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CHEMICAL CHARACTERIZATION AND ANTIOXIDANT PROPERTY OF FERMENTED BANANA VINEGAR

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ABSTRACT

Vinegar is made up of around 4% to 8% acetic acid in water, as well as different levels of fixed fruit acids, colouring matter, salts, and a few other fermentation products that give it its distinct flavour and scent. Vinegar has been used as a food preservation for centuries. The fermented banana vinegar has a pH of 3.21. The Brix (percent) indicator indicates the levels of soluble solids such as sugar, salts, and proteins in an aqueous sample; there was 11.8 brix. To quantify the amount of acetic acid in the vinegar, the acetic acid will be titrated with a solution of known sodium hydroxide concentration. According to the balanced chemical equation, one mole of CH3COOH interacts with exactly one mole of NaOH. The ability of antioxidants to donate hydrogen is thought to be responsible for their anti-DPPH effect. Free radical scavenging is essential for preventing free radical damage in a range of diseases, including cancer. In the DPPH experiment, adding the extract decreases the violet-colored DPPH solution to the yellow-colored product, diphenylpicryl hydrazine, in a concentration-dependent manner. This method has been widely used to predict antioxidant activity due to the small amount of time required for examination.

KEYWORDS: Vinegar, Fermentation, Banana, Antioxidant.

1. INTERODUCTION

Vinegar first emerges in human history with the discovery of alcoholic fermentation from fruits, cereals, and vegetables at the dawn of agriculture. Vinegar's origins are almost indistinguishable from those of wine. Although vinegar has long been regarded as one of the lowest-quality fermented-food products, it has also been used as a food condiment, a preservative, and, in some places, a nutritious drink.[1] Vinegar has been used as a food preservation for centuries. Vinegar inhibits microbial development and adds sensory characteristics to a variety of meals, whether it is naturally created during fermentation or purposely added. It can be used as a medication, corrosive agent, pickling agent, or directly ingested as a beverage when diluted. Vinegar is mostly employed as an acidulant in the food business, but it also has a variety of other uses in food processing. Salad dressings, mayonnaise, mustard, ketchup, bread and bakery items, tinned foods, marinades, and the recent decrease in wine use have favoured a growth in vinegar manufacturing. Vinegar is manufactured by fermenting ethanol to produce acetic acid, which is the major component. It has great preservation properties and is frequently used as a food ingredient as well as in medicine. Fermented foods have been a part of the human diet since the dawn of civilization, and they have been manufactured and consumed for millennia.[2] The process through which bacteria and their enzymes produce these beneficial changes in food is known as fermentation.[3] Vinegar is the result of bacteria in the Acetobacter genus converting ethyl alcohol to acetic acid. Vinegar can thus be made from any alcoholic substance, ranging from alcohol-water mixes to diverse fruit wines.

Consumption of fruits and fruit products has been shown to reduce the risk of heart disease, stroke, gastrointestinal disorders, certain types of cancer, hypertension, age-related macular degeneration, cataracts of the eye, skin conditions, lowering of low-density lipoprotein (LDL) cholesterol, and improved immune function, among other chronic diseases. To encourage a healthy eating habit.[5] Many disorders, including arthritis, diabetes, arteriosclerosis, age-related macular degeneration, certain types of cancer, inflammation, genotoxicity, and Alzheimer's disease, have been linked to reactive oxygen and nitrogen species (ROS and RON), such as hydroxyl radicals, superoxide ions, nitric oxide radicals, singlet oxygen, and hydrogen peroxide. Although the specific mechanism is unknown, the reactivity of these ROS and RNS species with biomolecules like as lipids, proteins, and DNA could be the cause of many diseases.[7] Alcoholic fermentation (which requires the presence of yeasts such as Saccharomyces cerevisiae) and acetous fermentation are the biotechnological processes involved in vinegar manufacture (acetic acid bacteria such as Acetobacter transform the alcohol to acetic acid).

2. MATERIAL AND METHOD

2.1 Raw material

Banana, sugar, enzyme (pectinase), yeast(saccharomyces cerevisiae), bacteria (acetobactor) from local market of Lucknow and laboratory of Babasaheb bhimrao ambedkar university.

