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## Effect on different levels of maltodextrin on physico-chemical properties of synbiotic lassi by using buffalo milk

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### Abstract

In the present investigation, Physico-chemical attributes of synbiotic lassi were studied. Synbiotic lassi was prepared by using maltodextrin as a prebiotic added @ T<sub>1</sub>-1%, T<sub>2</sub>-1.5%, T<sub>3</sub> 2%, and T<sub>0</sub> control without maltodextrin. *Lactobacillus acidophilus* as probiotic @ 1.5% in all treatments. From the outcomes of the present investigation, it may be concluded that maltodextrin could be successfully utilized for the manufacture of synbiotic lassi. The most acceptable quality of synbiotic lassi can be manufactured by using 1.5 percent maltodextrin which contained on an average 22.33, 5.04, 3.16, 13.63, 0.62, and 0.75 percent total solids, fat, protein, total sugar, ash, and titratable acidity, respectively.

**Keywords:** Synbiotic lassi, prebiotic, probiotic

### Introduction

Milk is a rich source of almost all essential nutrients and an excellent source of Ca, P, and minerals. These minerals in the optimum ratio are present in milk and are required for optimum growth maintenance of bones (Aneja *et al.*; 2002) [2]. It is essential for the proper growth and development of human beings hence milk is considered an ideal food. Processed fermented milk products have economical and several health benefits, about 9.1 per cent of the total milk produced in India is converted into various fermented milk products. The popularity of fermented milk products is due to their pleasant taste and therapeutic values. The products like Dahi occupy a prominent place in the diet of a large section of the Indian population. Besides, fermented milk products are easily digested, absorbed, and assimilated, and tolerant by infants, old people, and a person with gastric ulcers because of the breaking down of proteins into peptide and free amino acids bond. The production of fermented milk products is rapidly increasing in all major developing countries of the world. Cultured dairy products like Dahi, shrikhand, cultured buttermilk, acidophilus milk, kefir, lassi, etc. are also being manufactured in various countries. Fermented milk is known throughout the world for its taste, nutritive value, and therapeutic properties.

Lassi is one of the important Indian cultured dairy products. The importance of lassi in the daily diet of Indian people has been well recognized from the Vedic times. Due to the curative effect against gastro-intestinal disorder, it has been utilized by many civilizations (Sinha and Sinha, 2000) [27]. Lassi is one of the Dahi based white to creamy white, viscous liquid, with a sweetish, rich aroma and mild high acidic taste fermented milk products, commonly consumed during summer as refreshing beverage popular in North region of India. Different varieties of lassi include buttermilk, chhach, and mattha that are consumed with delight in other regions too. Lassi is flavored either with salt or sugar together with condiments, depending on regional preferences. (George *et al.*, 2010) [7].

Prebiotics are non-digestible, fibrous food ingredients and beneficially affect the host's organism by selectively stimulating the growth of activity some genera of microorganisms in the colon, generally lactobacilli and bifidobacteria (De Vrese and Schrezenmeir 2008) [4]. Probiotic fermented milk is one of the major segments amongst fermented milk that has tremendous potential for growth and development. To carry or multiply live and active cultured dairy products, milk is an excellent medium.

The applications of a probiotic organism in fermented dairy products aim to combine the potential health benefits of the bacteria with their ability to grow in milk, resulting in nutrition, healthy and desirable products for the consumer. Probiotic has been therapeutically to modulate immunity, improve the digestive process, prevent cancer, improve lactose intolerance, etc. Lactic acid bacteria decrease serum cholesterol levels and increase the Vitamin-D content of the product (Grill *et al.* 2000)<sup>[9]</sup>. It must be able to withstand acid hydrolysis in the stomach, able to move to the large intestine without any changes or being absorbed in the small intestine so that it can be utilized by indigenous microflora in the large intestine to enhance their growth. A functional food product is one that can positively influence one or more functions in the body, beyond its nutritional properties (Marchand and Vanderplas, 2000)<sup>[22]</sup>.

