

Development of Home-Made Cereal Based Probiotic Drink with Brown Rice

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Probiotics are defined as a live microbe which are safe for the consumption for humans, upon consuming it provides various health benefits specially in improving the condition of the gut [1]. According to the WHO "it is defined as the live microbes which will be beneficial for health if taken in correct amount. 'Probiotics are defined as microbes which encourage the development of the other microbes or organism in particular food or drink. Probiotics are defined as the microbes which can be added in various products like drugs, food items, supplements, drinks [2].

Probiotics is beneficial for health because of their advantages which include strengthening the immune system, improvement in cholesterol levels, inhibit the carcinogenic compounds, and restoring good bacteria in the gut [3].

First processed or functional food item taken by the humans was Fermented drinks or foods. Now a day's demand of fermented items is increasing like-yogurt, beer, wine, because of their long shelf -life, their consumption has great advantage on health [4]. Apart from this, as modernisation and awareness has increased the demand of fermented items as they are nutritious too. The changes in the strain and addition of various useful microbes make the beverages or food items more nutritious [5]. This study is emphasizing that the fermented beverages contain live microbes and such fermented beverages are consumed as "Probiotics" which play a vital role by keeping our gut healthy.

Materials and Methods

Materials which are involved in the preparation of home-made cereal based fermented probiotic drinks are Brown rice, Brown sugar, Black salt, Mineral water, fruit essence.

Soaking- Brown rice, brown sugar, black salt were soaked in mineral water. Soaking was done to improve the nutrient quality, for the removal of toxins, and to improve digestion. After soaking it further led to the fermentation.

Soaking caused the removal of phytic acid(toxin) present in the cereal and other grains [6]. Phytic acid present in the cereals and pulses leads to

less absorption of nutrients like vitamins and minerals. Soaking is also beneficial for the removal of other toxins like polyphenols and Tannins which make the nutrients unavailable. By the method of soaking, the presence of compounds i.e. oligosaccharides which are not digested by human beings are also decreased, such compounds are responsible for various stomach problems like diarrhoea, constipation, and acidity. Arsenic present in the brown rice is responsible for the various heart disease and makes the nutrient unavailable. by soaking, this toxin compound (arsenic) is removed from the brown rice [6].

Fermentation- Fermentation is a process in which particles are broken down into simpler molecules in the absence of air such as Glucose [7]. This is the very ancient process of making alcoholic beverages i.e. beer and wine, during processing foam occurs and causes releasing of certain by-products like carbon dioxide, and ethyl alcohol is termed as fermentation.

In the preparation of home-made probiotic drink, brown rice along with brown sugar was fermented to make it more nutritious it also caused the conversion of glucose and starch into alcohol and acid and it promoted easier digestion. fermentation causes the growth of the beneficial microbes of the intestine, which further results in increasing the absorption of vitamins and minerals. Thus, it causes the Vitamin K synthesis and enhances the Vitamin B.

To achieve the maximal nutritious properties, the probiotic drink was fermented for seven days. During this period the beneficial microbes present in the brown sugar get a favourable environment for their growth and it also improves the shelf-life of the drink and acts as a preservative for the probiotic.

Shaking- One of the most important step in the making of a probiotic drink is shaking of the drink. Shaking causes, the vibration in the materials and supports the growth of the microbes. Shaking is done in such a manner so that brown sugar is rubbed among themselves and causes the release of more microbes, which further support the growth of the microbes. To make it more effective shaking is done 10-20 times twice in a day. After the shaking, the foam must be removed as it contains a bad odour.

Procedure for making home-made probiotic drink:

1. Take 1 litre of mineral water in a bottle or air-tight container.
2. Add 3 cups (384gm) of brown rice in the mineral water
3. 11/2 cup (192gm) of brown sugar to the mixture.
4. 3/4 th cup (96 gm) of black salt to the solution.
5. After the addition of all the materials, the mixture should be shaken well i.e. 88 times.
6. After shaking of the solution, the foam should be removed.
7. Shaking should be continued for 7 days, twice in a day.
8. Shaking should be done in the interval of a maximum 8 hr.
9. It should be kept in a warm place.
10. After the completion of 7 days, various fruit essences should be added for the desired flavour and taste.

