

To Study Sugarcane Juice and to Study its Shelf Life

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Abstract: The Main Objectives is to Study The sugarcane Juice and to Increase the shelf life of it. The purpose is to Increase the nutritional value of sugarcane juice by chemical method and pasteurization method. Chemical method was studied by adding (KMS, Sodium Benzoate, Citric acid,) and kept in refrigeration for 1 week. Without addition of the chemicals, we can only preserve the sugarcane juice for 8 hours in refrigerator. Normal Temperature the Shelf Life of sugarcane juice is 2 to 3 hrs after that nutritional value are goes on decreasing. After preservation of sugarcane juice by adding chemical (KMS, Citric acid, Sodium Benzoate) for 1 week Microbial analysis of sugarcane juice sample was done , in which E. coli, coliform and enterococci bacteria were found to be present in sugarcane juice sample which are not consumable for health and industry purpose, which means after addition of chemicals sugarcane juice can only be preserved for less than a week.

Keywords:- Sugarcane Juice; *Saccharum officinarum*

I. INTRODUCTION

Sugarcane juice is the fluid obtained by pressing sugarcane. It is a well-liked beverage, particularly in areas where sugarcane is farmed commercially. Nowadays, the majority of sugarcane comes from Latin America, Southeast Asia, India, and North Africa. From ancient times, sugarcane has been used as a sweetener, and today, large amounts of refined sugar. It hydrates the body quickly when exposed to prolong heat and physical activity. It is excellent substitutes for aerated drinks and cola; it refreshes and energizes the body instantly as it is rich in carbohydrates. Sugarcane juice has significant values of (carbohydrates, magnesium and iron) and vitamins (complex B and C). (Shahi, H.N, 1999)

Around 271 million tons of sugarcane are produced in India overall. Sugar, jaggery, and Chandrasiri are just a few of the sweeteners that are produced from it. Only a small amount of sugarcane is used for other things. Nearly the entire nation can buy sugarcane juice. But, as the juice is stored, it begins to darken and show significant sedimentation. (Sivasubramanian, C.G, 1994)

The stomach, kidneys, heart, eyes, brain, and sex organs are all strengthened by it. Fever can benefit from the juice. Juice from sugarcane can help with infrequent urination. It should be used with coconut water, lime juice, and ginger juice for best benefits. It might speed the recovery from jaundice when used with lime juice. Sugarcane juice is a calorie-dense beverage. So, it works well as a treatment for being too thin. Regular use of it can result in a rapid weight gain. (Karthikeyan and Samipillai, 2010)

The delicate flavor of juice is negatively impacted by conventional heat processing, which adds the taste of jaggery. The type of sugarcane and growing techniques have an impact on the juice properties as well. polyphenol oxidase is the main enzyme responsible for the coloring of sugarcane juice, and its activity can be enhanced by heating the enzyme. It states that

adding citric acid or ascorbic acid to juice also resulted in a pleasing dull orange color. It states that pasteurization, Sulphur dioxide preservation, and the addition of lemon and ginger decreased physio-chemical alterations in ready-to-serve sugarcane juice during storage. (Blucher, C.S. and Robinson, S.P, 1994)

For thousands of years, sugarcane has been used as a sweetener, and it is still utilised today mostly as refined sugar. (Phanikumar, 2011) The sale of cane juice for ultimate consumption is primarily carried out by street vendors, frequently in unsanitary conditions. If the cane juice is harvested and maintained in a hygienic manner, it will readily solve our big population's nutritional needs. (Kapor, K.L, 1978)

Fresh sugarcane juice's limited shelf life and flavour sensitivity to heat are its key drawbacks. Because of this, most efforts to preserve sugarcane juice have concentrated on using refrigeration, mild heating, and preservatives. When heat processing is not feasible, product stability can be improved by minimum processing using various barriers to microbial growth. Hence, the first barrier to reducing microbial load is adequate sanitation, and low storage temperature further slows development. Many organisms cannot grow in an environment with a pH of less than 4.5 because it is too acidic. Fruit juices in general are acidic and can be used to acidify sugarcane juice. Preservatives that are antimicrobial and either natural or synthetic in nature also help. The shelf life of the juice has been found to be extended by low temperature storage. Bhupinder,(K., Sharma, 1991)

To extend the shelf life of sugarcane juice, numerous researchers and scientists have sought to develop a variety of preservation processes and techniques, including the use of natural preservatives, chemical preservatives, thermal treatments, non-thermal treatments, and the hurdle approach.

II. MATERIALS AND METHODOLOGY

The present study entitled "Preparation of sugarcane juice and to study its shelf life " was carried out in the Department of Food Technology, Parul Institute of Applied Sciences, Parul University, Vadodara. This section enlists the material used and elaborates the processing techniques, organoleptic evaluation and analytical procedure following during the research.

Three preservatives were used

- Citric acid
- Sodium Benzoate
- KMS

According to the three preservatives used there were 3 methods used as follows:-

Method 1: -

1. Take a fresh sugarcane juice in 250 ml in 1st plastic Bottle.

2. Add 0.5 in KMS (Potassium Metabisulphite) shake it well and kept in Room Temperature.



Method 2: -

1. Take a fresh sugarcane juice in 250 ml of 2nd plastic Bottle.
2. Boil sugarcane juice and add 0.3 in Sodium Benzoate in sugarcane sample.
3. Shake it well and kept in refrigerator.



Method 3: -

1. Take a fresh sugarcane juice in 250 ml of 3rd plastic bottle.
2. Add 0.5 % citric acid in 3rd sugar sample bottle preparation.
3. Shake it well and keep in refrigerator.



