Sugar content cane development & procurement programming is play vital role in our plant. Plant Operation Conditions, Milling Techniques, Process Description, Equipment Description, Juice Clarification, Fine Liquor Production, Molasses reduction by mean of our boiling technique are considered in this paper. Slurry preparation C-seed boiling and C- Continuous Pan boiling & boiling scheme also explain by mean of necessary calculations.

INTRODUCTION

We are reducing molasses % by mean of following few important modification and installation of equipments.

Percentage of final molasses play an important role in recovery enhancement, therefore by reduction of final molasses % cane, we can increase our recovery. We have high crusher juice purity; we introduce some new techniques to lower the final molasses purity and % age of final molasses. We achieved 4.19% final molasses % cane and 1.26 % sugar lost in final molasses, by using described technique in last 4year (average).

No doubt final molasses % cane depend upon cane quality but also by using condensate water for imbibition purpose, by controlling Dextran level, by achieving best juice clarification, by controlling molasses recirculation & C-massecuite boiling techniques, final molasses % cane may be reduced tremendously. All of these mentioned controlling parameter are being discussed in this paper and also our last 4 years results are tabulated for reference.

MOLASSES REDUCTION TECHNIQUES

1. IMBIBITION BY PURE CONDENSATE
2. DEXTRAN LEVEL CONTROLLING
3. SCUM DE SWEATING
4. JUICE CLARIFICATION
- " MASSECUITE CURING TECHNIQUES
5. A-HEAVY PURITY CONTROLLING
6. B-MASSECUITE

7. SUGAR SLURRY PREPARATION
8. C-GRAINING AND C-MASSECUITE
9. C-MASSECUITE CURING AND FINAL MOLASSES PURITY
10. C-MASSECUITE CURING IN MODIFIED BASKET

DETAIL OF MOLASSES REDUCTION ACHIEVEMENT BY USING FOLLOWING TECHNIQUES

1. IMBIBITION BY PURE CONDENSATE :

By using impurity free water, non sugar may be controlled for this purpose we have hot water (condensate) reservoir of capacity 1000m³ and mill house imbibition tank capacity 25m³, its temperature remained between 65-60°C. This condensate water is being used by mean of auto controlling system based on cane crushing rate. Average water addition % on cane, remained 40% for this purpose. To cool down the condensate water 4 cluster of capacity 25 M. Ton are being used for this purpose installed at hot water reservoir.

2. DEXTRAN LEVEL CONTROLLING:

Higher the Dextran level high will be Final Molasses % age, to control Dextran level in raw juice, we used Bleaching powder and Biocide 15ppm on cane and kept Dextran level same by proper sanitation at mill house and chemical treatment. Therefore we achieved Dextran level 12000-15000 PPM in mixed juice. Auto programming Dextran calculating apparatus Dr-2700 is in our laboratory being employed.

3. SCUM DESWEETING :

Scum of Talo refinery is desweeted in 3.5 meter dia scum clarifier & its sweet water is used for preparation of lime saccharate and desweeted scum is sent in mud tank. Due to this improvement in juice clarification is achieved and extra load of scum is reduced on juice clarifier. Also having great advantages when cane crushing stopped and no way to dispose of scum except in drain, during this period its sweet water is sent to pan storage tanks.

4. JUICE CLARIFICATION:

st Clarification, final molasses % age will be decreased in our juice clarification, we get clarification effect 12.5% and its ICUMSA unit remained 13500. Therefore for achievement of best clarification, we are using sweet water of scum clarifier for preparation of lime saccharate. Lime saccharate is being fed in suction line of defecated Pumps, which pH is monitory auto by system, kept 7.2-7.4.

5. A-HEAVY PURITY CONTROLLING TECHNIQUE:

10-15 degree purity drop from A-Massecuite to A-Heavy is suggested as best for quality sugar. Following consideration are carried out.

B-Seed 88 Purity and C-Seed 90 Purity is used for A-graining and good A-grain free of false grain is used for A-massecuite exhaustion. Brix of A-Massecuite is maintained at 94 for better curing.

For achievement of low purity A-Heavy, we are boiling three extra A-1 massecuite per shift by using rejected runoff and also using 0.06 mm nickel working screen (1st used in C-curing) for A-massecuite curing.

A-Massecuite Purity	81.77
A-Heavy Purity	64.80
A-Sugar Purity	97.40

6. B-MASSECUITE

We have 3 batch type Pan of 50m³ for B-Massecuite boiling A.H is taken as footing material and it grained by using slurry. 2 part of this B-Grain is cut in B-vacuum crystallizer and 1/3 Part in used for B-massecuite boiling by feeding A-Heavy in these Pan till boiling is completed. C-Light and B-heavy is strictly prohibited to use in B-massecuite boiling in any stage, due to this C-Light and B-Heavy circulation is controlling. We obtained B-Massecuite production and following results.