A combination of prebiotics and probiotics results in a functional product referred to as a synbiotics product. The advantages of developed synbiotic products are due to their potential synergistic effects on the host consumer. Upon regular consumption of synbiotic products, there is the promotion of growth of existing probiotic bacteria, implantation and facilitation of growth of newly ingested probiotic bacteria, as well as improvement in their survival (Niness, 1999)<sup>[24]</sup>. The principal behind synbiotic is that the human gastrointestinal (GI) system is populated by a large number and variety of different bacteria. Some of the bacteria present in the human gastrointestinal tract (*Bifidobacteria* and LB) have very specific nutrient needs and therefore by selecting specific foods or food ingredients. It is possible to increase the number of target bacteria synbiotics encourage the growth of the probiotic organism by providing the specific substrate fermentation (Farnworth, 2001)<sup>[6]</sup>. This investigation aims to study the Physico-chemical attributes in synbiotic lassi.

### Material and Method

For the preparation of synbiotic lassi, buffalo milk was collected from the dairy farm of the College of Agriculture, Dapoli. The freeze-dried probiotic pure culture of *Lactobacillus acidophilus* was procured from the National Dairy Research Institute, Karnal (Haryana). The culture was maintained separately in sterilized reconstituted skim milk test tubes.

### Physico-chemical analysis

The fat content of milk, dahi, and lassi was determined by using a standard Gerber method as per IS: 1224 (part-I), 1977. The acidity of milk, dahi, and lassi was estimated according to IS: 1479, (part-I), 1960. The total solids and protein content of milk, dahi, and lassi were determined as per IS: 1479 (part-II), 1961. The ash content of milk, dahi, and lassi was determined as per the procedure given in A.O.A.C. (1995)<sup>[1]</sup>.

### Preparation of synbiotic lassi

Synbiotic dahi was prepared by using the procedure prescribed by De (2008) with slight modifications. Fresh good quality buffalo milk was pre-heated to 35-40 °C and subjected to filtration. HTST (High-temperature short time) pasteurization at 90 °C for 15 min. immediately cooled to 35 °C. Milk was distributed into four different cleaned and sterilized utensils, Maltodextrin was incorporated as per the treatment @T<sub>1</sub>1%, T<sub>2</sub>1.5%, and T<sub>3</sub> 2% and T<sub>0</sub> control without maltodextrin. Inoculation of *L. acidophilus* culture @1.5% in all treatment and incubated at 37 °C for 8 hrs. Synbiotic lassi was prepared as per the method prescribed by Mule *et al.*, (2018)<sup>[23]</sup> with slight modification as-

