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DEVELOPMENT AND CHARACTERIZATION OF EXQUISITE PASSION FRUIT

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Abstract

Carbonated water is water containing dissolved carbon dioxide gas, either artificially injected under pressure. soda contain added or dissolved minerals such as potassium bicarbonate, sodium bicarbonate, sodium citrate. Carbonated water does not appear to have an effect on gastroesophageal reflux disease and improves satiety or feeling of fullness that could be a benefit for people who constantly feel hungry. In this study nutritious passion fruit is used as flavouring and it is a tropical fruit that grows on vines belonging to the genus *Passiflora*. The pulp is typically bright yellow or orange, with a gelatinous texture. Its flavour is an exquisite blend of sweet and tart. Provides key nutrients Rich in antioxidants, Good source of Fiber, Low glycaemic index, Improve insulin sensitivity Boosts the immune system, Supports heart health, Reduce anxiety. This study to develop the Flavoured carbonated soda from passion fruit nectar in different concentration (10%, 15 %,20%) along with granulated sugar, water, citric acid, carbon dioxide etc..

Keywords: Passion fruit nectar, carbon dioxide, Granulated Sugar , Citric acid

1. Introduction

2. Passion fruit (Passiflora edulis) a native of tropical America (Brazil) belongs to the family Passifloraceae, is an attractive high value crop. In India, it is found to be grown wild in many parts of Western Ghat such as Nilgiris, Kodaikanal, Shevroys, Coorg and Malabar and North Eastern States like Manipur, Nagaland and Mizoram. Fruits are nearly round to oval in shape with tough rind which is smooth and waxy and weighing about 35 to 40g in yellow species (P. edulis f. flavicarpa Deg) and about 60g in purple species (P. edulis Sims) and bears on woody perennial vines. An aromatic mass of double-walled, membranous sacs containing orange colour pulpy juice and as many as 250 small, dark brown to black pitted seeds, inside the fruit are the edible portion. The fruit has high nutritional and medicinal value. It is a rich source of Vitamin A and C and contains fair amounts of iron, potassium, sodium, magnesium, sulphur and chlorides and has dietary fibre and protein. the nutritional, medicinal, economic importance, future prospects, cultivation and post-harvest management of passion fruit. (Rocky Thokchom. et. al.,2017) .

3. Yellow passion fruit (YPF) is known for its natural attractive colouring and the best tropical fruit having a floral, estery aroma with an exotic tropical sulphury.By volatile thiol compounds . 3-sulphanylhexanol (3SH, which contributes to aromas of passion fruit and grapefruit) and acetic acid 3-sulphanylhexyl ester (3SHA, which contributes to aromas of boxwood, grapefruit zest and passion fruit) were identified in YPF and present in both free and conjugate form. **(**Srisamatthakarn, P.et.al 2012).In India, passion fruit is processed into juice, instant drinks, lemonade and syrup in the states of Mizoram, Manipur and Nagaland.Passion fruit is rich in Vitamin C.Passion fruit is rich in this antioxidant.The body uses it to form blood vessels, cartilage, muscles and collagen, and to keep skin youthful.It also helps the body heal, reduces inflammation and protects cells from damage.Adequate intake of Vitamin C reduces the risk of colds and certain cancers.Vitamin A.Passion fruit flesh and crunchy seeds contain 8% of your daily vitamin A needs.It is important for healthy eyes and cells, reproductive and immune systems.Fiber.Passion fruit is high in fiber.Fiber helps maintain intestinal health and motility, and keeps you fuller longer It also lowers cholesterol levels and the risk of diabetes, heart disease, and certain cancers.Other nutrients: Passion fruit also provides the body with calcium, magnesium, phosphorus, potassium, and folate, which help strengthen kidney, nerve, muscle, and heart health.(Kulkarni,S.G.,et al ., 2010)Artificial carbonated water was "invented" in England in the mid-to-late 18th century, when scientist and clergyman Joseph Priestley suspended water in a barrel of fermenting beer,producing carbon dioxide that passively dissolved in the water.People found the effervescence to be pleasant.Today, carbonated drinks are ubiquitous and everyday beverages.They are an essential part of the modern culinary repertoire and range from sparkling water to beer, lemonade and colas.Carbonated drinks like soda, carbonated water and beer have unique properties.While this is not necessarily true for all types of carbonated drinks, the most important characteristics are carbonation, acidity, and a high sugar or sweetener content.The carbon dioxide that creates the characteristic fizz and