B-Massecuite	: 66.18
B Sugar	: 88.12
B-H Purity	: 44.85

7. SUGAR SLURRY PREPARATION TECHNIQUE :

Slurry machine horizontal type containing 16 Nos. of S.S Bar of Ø24mm are used for preparation of fine paste of sugar, (Slurry) for graining B/ C- massecuite, containing uniform crystals. It play vital role for boiling a good quality C-massecuite.

8. C-GRAINING AND C-MASSECUITE:

C-grain is basic necessary requirement for reduction of final molasses quantity. For boiling of C-grain 40m³ Pan is used, we drop 5 Pan in a day, initially 3/4 A Heavy & 1/4 C-Light of quantity 20 M.Ton is taken in Pan as footing material. Slurry is used for graining purpose. After feeding slurry we used exhaust steam instead of vapor. The steam consumption remained between 3.0 - 3.5 M .Ton, Pan take 2.25 hrs for completion of boiling, its dropping purity kept 60°- 61° by fed in C- Light and B-Heavy as per requirement. Regular hard and dust free grain is obtained. This grain is fed in C-Conti Pan for producing a C-massecuite and run on routine practice.

1)	C-Massecuite Graining Purity	62.59
2)	C-Massecuite Cut Purity	60.40
3)	C-Massecuite Purity	51.80

9. C-MASSECUITE CURING AND FINAL MOLLASSES PURITY:

6 No. vertical crystallizer of capacity 175m³ each used for cooling and reheating in two heaters. Seven Nos.CFW machine of BMA K1100 are used for curing. Nickel Screen of 0.06mm are implying as working Screen, replaced after 15 days and re-used in A-centrifugal machines. Results obtain are given below.

1)	Final Molasses Purity	31.21
2)	Final Molasses Brix	94.81
3)	C-Sugar Purity	78.79

10. C-MASSECUITE CURING IN MODIFIED BASKET:

C -Massecuite curing in new Basket of having perforated Area equal to Ø8" instead of 6" (inches) pipe area following results are obtain at 65A load

Final Molasses		C-Sugar	
Brix	Purity	Brix	Purity
96.60	31.08	99.00	81.51

Comparison of old and new baskets is given

	<u>OLD</u>	<u>NEW</u>
1. Opening Area of Holes	0.015m ²	0.0365m ²
2. Basket middle line holes Nos.	216	286
3. Basket Middle line holes Dia	8mm	12mm
4. Molasses Pipe Dia	6"	8"

RESULTS:

This year molasses results are tabulated as reference:-

1	Final Molasses Brix	94.506
2	Final Molasses Pol	29.589
3	Purity Final Molasses	31.210
4	Molasses % Cane	4.3763
5	Sugar Lost in Molasses % cane	1.2949

CONCLUSION

1. By implying described techniques, we reduced final molasses % cane.
 - I. Final Molasses % age cane
 - II. Sugar lost in final molasses

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FOUR YEARS RESULTS

Sr.#	Season	2008-09	2009-10	2010-2011	2011-2012
1	Total Days	94	117	121	117
2	Cane Crushed (M. Tons)	552,646	786,256	1,051,524	1,135,063
3	Sugar Production	62483.50 M.T (1249670 Bags)	83696.750 M.T (1673935 Bags)	115033 M.T (2300660Bags)	120721 M. T (2414427Bags)
4	Recovery %	11.30	10.64	10.94	10.63
5	Average Cane Crushed/Day (M. Tons)	5879	6720	8690.28	9701.39
6	Mill Extraction	95.10	95.59	95.76	95.94
7	Primary Juice Purity	83.69	81.33	82.38	81.14
8	Pol % Cane	13.28	12.59	12.78	12.51
9	Average Added water % Cane	37.79	36.10	34.45	39.11
10	Pol% Bagasse	1.93	1.711	1.761	1.62
11	Fiber % cane	15.10	14.70	13.78	14.10
12	Pol % Mud	2.24	2.37	2.70	2.33
13	Pty. Final Molasses	33.46	32.06	32.47	31.21
14	Molasses % Cane	4.05	4.41	3.95	4.37
15	Sugar Lost in Molasses % cane	1.25	1.31	1.20	1.29
16	Total Losses	1.98	1.94	1.84	1.88