Effect of Inulin on Probiotic Count of Bio Sweetened Probiotic Lassi

Immadi Sree Bhavya¹, Vijay P Jadhav¹* and Ramachandra Rao HG²

¹Department of Dairy technology, Dairy Science College, K.V.A.F.S.U, Hebbal, Bengaluru, India
²Professor and Head, Dairy Technology, Dairy Science College, K.V.A.F.S.U, Hebbal, Bengaluru, India

*Corresponding Author: Vijay P Jadhav, Department of Dairy technology, Dairy Science College, K.V.A.F.S.U, Hebbal, Bengaluru, India.

Received: December 02, 2019; Published: December 13, 2019

Abstract

In this study, an attempt has been made to incorporate the inulin into the milk at 1, 2 and 3% before the incubation. Further, the probiotic lassi was made by the curd which was fermented by pure probiotic cultures of Lactobacillus acidophilus and Bifidobacterium bifidum @ 4% and was further blended with 50% water, 6% sugar and 6% bio-sweetener (stevia) followed by stirring and cooling. The sample prepared with 1% inulin was awarded maximum overall acceptability in terms of sensory compared to other combinations. An increase in the probiotic counts of lassi was observed with the increase in the inulin levels and was recorded the highest at 3% inulin with 8.53 DMCC log10/ml.

Keywords: Lassi; Probiotics; Inulin; Bio-sweetener; Sensory Characteristics

Introduction

Lassi is close to sweet stirred yoghurt (yoghurt drink) which is a popular summer drink in India, especially in north India. It is also popular in other parts of the world like East Asia, Africa and Europe etc. It is prepared by mixing calculated quantity of sugar or spices and cold water with dahi/yoghurt. It has creamy consistency, sweetish rich aroma and mild to acidic flavour, which makes the product refreshingly palatable. The conventional lassi microflora consists of Lactococcus lactis ssp. Lactis, streptococcus thermophilus and Lactobacillus ssp. delbrueckii bulgaricus or it may be heterogeneous dahi culture.

Yoghurt drinks, similar to lassi are designed to be consumed as a drink or shake and it consists of (a) refreshing low–milk – solids drink or (b) a health – promoting yoghurt drink supplemented with prebiotics, probiotics, vitamins and minerals [3]. In this direction efforts were made by some researchers to add probiotics to lassi [2]. Lilly and Stillwell [3] introduced the term ‘probiotics’ for the growth promoting factors produced by the microorganisms. FAO in 2007 defined prebiotic as non-viable food component that confers health benefit on the host associated with modulation of the microbiota”.

Sugar is an important ingredient of Lassi. It is the most widely used sweetener in the food industry. The pleasant sweet taste, cheap cost and high energy value make it a most desirable food ingredient [4]. But it cannot be used by many people suffering from diabetes, obesity, heart disease etc.

Stevia, a natural sweetener obtained from the leaf of Stevia rebaudiana plant, is 130–300 times sweeter than sucrose. It is heat stable up to 200ºC. It contains different sweetening compounds like stevioside, a principal diterpene glycosides having sweetness of 250–300 times than that of sucrose. Rebaudioside-A is another sweet constituent, which is ~400 times sweeter than sugar [5].

Inulin, a compound extracted from the chicory root, is a fructan of significant importance commercially, with a fully proven prebiotic function. Inulin is considered within the so-called fructans compounds and is present in fruits and vegetables. Additional to its prebiotics properties, inulin presents technical and functional characteristics, such as fat replacer; sugar replacer; emulsion and foam stabilizer [6]. Therefore, an attempt has been made to prepare probiotic bio-sweetened lassi along with the addition of inulin.

Materials and Methods

Whole milk: Fresh cow milk was taken from Student’s Experimental Dairy Plant (SEDP), Dairy Science College, Bengaluru.

Skim milk powder: “Nandini” brand skim milk powder manufactured by Karnataka Milk Federation was procured from the local market.

Starter cultures: Dahi culture was used for the preparation of control lassi and Probiotic Starter cultures of Lactobacillus acidophilus and Bifidobacterium bifidum was obtained from Department of Dairy microbiology, Dairy science college.

Sugar: Good quality of cane sugar was purchased from the local market.

