

Improve of Sugar Content and Purity by Adding Beet Juice to Cane Juice

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ABSTRACT

The study aimed to improve the quality of Cane juice by adding sugar Beet juice and determining the best addition ratio of sugar Beet juice to sugar Cane juice. The experiment is conducted by mixing beet juice with the cane juice by different ratio, begin experiences by ratio %5 of beet sugar juice and 95% of sugar cane juice until we reach the ratio equal of Beet juice and cane juice and to know the change that happens to Cane juice after mixing. where the calculation were carried out by the formula for calculating the concentration of mixtures.

This study showed the improves of quality parameters of the mixture of Beet juices and cane juices Positively. The pol increase from 10.5 to 21.5 and the Brix increase from 13.4 to 25.1. The purity of the blended juice increased significantly where before the addition of sugar Beet juice was 78.3 and after addition of sugar Beet juice recorded purity 88.65. The pH value increased from 5.2-6.65 .. Each increased percentage added Beet juice note the improvement in the properties of mixed juice, especially in the degree of purity. The study was recommended to add Sugar Beet juice to Sugar factories in Sudan to improve the quality of Cane juice and conduct more studies on the effect of adding sugar Beet juice to sugar Beet juice

Keywords: Improve ,Beet juice ,Cane juice ,Sugar content ,Purity

INTRODUCTION

Sugar production was considered as an important chemical industry. The raw material for this process can be obtained from Cane and Beet. Beet Sugar plant the Mediterranean basin and bred and developed as an alternative to Cane in Sugar production due to lack of success of the Sugar Cane and cold regions and thus the difficulty of obtaining Sugar and in recent decades moved Sugar Beet south to the sub-tropics where produced in Pakistan, Egypt and morocco large amounts but in can be said that the production of Sugar from Beet in Egypt increased its production of Sugar Cane in recent years(Mathur,1990).

And more recently has been producing some varieties of Sugar Beet suited to tropical conditions and named tropical varieties and conducted research in Sudan for a period of more than ten years the results indicated the possibility of Sugar Beet cultivation in Sudan with great success in the winter season in Sudan. Although the process that the Sugar industry of the Cane is similar in its large operation production of the Beet ,variation in one of the stages and some of the properties of the final product to make the industrial disappear from the Cane to the Beet .

This difference led to the separation of industry every type of the modern ,the appeared the idea was to mix the two types any operation mixing the Beets with the Cane and is the idea aimed at the development of the industry and take advantage the properties to increase the quality, In previous years it has been conducting this experiment in the Guneid Sugar factory (Gazeera state ,Sudan) by mixed Beet juice with the Cane juice by different ratio (Yasir *et al*,2011).

This study and calculation improves quality parameters of the mixture of Beet juices and Cane juices positively, there was an increase in pol and purity of the mixture, which is reflected in the improvement of the production

processes of purification, evaporation, crystallization and in the amount of Sugar produced (Dambalkar *et al*,2015).

MATERIAL AND METHODS

Analysis of samples before and after the completion of the experiment include analysis of the elements below:

1. Cane juice
2. Beet juice
3. Mixed juice

Take reading for Polarization-pol and Purity-Pty

Conduct analyses of the juice of Beet and Cane juice before mixed

Calculation equation of mixer concentration

$$E_{mix} = E_C * X_C + E_B * X_B \quad (1)$$

E_C parameter value of Cane,

X_C ratio addition of Cane juice

E_B parameter value of Beet ,

X_B ratio addition of Beet juice

The experiment is conducted for wide range of Beet Sugar juice and Sugar Cane juice ratio (5 -95%). The first experiment is conducted by using ratio 5% of Beet Sugar juice and 95% of Sugar Cane juice .

The experiment were continued until we reach the ratio equal of Beet juice and Cane juice. All samples were collected and tested for Sugar content and purity((Asadi, 2011).

Table (1): Added ratio of Beet juice to Cane juice

Ratio Beet juice %	Ratio Cane juice %
5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50

RESULTS AND DISCUSSIONS

Samples were taken over several months during the production season October, November, January, February and March. The months were chosen based on the beginning of the season, end of the season and the middle of the season. Table (2) showed the Sugar content in mixed juice after adding (5-50) % of Beet juices to Cane juices during the five months production.