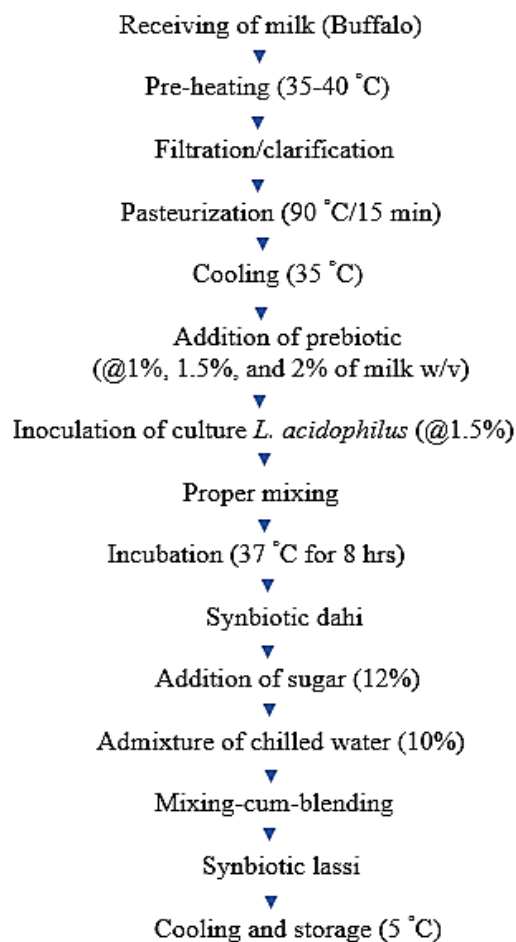


Fig 1: Flow chart for synbiotic lassi preparation  
Result and Discussion

### Effect of different levels of maltodextrin on physico-chemical properties of synbiotic lassi

#### Total solids (TS)

The recorded data cleared that the variation in the total solids content of synbiotic lassi was found to be significant. It was also observed that the total solids content gradually decreases with the increase in the level of maltodextrin. The decreasing trends of total solids are due to the increasing proliferation of micro-organism. The highest total solids content was found in treatment T<sub>0</sub> (22.38%) and the lowest was found in T<sub>3</sub> (22.31%). It was showed that treatment differences are significant at a 1 per cent level of significance. The finding of the present record corroborates well with Phadatar (2009)<sup>[25]</sup> who reported TS content in lassi about 21.20 and 19.52 per cent, respectively. These results are different from those reported by Gupta *et al.*, (2014)<sup>[10]</sup> and Jadhav, (1991)<sup>[23]</sup> who reported 18.35 and 17.78 percent TS respectively.

#### Fat

The highest fat was recorded in synbiotic lassi treatment T<sub>0</sub> (5.07%) without maltodextrin and lowest in treatment T<sub>3</sub> (5.043%). It was observed that treatment differences are statistically significant at a 1 per cent level of significance, indicating that there was a significant decrease in the fat content of lassi due to an increase in the level of maltodextrin. The inclination of a prebiotic level was showed that a higher rate of microbial proliferation. Hence, microbes can degrade a certain amount of fat. Due to that decreasing trends was shows in fat. The present result is in contrast with Malhotra (2014)<sup>[20]</sup> was reported the amount of fat content did not increase significantly with a decrease in the amount of sugar and an increase in the amount of mango pulp.

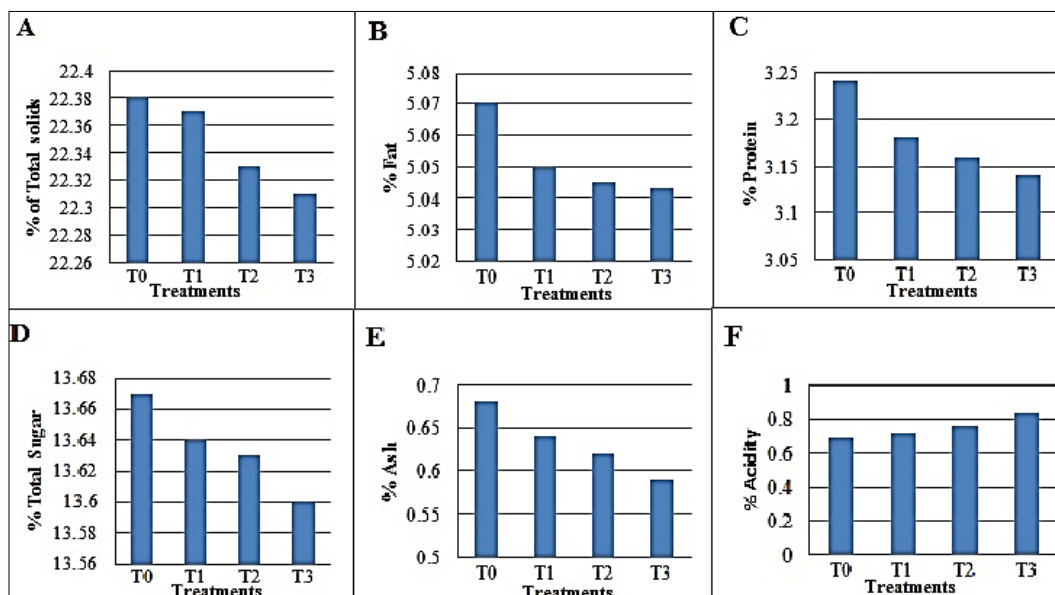


Fig 2: Results Showing for Synbiotic Lassi on Various Parameters

### Protein

The data pertaining that the addition of maltodextrin had significantly affected the protein content of synbiotic lassi. The integration of maltodextrin levels gradually diminution in protein content of synbiotic lassi. The highest protein content was recorded in treatment T<sub>0</sub> (3.24%) lassi prepared without addition maltodextrin and the lowest found in treatment T<sub>3</sub> (3.14%) lassi with 2% maltodextrin. Due to the integration of