Stevia: Refined stevia extract powder was obtained from Stevia World Agro Tech Pvt. Ltd., Sahakarnagar, Bengaluru.

Inulin: Inulin was procured from Global Calcium Pvt. Ltd, Bengaluru.

The effect of different levels of inulin on the sensory characteristics of probiotic lassi

The scores for the sensory characteristics of probiotic lassi with inulin added at 1, 2 and 3% are presented in Table 1. Among different levels of inulin used in the preparation of lassi at 1.0, 2.0 and 3.0 per cent levels based on volume of milk, 1 per cent secured highest sensory scores viz., colour and appearance, body and texture, flavour, overall acceptability. Further addition of inulin lowered the sensory scores of body and texture and overall acceptability of treated samples. Increase in levels of inulin may increase the more thickness in the product thereby it decreases the scores of body and texture and overall acceptability. Inulin of 1 per cent was selected for further studies. Similar findings were reported by Allgeyer, et al. [7] who found that yoghurt prepared with 1.24 per cent inulin and combinations of L. acidophilus and B. bifidum cultures was accepted, further addition of inulin decreased the sensory scores.

![Flow diagram for preparation of inulin blended probiotic bio-sweetened lassi.](image_url)

Table 1: Effect of different levels of inulin on the sensory characteristics of probiotic lassi.

<table>
<thead>
<tr>
<th>Levels of Inulin Addition (%)</th>
<th>Colour and Appearance</th>
<th>Body and Texture</th>
<th>Flavour</th>
<th>Overall Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (0)</td>
<td>7.80&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.80&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.60&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.70&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>1</td>
<td>8.00&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.20&lt;sup&gt;d&lt;/sup&gt;</td>
<td>7.90&lt;sup&gt;c&lt;/sup&gt;</td>
<td>8.20&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>2</td>
<td>7.30&lt;sup&gt;c&lt;/sup&gt;</td>
<td>7.50&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.70&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.60&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>3</td>
<td>7.50&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.20&lt;sup&gt;c&lt;/sup&gt;</td>
<td>7.80&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.30&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>CD (p≤0.05%)</td>
<td>NS</td>
<td>0.23</td>
<td>NS</td>
<td>0.26</td>
</tr>
</tbody>
</table>

Note:
- All the values were average of 3 trails.
- Control was prepared using 2% dahi culture.
- Product prepared by using L. acidophilus and B. bifidum at 4% (1:1).

The effect of different levels of inulin on the probiotic count of probiotic lassi

The results pertaining to the effect of different levels of inulin on the probiotic counts of probiotic lassi are presented in Table 2. Addition of inulin at 1.0, 2.0 and 3.0 per cent increased the probiotic counts to 8.00, 8.26 and 8.53 DMCC log10/ml respectively. This may be due to the fructan compounds present in inulin that promotes the growth of probiotic cultures which acts as prebiotic. These similar findings were agreed by Kurien., et al [8], who evaluated the effect of inulin, oligofructose and honey (at 0-5 per cent) in enhancing the growth and activity of L. acidophilus strains to select a suitable prebiotic for the development of symbiotic yoghurt. Among the different concentrations of prebiotics evaluated, 3 per cent inulin resulted in better growth and acid production.

![Flow diagram for preparation of inulin blended probiotic bio-sweetened lassi.](image_url)

Table 2: Effect of different levels of inulin on the probiotic count of probiotic lassi.

<table>
<thead>
<tr>
<th>Levels of Inulin Addition (%)</th>
<th>Probiotic Count DMCC Log10/ ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (0)</td>
<td>-</td>
</tr>
<tr>
<td>1</td>
<td>8.00&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>2</td>
<td>8.26&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>3</td>
<td>8.53&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>CD (p≤0.05%)</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Note: Control prepared using 2% dahi culture showed of 7.37 DMCC log10/ml.
Conclusion

Fermented products are widely used as a vehicle for delivery of other beneficial microorganisms. Among the various fermented products, lassi contains appreciable amounts of milk protein, phospholipids, nutritive value and various therapeutic benefits. Inulin, being considered as a prebiotic, has the capacity to stimulate the development of specific bacteria such as *Bifidobacterium* and *Lactobacillus*. From this investigation was it was concluded that increased level of inulin addition increased the growth of probiotic count in bio-sweetened lassi.

Bibliography