Table 2: the samples during five season

Month	adding ratio of Beet juice										
	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
October	12.8	13.2	13.6	14	14.5	14.9	15.3	15.8	16.2	16.6	17.1
November	13.7	14.1	14.5	15	15.4	15.9	16.3	16.8	17.2	17.7	18.1
January	17.2	17.6	18	18.4	18.9	19.3	19.7	20.1	20.6	21	21.4
February	16.2	16.7	17.2	17.7	18.2	18.7	19.2	19.7	20.2	20.7	21.2
March	10.5	10.8	11.1	11.5	11.8	12.2	12.5	12.9	13.2	13.5	13.9

Table 2 show a noticeable increase in the percentage of Sugars content during the five months mentioned above. Also noticed that, at the beginning of the production season in October, the value of Sugars content before addition of Beet juice was 12.8, and after the addition of Beet juice the value of Sugars content increased to 17.1. In January which is considered as the one of the best production months, the value of Sugars content before the adding of Beet juice was 17.2, this meaning the value of Sugars content rise to the point which it became equivalent to the best value of Sugars in the best month.

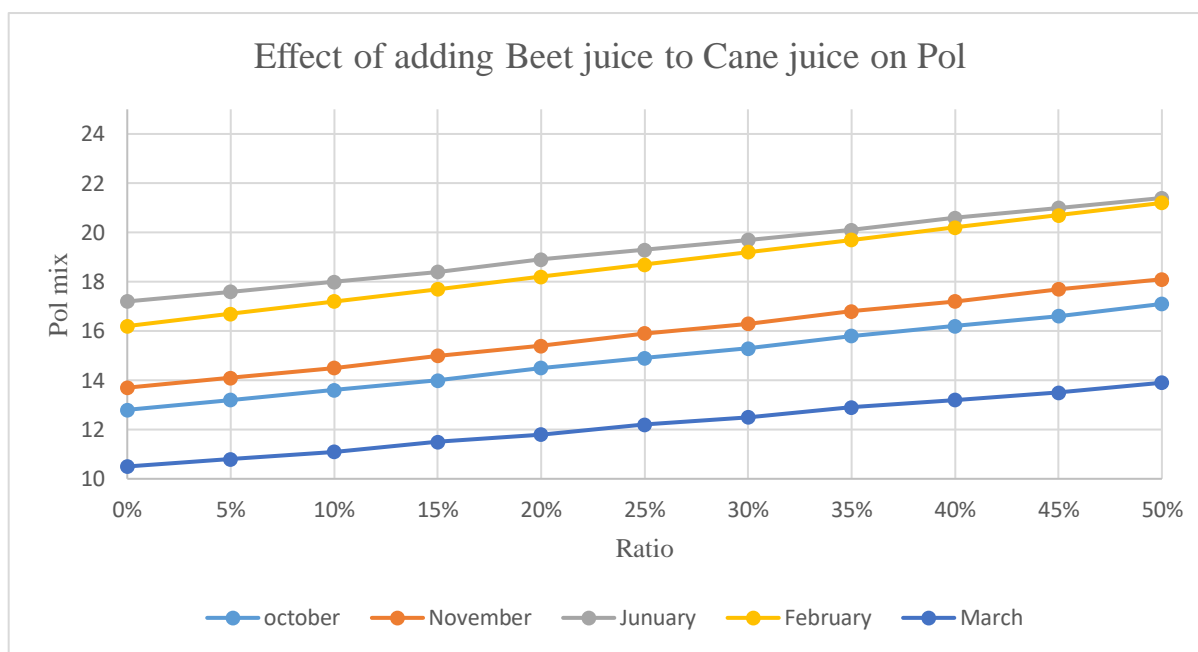


Fig (1): Added ratio of Beet juice with pol mix graph

Table (3): Study the effect the adding a ratio (5-50) % of Beet juices to Cane juices on purity in a five months production period

Month	Adding ratio of Beet juice										
	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
October	79	79.4	79.8	80.2	80.6	81	81.4	81.8	82.2	82.6	83
November	82.5	82.6	82.7	82.8	82.9	83	83.1	83.2	83.3	83.4	83.5
January	81.5	81.8	82.1	82.5	82.8	83.2	83.5	83.8	84.2	84.5	84.9
February	88.5	88.51	88.53	88.54	88.56	88.57	88.59	88.6	88.62	88.63	88.65
March	78.3	78.4	78.6	78.7	78.9	79	79.2	79.3	79.5	79.6	79.8

Table 3 shows the improvement in the purity of the mixed juices, especially in October which is considered the beginning of the production season and also the same effect on April which is considered the end of the season.

