



ISSN (E): 2277-7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2022; 11(10): 295-297

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www.thepharmajournal.com

Received: 26-07-2022

Accepted: 29-08-2022

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Studies on development of synbiotic banana (*Musa acuminata* Grand Nain) lassi

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Abstract

Lassi is considered as nutritive digestive and useful in gastrointestinal ailments and fruits are considered good source of minerals, carbohydrate as well as vitamins. The supplementation of Lassi with Banana pulp will not only improve its flavor but also its overall nutritive value and taste. The present study was focused on Development of Synbiotic Banana Lassi with Grand Nain variety of Banana pulp at different concentrations i.e. Control (0%) and Treatment (T₁ 5% T₂ 10% T₃ 15% and T₄ 20%) along with honey used as a sweetener and for prebiotic, *Lactobacillus rhamnosus* GG and *Streptococcus thermophilus* used respectively. After that end result was dissect for their physicochemical and microbiological action assessment during capacity period.

Keywords: Banana pulp, honey, prebiotic lassi, probiotic lassi, synbiotic lassi

Introduction

India positions first in milk creation, representing 22% of world creation, accomplishing yearly result around 208.3 million tons during 2020-21 (NDDB: 2020) [9]. Among all dairy items aged milk items assume a significant part in human nourishment, all things considered. Lassi is one of the famous, prepared to serve native aged milk refreshments. Lassi is served on very large scale in cold drink bars and restaurants during summer in almost every state. Many times "Chhash" is also referred to as "lassi" by technocrats in literature. However, Lassi is a popular product close to sweet stirred yoghurt has been used as a refreshing beverage from time immemorial in India, especially in western, northern and central regions. Lassi is also popular in some other parts of the world too, it is prepared by stirring whole curd into a delicious drink with addition of sugar or salt, a small amount of cold water or ice to make the product flow able. The product is popular not only because of its refreshing and delicious taste, but also due to its nutritive and therapeutic benefits and thirst quenching quality (Momin, 2009) [8].

Grand Nain bananas (additionally spelled Grande Nain) are banana cultivars of *Musa acuminata*. Banana is most important worldwide consumed fruit product (*Musa* spp.). It was reported that its world's production exceeded 91 million tones and it was the second most produced fruit. It is a decent wellspring of B6, B12 nutrients with potassium and magnesium contained in the organic product assists the body with recuperating from the impacts of nicotine withdrawal. The banana is said to quiet the stomach and with some honey and milk added to it, can develop exhausted glucose levels, while the milk calms and rehydrates the framework.

Honey might be a preferred choice over fake flavorings for use in the improvement of new dairy items (Machado *et al.*, 2017) [6]. This utilizes honey in Lassi less unsafe than sugar. Honey has antimutagenic, antibacterial and cell reinforcement impacts (Erejuwa *et al.*, 2010) [3]. It is a characteristic item with extremely complex substance synthesis. It is made essentially out of fructose and glucose yet additionally contains 4 to 5% fructo oligosaccharides which act as prebiotic specialists. Honey can go about as an additive and sugar in dairy items (Chick *et al.*, 2001) [1].

The synbiotic concept combines efficacious probiotic strains with specific prebiotic compounds in a single product. Synbiotic is defined as "A mixture of probiotics and prebiotics that favourably affects the host by improving the survival and implantation of live microbial dietary supplement in the GI TRACT" (Gibson and Roberfroid, 1995) [4].

Keeping these focuses in view, an undertaking to create synbiotic lassi with banana pulp which could be a reviving and refreshing with well being advancing properties was done.

Thus this examination was taken up with the accompanying targets. To assess the impact of some food additives added substances (banana pulp) on the growth of probiotic culture and the changes in probiotic population stored at refrigeration temperature.

Material and Methods

Present work was carried out in the Department of Dairy Microbiology, College of Dairy Science and Food Technology, Chhattisgarh Kamdhenu Vishwavidyalaya, Raipur, (C.G).

Preparation of starter culture

The culture used in the present study was freeze dried *Streptococcus thermophilus* (NCDC- 325) and *Lactobacillus rhamnosus* GG (NCDC-347) was procured from NCDC, Dairy Microbiology Division, National Dairy Research Institute, Karnal. The cultures were maintained by propagating in sterilized skim milk and stored at 5 ± 2 °C. Prior to use, cultures were activated in suitable medium by incubating at 37 °C for 24 h.

Preparation of Synbiotic Banana Lassi

Lassi was prepared by using following procedure given by De (2006) [2]. The prepared dahi as per the treatment combination was taken separately and continuously stirred. Honey Syrup and Water was added at the rate of (1:1) in dahi, Then dahi was continuously stirred again for the proper mixing of Honey. After that the Banana pulp addition (with 0.5% Cinnamon powder) was added at the rate of (0, 5, 10, 15 and 20%). The prepared lassi was been filled in Polythylene pouches and stored at refrigerated temperature.

Microbiological analysis of synbiotic Lassi

Probiotic Count (*Lactobacillus* count)

Enumeration of lactobacilli count of lassi was determined by using pour plate method employing MRS agar by Tharmaraj and Shah, (2003) [10].

Coliform count

Enumeration of Coliform count of lassi was determined by using pour plate method described by (Hought *et al.*, 1992) [5] employing Violet Red Bile Agar (pH 7.4 ± 0.1).

Yeast and mold count

Lassi was ascertained for yeast and mold counts as per suggested by Marshall, (1993) [7] using Potato Dextrose Agar and pH of media adjusted to 3.5 ± 0.1 using tartaric acid solution.