4. effervescence of these drinks is produced by the dissolution of gaseous CO2 into a liquid under pressure.Temperature and pressure affect the rate at which dissolved carbon dioxide turns into a gas and is released, creating the bubbles when the beverage container is opened.Acid is a common chemical property in many carbonated drinks.Colas, sodas, and beers are known to be some of the most acidic drinks consumed in modern society.The acidic properties of soda(pH ~ 3) are due in part to theconversion of dissolved CO2 to HCO3- and H+ through interaction with H2O and additives such as citric and phosphoric acids. (Johnson,T.,2010)

Materials and methods

Materials:

Fresh passion fruits (about 8-10 medium-sized fruits),Granulated sugar (equal weight to the passion fruit pulp),Water ,Lemon juice (for added acidity and preservation),Sharp knife, Spoon, Blender ,Fine mesh strainer ,Saucepan, Measuring cups, Sterilized bottles for filling and storage and used Carbonator.

Methods:

Procurement of raw material:

Enthusiasm natural product which could be a one of the assortment of natural products was secured from nearby natural product advertise Banglore , Karnataka. The fruits were taken in a single part to induce freed of any varietal differences. At that point the natural products were cleaned and put away in refrigerated conditions within the cold room.

Juice extraction

Enthusiasm natural product was cutdown in half by utilizing sharp cut and scooped out the mash with spoon counting the seeds into bowl and mash of the natural product was extricated with hand worked juicer at that point juice was sifted with muslin cloth and the juice was at that point warmed by including granulated sugar and citric corrosive at 85^0 C for 10 min at that point it was poured into a bowl while letting it to cool down the pressure. it was at that point filled in already sterilized bottles and after that sorted at temperature within the run of 1- 4˚C Handle of carbonation.

Carbonating process:

To begin the method to begin with fit the gathering legitimately after that put the fabric to be carbonated in to the carbonation bottle. Press the bottle to form space for the CO2 to fill in at that point put the carbonation cap in to the bottle. At that point open the valve of the cylinder adjust the weight of the gas required with the assistance of the regulator and carbonate the test by interfacing the chuck to the valve of the carbonation cap and you're prepared with the carbonated fabric store it beneath refrigerated conditions for letting the CO2 to dissolve in test and serve chilled. The major thing to be beyond any doubt amid carbonation is the temperature of the fabric to be carbonated and the pressure of the gas as both these components play an critical part within the disintegration of CO2 within the fluid. Dissolvability of CO2 depends on the temperature of the fabric to be carbonated and the pressure of the gas over the fluid. So to get it all these and the impact of distinctive parameters on the method of carbonation to begin with juice was extricated from energy natural product and diverse varieties of juice with diverse TSS values were made and they were carbonated at changing temperature and weight and their combined impact was examined on the quality and taste of juice and after that the juice was carbonated at that temperature and weight which suits best for the enthusiasm natural product pop.(Solanke, N.D., et.al.,201

Result and Discussion:

In this study which it is evident that the addition of passion fruit and moderate amount of citric acid enhances the overall flavour profile of the passion fruit soda. The incorporation of passion fruit syrup not only adds a subtle tanginess but also accentuates the natural sweetness of the soda, resulting in a more balanced and

refreshing beverage. This conclusion underscores the importance of carefully adjusting ingredient proportions to achieve the desired taste profile, ensuring that every sip of the passion fruit soda delivers a delightful burst of flavour. With the successful outcome of this trial, it can be confidently stated that the addition of a moderate amount of passion fruit syrup and citric acid significantly contributes to the appeal and quality of the soda recipe.