2.2 Preparation of banana juice

For vinegar production, one kilogram of peeled banana robusta was taken. It was converted to pulp and treated with 0.003 % w/v pectinase enzyme and incubated at 38 ˚ C for six hours to get the clear juice.

2.3 preparation of banana vinegar

The banana juice was pasteurized for 30 min at 60ºC. Alcoholic fermentation was conducted for 5 days at room temperature under static conditions in plastic vessels containing 2 L of the banana juice inoculated with wine yeast, *Saccharomyces cerevisiae*, (Wine & Scientific Equipment Ltd., Part) at a ratio of 0.75% (v/v). Preparation of yeast inoculum was carried out by mixing 5 g of yeast powder with 60 mL of warm water. At the end of the fermentation process, the obtained wine was separated from the sediment by allowing it to settle in glass bottles, followed by pasteurization for 30 min at 60ºC. Acetous fermentation was performed for 15 days under the aforementioned conditions in glass vessels containing 135 mL of the banana wine inoculated with *Acetobacter pasteurianus* TISTR 521 at a ratio of 10% (v/v). At the end of the fermentation process, the obtained wine was separated from the sediment by allowing it to settle in glass bottles, followed by pasteurization for 30 min at 60ºC.[8]

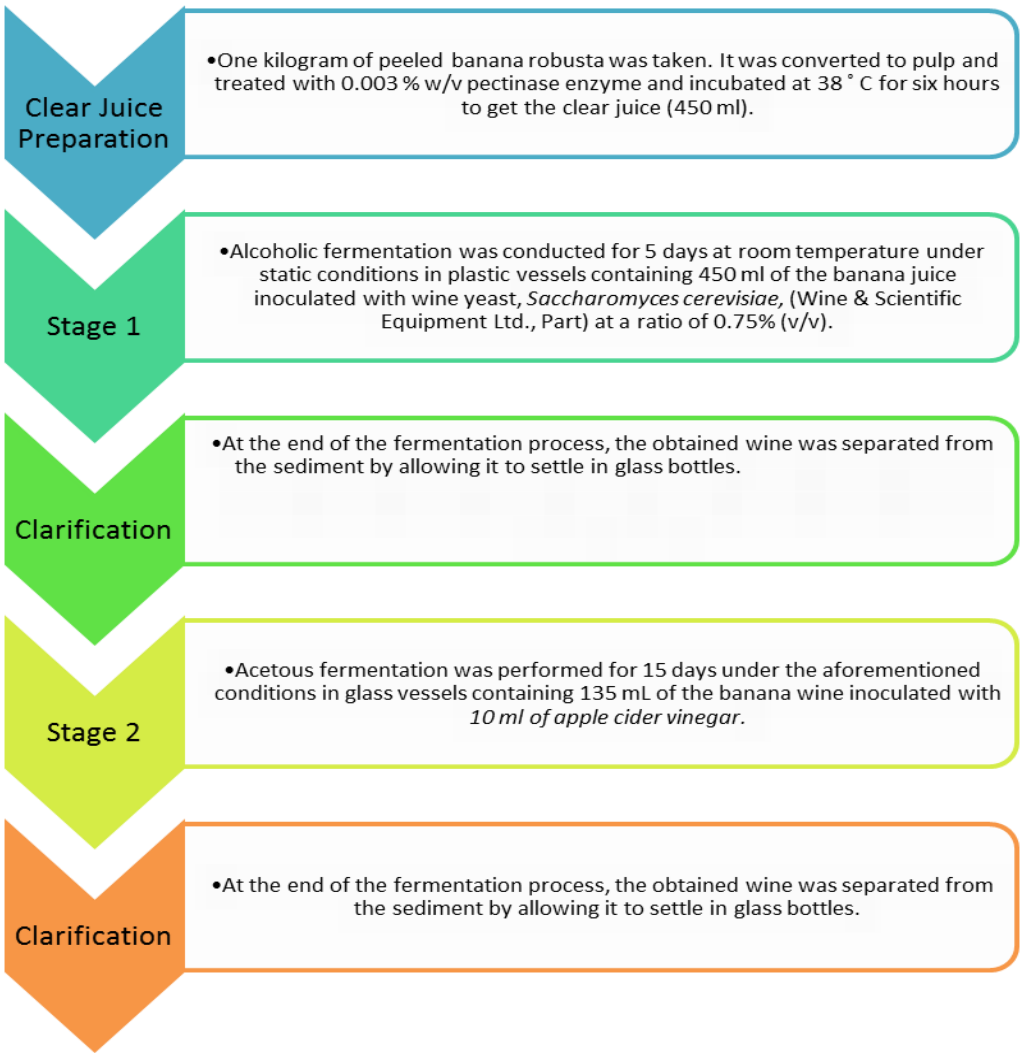

Fig. 1: Flow chart of preparation of fermented banana vinegar.

3. RESULT AND DISCUSSION

The pH of the fermented banana vinegar was 3.21. The levels of soluble solids including sugar, salts and proteins in an aqueous sample are indicated by Brix (%) parameter there was 11.8 brix. The acetic acid will be titrated with a solution of known sodium hydroxide concentration to determine the amount of acetic acid in the vinegar. One mole of CH3COOH interacts with exactly one mole of NaOH, according to the balanced chemical equation. Antioxidants' ability to donate hydrogen is suggested to be responsible for their action

on DPPH.Free radical scavenging is critical for preventing the harmful effects of free radicals in a variety of disorders, including cancer. Screening for antioxidant activity of plant extracts using DPPH free radical scavenging is a widely used method. The addition of the extract in a concentration-dependent way reduces the violet colour DPPH solution to the yellow coloured product, diphenylpicryl hydrazine, in the DPPH assay. Because of the short amount of time required for analysis, this approach has been widely utilised to predict antioxidant activity.