prebiotic, it helps to a rapid proliferation of micro-organism. Hence, the microbes are degraded a certain amount of protein. The findings of the present studies were close to the finding of Phadataré (2009)<sup>[25]</sup> and Bhoir *et al.*, (2012)<sup>[3]</sup>. Contrary findings to the present observation were recorded by Mittal, (2003), Kumar (2004)<sup>[18, 19]</sup>, and Gupta *et al.*, (2014)<sup>[10]</sup>, who recorded 1.35, 1.85, and 1.58 per cent protein content in lassi, respectively.

Table 1: Effect of different levels of maltodextrin on physico-chemical properties of synbiotic lassi

Treatment	Total solids	Fat	Protein	Total sugar	Ash	Acidity
T <sub>0</sub>	22.38 <sup>a</sup>	5.07 <sup>a</sup>	3.24 <sup>a</sup>	13.67 <sup>a</sup>	0.68 <sup>a</sup>	0.69 <sup>d</sup>
T <sub>1</sub>	22.37 <sup>ab</sup>	5.05 <sup>b</sup>	3.18 <sup>b</sup>	13.64 <sup>ab</sup>	0.64 <sup>b</sup>	0.72 <sup>c</sup>
T <sub>2</sub>	22.33 <sup>bc</sup>	5.045 <sup>c</sup>	3.16 <sup>bc</sup>	13.63 <sup>bc</sup>	0.62 <sup>b</sup>	0.75 <sup>b</sup>
T <sub>3</sub>	22.31 <sup>c</sup>	5.043 <sup>b</sup>	3.14 <sup>c</sup>	13.60 <sup>c</sup>	0.59 <sup>c</sup>	0.83 <sup>a</sup>
SE	0.006992	0.006173	0.011585	0.013642	0.007782	0.008346
CD	0.021076	0.018606	0.034921	0.041122	0.023457	0.024855

### Total sugar and ash

The total sugars and ash were recorded in decreasing trends in the final product. The highest total sugars were observed in treatment T<sub>0</sub> (13.67%) without maltodextrin, while the lowest was recorded in treatment T<sub>3</sub> (13.60%) of 2% maltodextrin. Similarly, the ash lowest ash content was recorded in treatment T<sub>3</sub> (0.59%) and the highest was noticed in treatment (T<sub>0</sub>) (0.68%). The treatment differences were significant at a 1 per cent level of significance, indicating that total sugars and ash content was a significant decrease in synbiotic lassi due to an increase in the level of maltodextrin. The inclination of a prebiotic level showed that the increasing trends of micro-organisms proliferation rate, due to that the total sugars content was degraded by the micro-organisms. A similar finding was reported by Gupta *et al.*, (2014)<sup>[10]</sup>, Mane *et al.*, (2014)<sup>[21]</sup>, and Ghule *et al.*, (2015)<sup>[8]</sup>. While higher values for total sugar content in lassi was reported by Kumar (2004)<sup>[18, 19]</sup>.

### Acidity

The data showed that the acidity increased with an increasing level of maltodextrin. The highest acidity was found in treatment T<sub>3</sub> (0.83%) inclining 2 per cent maltodextrin, while the lowest was recorded in treatment T<sub>0</sub> (0.69%) without inclination of maltodextrin. It was observed that treatment

differences due to an increase in the level of maltodextrin are statistically non-significant at all percent level of significance. The addition of prebiotics enhancing the rate of microbial proliferation, due to the increasing microbial proliferation the degradation rate of solids mass content was increase with increased production of lactic acid in the product. The findings of the present studies were close to the finding of Kumar and Rathur (2000)<sup>[18, 19]</sup>, Kadam *et al.*, (2005)<sup>[23]</sup> and Shuwu *et al.*, (2011)<sup>[23]</sup> observed a gradual increase in acidity during storage of lassi.

### Conclusion

The present investigation, it may be concluded that combination of prebiotic i.e., maltodextrin @1.5 and probiotic *L. acidophilus* @1.5 per cent could be successfully utilized for preparation synbiotic of lassi.

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