TABLE -1 Different variations of sample with measured ingredients

S#	SAMPLE	VARIATION 1	VARIATION 2	VARIATION 3
1	Passion fruit	150g	200g	250g
2	Granulated sugar	200g	200g	200g
3	Lemon	20ml	30ml	25ml
4	Water	100ml	100ml	100ml
5	Carbon dioxide	3.9%	3.9%	3.9%

Moisture

The moisture content of the sample was determined by using the method of (AOAC 2007)

Procedure:

1.the petridish with lid was weighed.

2.5 g of the sample was weighed into the petridish and spread evenly for uniform drying.

3.oven was set at 100 to 105 and the petridish with sample was placed inside the oven withzlip open for 15 - 17 hours.

4.the petridish was cooled in a dessicator with lid open for 1-2 hours.

5. The petridish with sample was weighed.

6. This was prepared for all samples till constant weight was achieved.

Calculations (w2-w1) -(w2-w3) ×100

Moisture%=(w2-w1)

Where, W1=intial weightof the petridish(g)

W2=weightof the petridish with sample before drying (g)

W3=weight of the petridish with sample after drying (g)

Ash

The sample (5 g) was kept in a muffle furnace and asked at a temperature not exceeding 525 C for 6 hours. The ash was then cooled in a desiccator and weighed. The ash content was recorded as g per 100 g-fresh weights (g/100 g-fw). (Marshall, Maurice R. 2010**)** Sugars and soluble solid

Brix

Open the daylight plate to reveal the glass prism. Use a clean, dry cloth with soft fibers to wipe any dust or residue off of the prism. Suck two to three drops (.1 to .15 ml) up into the pipette. Hold the refractometer horizontally in a bright light source. The refractometer shows a set of lines with numbers on the edges, which correspond to a Brix number. It shows a distinct line, usually a split between blue or grey and white, which is the Brix number of the sample.

Titratable acidity:

Preparation of Sample: Take a known volume of the sample (usually 10-50 mL) and transfer it into an Erlenmeyer flask. If the sample is very acidic, you might need to dilute it with distilled water to bring the titration within a measurable range.

Add 2-3 drops of phenolphthalein indicator to the sample. Phenolphthalein is colourless in acidic conditions and turns pink in alkaline conditions, making it useful for detecting the endpoint of the titration. Fill a burette with the standard NaOH solution. Record the initial volume of NaOH in the burette. Slowly add the NaOH solution from the burette to the sample while continuously swirling the flask to mix. By using a magnetic stirrer, place the flask on the stirrer and turn it on to maintain a consistent mixing rate. Watch for the first permanent colour change in the solution, which indicates that the endpoint has been reached. The solution should turn a faint pink colour that persists for about 30 seconds. Record the final volume of NaOH in the burette. Calculate the volume of NaOH used by subtracting the initial volume from the final volume.

The titratable acidity is often expressed in terms of a specific acid, such as tartaric acid in wine or citric acid in fruit juices. Use the following formula to calculate the titratable acidity: Titratable Acidity (g/L)=(Volume of sample (L)Volume of NaOH used (L)×Normality of NaOH×Equivalent we ight of acid)

Sensory evaluation:

Sensory evaluation is one of the important criteria for analysing and accepting of any food product by means of sense, taste, touch. The sensory evaluation for formulation and quality evaluation of strawberry and orange ice popsicles is carried to evaluate the acceptability on the basis of texture, appearance, taste, smell, and overall acceptability by using nine – point hedonic scale method by 10 trained panel members. Passion fruit contains Aspartame and sucralose are the best sucrose substitutes, because these sweeteners presented a high intensity of passion fruit flavor, and did not present bitter taste, bitter aftertaste, and metallic taste. (Rocha,I.F.D.O., 2015)

Sensory quality evaluation The samples prepared during product formulation and standardized samples of passion fruit soda were evaluated fresh as well as during storage study for sensory quality by a panel for appearance, mouth feel, aroma, taste, consistency and overall acceptability using 9-Point Hedonic Scale as described by Larmond (1970). (Agarkar ,B.S.,et.al 2019).