Results & Discussion

The lassi samples were examined for the probiotic count, Coliform count, and yeast and mould count.

Preparation of samples for microbiological analysis of Lassi

On the 0th day, 11 ml of freshly prepared lassi samples (Both of A & B) after thoroughly mixing were taken in 99 ml phosphate buffer for the enumeration of probiotic count (LAB), coliform count (CC) and yeast and mould count (YMC). Serial dilution was carried out till appropriate dilution. Similarly, after, at an interval of 7 days, to 10 days of storage.

1. Probiotic Count

The viable Probiotic count in terms of \log_{10} CFU/g of Synbiotic Lassi during storage period is presented in Table 1.1. The probiotic count i.e. *Lactobacillus rhamnosus* GG of test product (T₂) was slight decreased with the days of storage. The number of probiotic count present in a product should be minimum 10^6 CFU/g as per ICMR guideline.

Table 1.1: Viable probiotic count (\log_{10} CFU/g) of synbiotic banana Lassi

Storage Days	0	2	4	6	8	10
T ₀	8.9286662	8.772034	8.389076	7.977121	7.772034	7.150515
T ₂	8.9844748	8.874094	8.573064	8.150515	7.840621	7.259257

Values are expressed as mean \pm standard deviation (n=6).

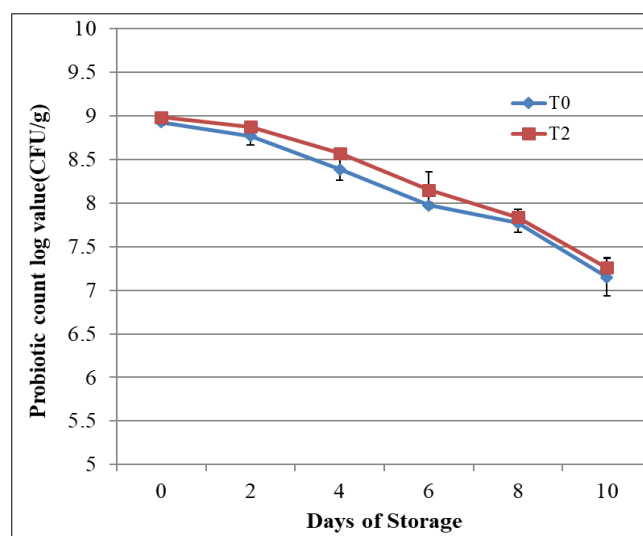


Fig 1: Graph showing probiotic count (\log_{10} CFU/g) of synbiotic Lassi (T₂) and control (T₀)

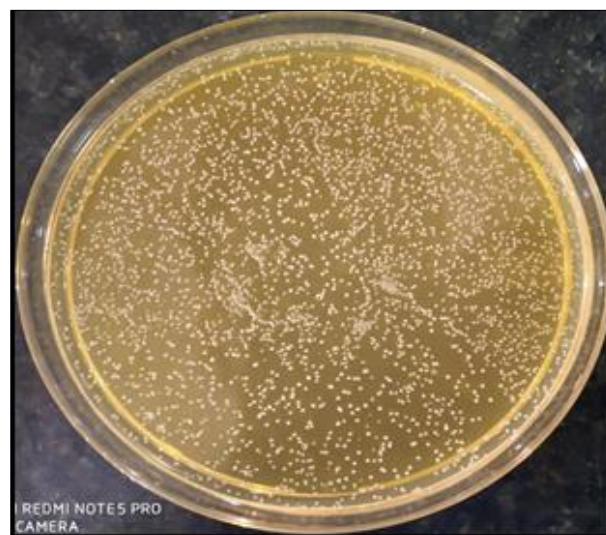


Fig 2: Petri plate showing probiotic count

2. Coliform Count

In the present study coliforms were absent in both the treatment as well as control sample throughout 10 days of refrigerated storage period. The presence of coliform bacteria in dairy products is indicative of unhygienic conditions or practices followed during manufacture, and storage. The confirmation of presence of faecal coliforms in the products,

further, indicates probable and alarming presence of potent human pathogens too. In the present work to adjudge mainly the extent of sanitary practices followed during production and storage or otherwise, the coliform count of plain probiotic lassi and banana pulp incorporated synbiotic lassi was carried out. These results were comparable with the results of different workers who have reported similar trends in the coliform counts in fermented milk products during storage study (Momin, 2009) [8].

3. Yeast and Mold

No yeast and mold was reported in finalized as well as control products during storage period. The storage stability of T₂ having added health and nutritional benefits of probiotic and banana pulp was found suitable for consumption up to 10 days of storage at refrigeration temperature. The high level of yeast and mould count in fermented dairy products indicates poor aerial sanitation, insanitary conditions during manufacture, contaminated packaging material, and use of contaminated culture as well as luxuriant growth of this group under acidic nature of the products during storage.

Conclusion

Present study has proved that banana pulp added synbiotic lassi were having satisfactory shelf-life of 10 days at 4±1 °C. This product could be a potential functional food mainly because they contained viable cell of probiotic lactobacilli well above 10⁶ CFU/g as per ICMR guideline that had many reported health benefits. Current study has shown a positive influence of cinnamon and honey on the survival of probiotic lactobacilli. The results highlighted the possibility of processing lassi with 10% banana pulp being most acceptable. The best product i.e. T₂ was selected on the basis of sensory attributes. The storage stability of T₂ having added health and nutritional advantages of banana and probiotics was found suitable for consumption upto 10 days of refrigeration temperature.

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