The increase in the quality of the juice and the more the degree of purity of the juice increased, the more the accompanying processes of purification, evaporation and crystallization process were going better, increase the

value of the crystal (0.1) is equivalent to thousands of tons of the amount of Sugar produced an increase in quality means an increase in the amount of Sugar produced.

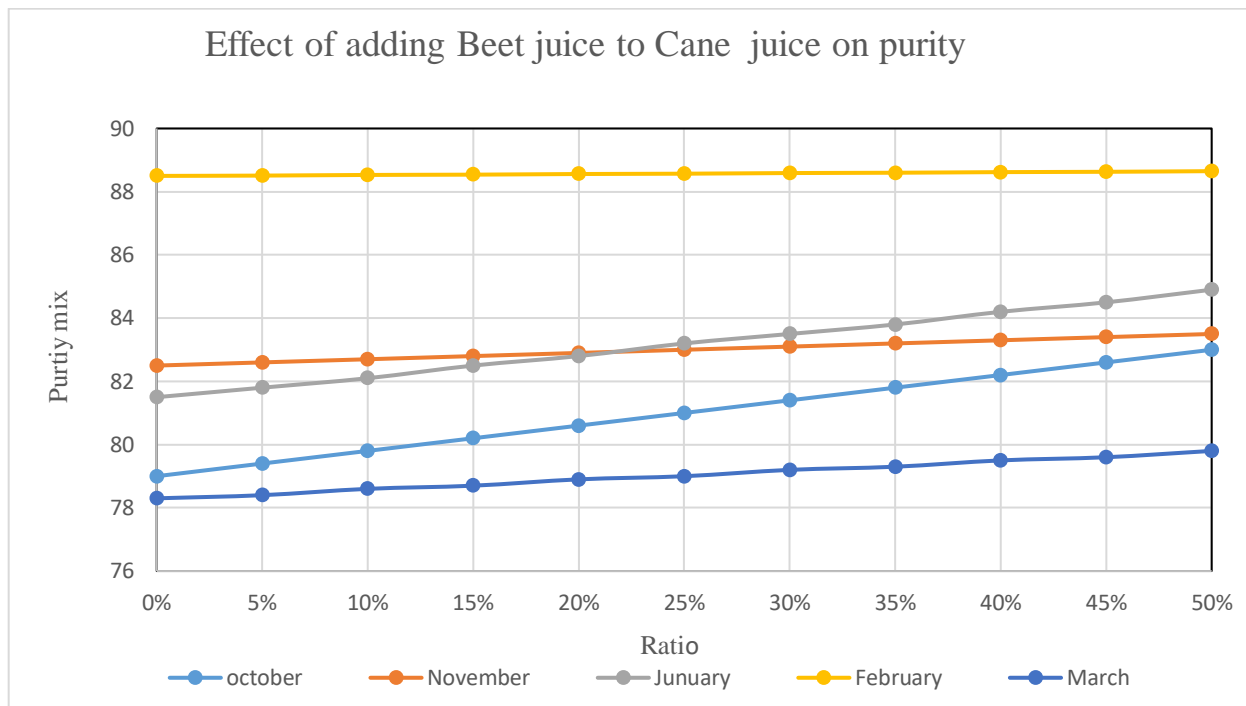


Fig (2): Added ratio of Beet juice with Purity mix graph

CONCLUSIONS

The effects of different values of adding Beet juice to Cane juice on pol and purity properties have been studied, in this research, these effects were identified and explained in tables and chart.

At the end of this research, it became clear the importance of mixing Sugar Cane juice with Sugar Beet juice, the importance of mixing became clear from the results of the experiment, which were to improve the quality of the mixed juice.

The Sugar content in the mixed juice increased significantly from 10.5 to 21.5 and the purity of the mixed juice increased significant, where before the addition of Sugar Beet juice was 78.3 and after the addition of Sugar Beet juice recorded purity 88.65, this improving the quality standard is positively reflected in improving the production processes of purification, evaporation, crystallization and in the amount of Sugar produced.

Each increased percentage added Beet juice note the improvement in the properties of mixed juice, especially in the degree of purity, which is also reflected in the amount of Sugar produced.

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