Table 1: TSS, pH, titratable acidity % age, antioxidant acticity.

S.NO.	TESTS	RESULTS
1	pH	3.21
2	TSS	11.8
3	Titratable acidity%	8.67%
4	Antioxidant (% RSC – radical scavenging capacity)	48.88

CONCLUSION

In this study, we determined the antioxidant scavenging activity and chemical characteristics of fermented banana vinegars. The production of banana pulp vinegar should be foreword studied in order to produce vinegar that meets the standard requirements and that can lead to sugary/starchy food minimization and diversified vinegar offer on the market. It has great preservation properties and is frequently used as a food ingredient as well as in medicine.The process through which bacteria and their enzymes produce these beneficial changes in food is known as fermentation. pH of banana vinegar is to high, acidity % is 8.67.

REFERENCE

1. fatima b. *et.al*, "optimization of process parameter for the production of vinegar from banana peel andcoconut water": a review *International Journal of Science, Engineering and Technology*, 2015; *3(3).*
2. Mokhtar S. *et.al*, "Study On The Nutritional Values And Customer Acceptance OF *Lansium domesticum* &*Nephelium lappaceum* Newly Fermented Natural Fruit Vinegars In Malaysia " a review *Asia pacific journal of advanced business and social studies*, 2016; 2(2).
3. Konate M. Et.al, "Banana Vinegars Production Using Thermotolerant *Acetobacter pasteurianus* Isolated From Ivorian Palm Wine": a review Journal of Food Research, 2015; 4(2).
4. Hemke J. Et.al, "Vinegar: a traditional functional food" a review *Think India Journal*, 2019; *22: 34.*
5. Sidhu J. Et.al, "Bioactive compounds in banana fruits and their health benefits" a review *Food Quality and Safety*, 2018; *2: 4.*
6. Muhidin et.al, "The Response of Dwarf Banana Cavendish Growth and Production under Natural Shade" a review *International Journal of ChemTech Research*, 2016; 9: 12.
7. Boonsupa w. Et.al., "Development of Fermented Banana Vinegar: Chemical Characterization and Antioxidant Activity" a review Journal of Food Health and Bioenvironmental Science, 2019.
8. Bhat S. et al, "An Overview on the Biological Production of Vinegar"a review of *International journal of fermented food*, 2014.
9. Williams et al, "Use of a free radical method to evaluate antioxidant activity*" Food Science and Technology*, 1995.
10. Adams, M.R. The small-scale production of vinegar from bananas.Tropical Product Institute, 56/62 Grays Inn Road, London, 1980.