Table -2 The results of sensory evaluation of formulated variation are exhibited .

S#	SENSORY ATTRIBUTES	TRAIL 1	TRAIL 2	TRAIL 3
1	Appearance	8.0	8.4	8.0
2	Colour	8.4	8.6	8.4
3	Taste	8.2	7.8	8.0
4	Texture	7.9	7.8	7.7
5	Flavour	7.9	7.6	7.6
6	Overall Acceptability	8.0	8.6	8.1

The mean score of the sensory evaluation is obtained for the Trail (2)by overall acceptability. Therefore, from the results it is concluded that the carbonated soda formulated with passion fruit scored maximum score so it was further subjected to quality analysis.

Physicochemical properties:

The physical and sensory qualities of passion fruit soda impact towards the customers' acceptance. The physical properties of passion fruit soda such as PH, titratable acidity, total soluble solids and Total sugars.Determination of sweetness preference To determine the sweetness preference of the panellists as well as the effect of TSS on the degree of carbonation, the passion fruit soda was adjusted to 16°Brix. .Effervescence, bubble size, clarity, sweetness, sourness and overall acceptability were evaluated. Dissolved CO2 content was also analysed. (Zubia,C.S., 2019)

Table - 3 Physiochemical Properties of Selected passion fruit soda

S.no	Physical properties	Variation-2 passion fruit soda
1.	pH	4.10
2.	Titratable acidity (%)	3.3
3.	T.S.S(%)	16^{0} Bx
4.	Total sugars	40-45g

Nutritional Analysis:
Nutritional analysis of the Passion fruit sods such as energy, carbohydrates, moisture. Ash and sodium were performed and the results are exhibited in the table 4. (Jori. D et.al 2013).

Table – 4 Nutritional analysis of passion fruit soda

S.no	Nutrient	VALUES
1	Moisture(%)	87.1%
2	Ash(%)	0.12%
3	Energy (Kcal)	150-168kcal
4	Carbohydrates(g)	40-45g
5	Sodium(mg)	25-35g

Passion fruit soda with citric acid typically contains about 150-180 calories and about 40-45 grams of carbohydrates and sugar per 12 ounces.Citric acid not only enhances the soda sour taste, but also acts as a natural preservative, extending shelf life without significantly altering the nutritional content. The fruit is high in carbohydrates and simple sugars, which improve athletic performance. It contains phytosterols that lower cholesterol levels. Passion fruit is a great source of Vitamin C, Vitamin A and potassium..Passion fruit lemonade has a tangy, refreshing taste with a distinctive tropical fruit aroma.It is rich in vitamins A and C and contains antioxidants that support immune function and cellular health. This drink also contains dietary fiber to aid digestion. However, like most carbonated drinks, it contains sugar and should be consumed in moderation. Enjoying a glass of passion fruit soda providing nutritional benefits.it appealing to consumers who are looking to be both indulgent and nutritionally conscious in their beverage choices..(Hui,Y.H.,et al., 2010).

Conclusion:

From all the results and comparison obtained in the above study palatable and shelf stable beverages can be prepared from passion fruit juice by adjusting the juice concentration and carbonation. Based on the overall statistical analysis of all attributes, V2 was the most preferred by the sensory panel due to its good aroma, smell, taste and nutrients such as vitamins C and K. The results of this study showed that the addition of passion fruit nectar and citric acid is a practical option to preserve natural nutrients and antioxidants and extend shelf life. Carbonation of passion fruit juice beverages has an added advantage with an improving the palatability during storage period. The developed formula has been analyzed and quality evaluated for physicochemical properties and has a refreshing sour taste.

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