Microbial Analysis

1. Preparation of Agar plate

1. preparation of saline solution: -
2. In 100ml of distilled water add 0.85 NACL.
3. Make 9ml of each test tube.
4. Dilution of 1ml each test tube.
5. Take 4th dilution of sugarcane juice.
6. Pour the plate count agar media in Petri dish.
7. Kept solidified the media for 15-20 min.
8. kept in Hot air oven.



Serial Dilution of Sugarcane juice: -

1. Taking the 10^6 the dilution of SPA
2. of sugarcane juice sample (Citric acid) = Bacteria count (30).
3. Taking the 10^4 the Dilution of (VRBA) Sugarcane juice sample (sodium benzoate)=Bacteria count (15).

2. Preparation of Media (VRBA)

METHOD:

Distilled water in 1000 ml should have 41.53 grammes. For the medium to thoroughly dissolve, heat while stirring until boiling. Pour into sterile Petri plates with the inoculum after cooling to 45°C . A 1 mL aliquot of the test material should be transferred to a petri dish. At 48°C , add 10 mL of Violet Red Bile Agar and stir to combine. Before incubating the medium at 35°C for 18–24 hours—use 32°C for dairy products—let the medium solidify. Look for purple-red colonies with a 0.5 mm (or bigger) diameter and a zone of bile acid precipitation.



Sensory Evaluation.

Probiotic chocolate was evaluated by 3 panellists .

The samples were evaluated for appearance, colour, melt in mouth, texture, flavour, taste and overall acceptability, using 9-hedonic scale test as described by Larmond (1991)

Scores to Be Given As Follows

1. Liked extremely – 9
2. Liked very much – 8
3. Liked moderately – 7
4. Liked slightly – 6
5. Neither liked nor disliked – 5
6. Disliked slightly – 4
7. Disliked moderately – 3
8. Disliked very much – 2
9. Disliked extremely – 1

III. RESULTS AND DISCUSSION

The parameters like moisture content, Sugar content, Reducing sugars and microbial Analysis (TPC and yeast and mould) were evaluated for sugar cane juice and presented in the table 1.

Table 1: Composition of Sugar Juice

Composition	Amount of sugarcane juice analyzed.
1. Moisture	82.91%
2. Ascorbic acid	3.39mg/100ml
3. Reducing sugars	0.50%
4. Total sugars	16.32%
5. Total carbohydrates	9.23 gm/100 ml
6. Viable bacterial count	4.56 x 10 cfu/ml
7. Viable yeast and mold count	2.6 x 10 cfu/ml

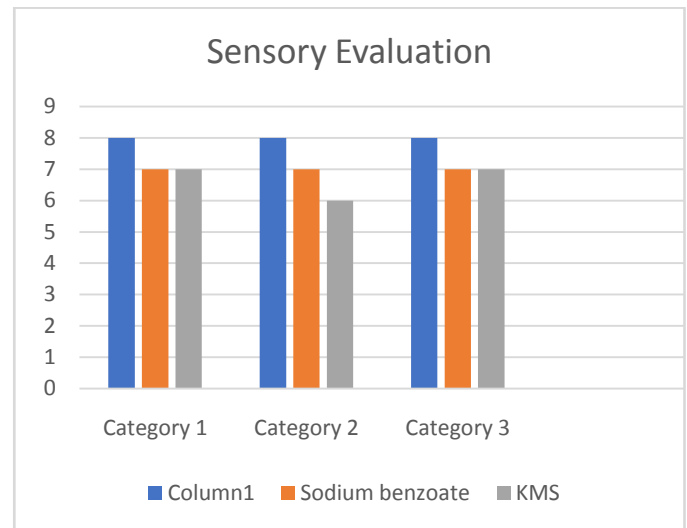
Organoleptic evaluation of probiotic chocolates

Sensory evaluation acceptance tests was performed for sugarcane juice which was formulated by addition of chemical preservatives such as citric acid, KMS and Sodium benzoate.. The acceptance scores were assigning for varies sensory parameter like colour, flavour, taste, texture, appearance and overall acceptability.

Table 3: Organoleptic evaluation of Sugarcane juice

Sr No	Parameter	Citric acid	Sodium benzoate	KMS
1	Colour	8	6	7
2	Flavour	8	7	6
3	Texture	8	6	7
4	Appearance	8	7	7
5	Overall acceptability	8	7	7

It was observed that highest overall acceptability score was awarded for citric acid 8 because it got acceptable result in colour, flavour, texture, appearance and overall acceptability. So that based on sensory data for citric acid sample was finalized which acts as a good preservative as compared to other two preservatives used.



Microbial analysis of Sugarcane Juice

- **Total plate count (TPC)** : The TPC value in T3 was observed as (4.56 x 10 cfu/ml). With different treatment there is a significant difference in TPC.
- **Yeast and mould count:** Potato dextrose agar was used for detection of yeast and mould count and kept for 25-30°C for 3 to 4 days after incubation 2.6 x 10 cfu/ml were found.

CONCLUSION

We can conclude that at normal temperature after removing of sugarcane juice we can hardly preserve for 2-3 hours. This study was to know for many days can we preserve the juice using chemicals Adding chemical to increase the shelf life of sugar cane juice at industry level and we can easily store the sugarcane juice at refrigeration condition . We can preserve for 1 week but not more than that since after performing microbial test after a week it showed microbial growth in juice which is not consumable by us. Hence , we can conclude that chemicals can help preserve the juice for a week but not more than that and out of 3 chemicals used Citric acid proves to be the best.

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