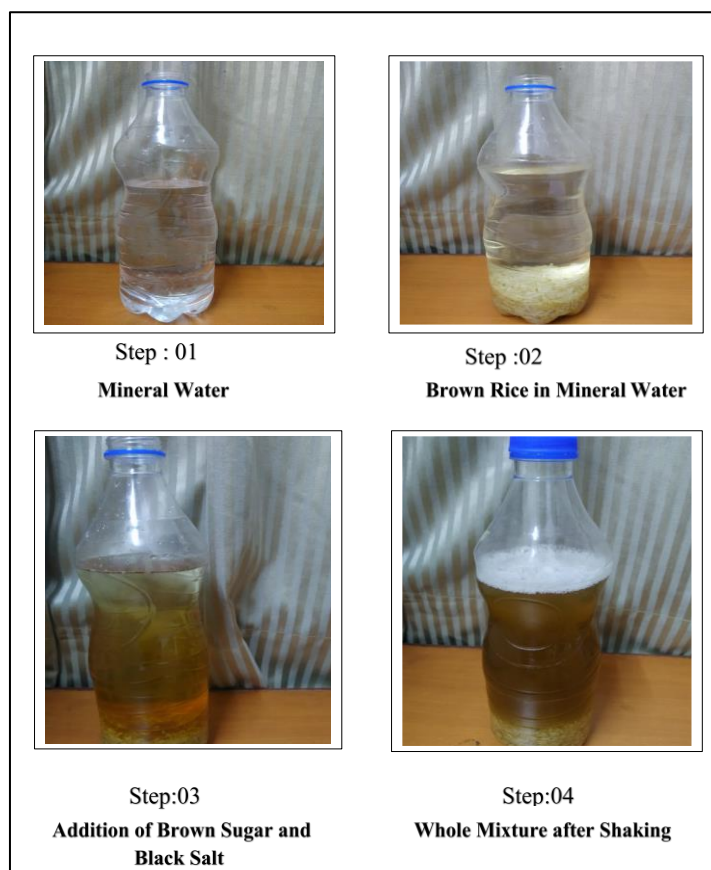


Fig. 1: Steps involved in fermentation of brown rice in mineral water

Standardisation of Recipe:

During the preparation of any recipe, it is very important to look after their method, missing ingredients etc. so that the recipe doesn't get affected

by the number of times it cooked. Standardisation of recipe includes the preparation of recipe by keeping each and every factor in mind like the – temperature, location, presentation, taste, approved testing etc. so that every time it is cooked should be identical to the previous one.

Variation of the sample:

After the collection of all of the ingredients, the variation of sample is carried out. As the variation among the major ingredients (brown rice, brown sugar) may affect the number of growth of microbes which is directly proportional to the health benefits. So, Variation of drink was based on the fruit essence. Four variations were made which contain different type of fruit essence.

Table 1: Variation of sample in gram

Samples	Sample A	Sample B	Sample C	Sample D
Fermented Probiotic drink	100 ml	100 ml	100 ml	100 ml
Fruit essence	Water melon 5 gm	Apple 5 gm	Mango 5 gm	Grapes 5 gm

All the samples were carried out for the sensory evaluation. And for the calculation and for the overall acceptability hedonic rating test was used, and the rating were made according to the hedonic test.



Fig. 2: All Samples (Probiotic Drink with Different Fruit Essence)

Result**Sensory Evaluation**

The sensory evaluation was done by using the 9-point hedonic test rating scale, it gives either a pleasure or unpleasure experience to the panel members. All 4 samples were presented to the panellist members with the sensory evaluation form.



Fig. 3: Samples Ready for Sensory Evaluation

The Sensory Evaluation Scores

Table 2: Compiled Result of Mean and Standard Deviation of Each Sample

Attributes	Sample A	Sample B	Sample C	Sample D
Appearance	8.8± 0.421	8.1 ± 0.3612	8.7 ± 0.4830	8.6 ± 0.5163
Taste	7.8± 0.421	8.4 ± 0.5163	8.4 ± 0.5163	9 ± 0
Consistency	8.3± 0.5	8.6 ± 0.5163	8.6 ± 0.5163	8.9 ± 0.4216
Mouthfeel	7.2 ± 0.5	8.6 ± 0.5163	8.5 ± 0.5270	9 ± 0
Color	9.0 ± 0.31	9.0 ± 0.4216	8.7 ± 0.4830	8.2 ± 0.4216
Flavor	8.1± 0.31	8.9 ± 0.3162	7.9 ± 0.5676	9 ± 0
Overall acceptability	8 ± 0	8.8 ± 0.4216	8.1 ± 0.3162	9 ± 0

The best sample was found to be Sample D, followed by Sample B, Sample C, and Sample A was ranked last. Sample D was the most accepted, while sample A was the least accepted sample.

Sample A as it is seen, containing fermented probiotic drink (100 ml) and Fruit essence (5 gm of watermelon essence) is rated best among all four samples in terms of overall acceptability.

Conclusion

The main aim of the study is to develop a home-made cereal based fermented probiotic drink. Home-made probiotic drinks are convenient, effortless, pocket friendly and easy to store. This functional drink has various health benefits, it is helpful in making healthy gut, reduction in anti-carcinogenic properties, reduction in cardio-vascular disease, obesity, and other disease like Diarrhoea, constipation etc.

This probiotic drink is cereal based and thus it provides abundant energy and other nutrients like various vitamins and minerals. Home-made probiotic drink provide immunity which further help to fight against various disease, it is helpful in various urinary tract disease, it is helpful in the digestion of cholesterol.

After conducting sensory evaluation, it is concluded that probiotic drink is acceptable by various age groups 16- 80 in terms of taste, appearance, colour, flavour, mouthfeel and among the four different sample, sample "D" scored the most and overall acceptability of sample "D" is high.

Market based probiotic drink contain artificial strain which are sometime harmful as strains are injected. But in the home-made probiotic drinks are natural useful strains are produced by shaking it twice in a day. So, this probiotic drink can be consumed by all age group to maintain their gut and overall body healthy.

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