Effect of different levels of safflower milk and inulin on microbial analysis of Srikhand

Shimar Mishra, John David, Sangeeta Shukla, SN Thakur and SGM Prasd

Abstract
Fermented foods have a wide range of dietary and medicinal benefits. Lactic acid bacteria play a key role in assessing the health benefits of fermented milks and other products. Bifidobacteria spp. and Lactobacillus acidophilus a probiotic dairy food that is commonly used. In the present study, buffalo milk was standardized to 6% fat and 9% solid not fat for manufacturing of Chakka. During the preparation of Shrikhand; using different levels of Inulin viz., @ 2%, @ 4%, @ 6% and @ 8% and levels of Safflower (Carthamus tinctorius L.) milk viz., @ 5%, @ 10%, @ 15% and @ 20% was added. Sugar was added @ 35%. The SPC count was declined from $6.2 \times 10^3$ to $18.3 \times 10^3$ cfu/g for Shrikhand stored at –10 and 5 °C temperature, on 7th day. During preparation, the yeast and mould counts decreased. Shrikhand, both new and preserved, had no coliform bacteria. Shrikhand could be held at –10 °C for up to 56 days.

Keywords: safflower milk, inulin, microbial analysis

Introduction
Preservation of milk the usage of fermentation with LA bacteria is one of the elderly and efficient process to retain milk with its treasured vitamins as it is a probiotic product (Kongo and Malcata, 2016) [8]. Shrikhand is milk product obtained from lactic fermented curd which is semi- soft and sweetish-sour taste (Singh et al., 2014).

Indigenous (local) dairy fermented products have performed a vital function in the socio-economic lifestyles of Indians since times immemorial accounting for over 90% of dairy products (Singh, 2007). Milk products are organized to extend the shelf lifestyles and keep its nutritive cost as milk is the most perishable product (Harper and Richard, 2008). Fermented milk products have therapeutic, anti-cholesterolemia and anti-carcinogenic residences on the grounds that antiquity (Boghra and Mathur, 2000) [1]. Swapna et al., (2011) takes a gander at the unmistakable exceptional from Shrikhand by using the adjustment of probiotic lactic destructive organisms and as a way of life, used as an alternative curd as a starter tradition. The probiotics are usually used are Lactobacillus rhamnosus, Lactobacillus acidophilus and Lactobacillus sporogens and mixed as Lactobacillus acidophilus Lactobacillus + sporogens. The unusual lactic unfavourable tiny dwelling beings isolates executed from bull like milk, dairy milk and buffalo milk autonomously as a starter way of life or in whole with the aid of probiotics. The instances of Shrikhand have been investigated for organoleptic normal for the factor. are performed through using probiotics as a starter tradition within the Shrikhand had been prepared, the most excellent with recreation plan of probiotics that Lactobacillus acidophilus + Lactobacillus sporogens score used recorded and the base in Lactobacillus rhamnosus in concealing recorded rating used, appearance, scent, surface, taste and normal affirmation of the component. Comparable results had been subtle with the integration of lactic damaging microorganism’s isolates together with probiotics.

Materials and Methods
The Experimental work was carried out in the research laboratories of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.).
**Procurement and collection of ingredients**

a) **Buffalo milk:** Buffalo milk was collected from the local market at Prayagraj.

b) **Safflower seed:** It was collected from A.D.A. Market Alopi Bag, Prayagraj -211001, Uttar Pradesh.

c) **Sugar:** Sugar was collected from local general stores of Prayagraj.

d) **Starter culture:** Starter culture was collected from NCDC, NDRI, Karnal.

e) **Inulin:** It was procured from Azelis (India) Private Limited, Navi Mumbai.

f) **Sodium Hexametaphosphate:** Procured from M/S Scientific and Allied Industries, E-39 New Agra – 282005.

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**Flow Diagram for Preparation of Safflower Milk**

1. Safflower seeds (50gm)
2. Seeds washed with hot water
3. Grinding of seed (in a small amount of water)
4. Filtration (Final seed to water ratio 1:5)
5. Addition of sodium hexameta-phosphate (@ 0.2 per cent)
6. Addition of common salt (@ 0.05 per cent)
7. Heating of milk
8. Safflower milk (250ml)

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**Flow Diagram for Manufacturing of Shrikhand**

1. Receiving of Buffalo milk
2. Standardization (fat 6%, S.N.F. 9%)
3. Heat treatment (85 °C/30 minutes)
4. Cooling (50-60 °C)
5. Addition of Safflower milk (5%, 10%, 15%, 20%)
6. Addition of Inulin powder (2%, 4%, 6%, 8%)
7. Cooling (30 °C)
8. Inoculation (@ 2% starter culture) (NCDC-167)
9. Incubation (32 °C/ 10-12 hrs)
10. Breaking the curd
11. Draining the whey
12. Chakka
13. Addition of sugar (35%)
14. Kneading to a smooth paste (5 min.)
15. Filling in cup
16. Shrikhand
17. Storage (5-7°C)
Table 1: Treatments combinations of developed Shrikhand supplemented with the addition of inulin and safflower (Carthamus tinctorius L.) milk levels. Y0- 100% Buffalo milk (T0) Shrikhand without Safflower milk (S0) and Inulin (I0).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Fat (%)</th>
<th>Protein (%)</th>
<th>Lactose (%)</th>
<th>Ash (%)</th>
<th>TS (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffalo milk</td>
<td>6.00</td>
<td>3.78</td>
<td>5.10</td>
<td>0.78</td>
<td>15.66</td>
</tr>
<tr>
<td>Safflower milk</td>
<td>4.50</td>
<td>2.34</td>
<td>2.27</td>
<td>0.67</td>
<td>9.78</td>
</tr>
</tbody>
</table>

Total microbial load (SPC): Effect of storage on SPC (10^7 CFU/ml) of developed Shrikhand during storage at 5-7 °C. The SPC count on first day was 17.50 x 10^7 CFU/ml for Shrikhand stored at 5-7 °C respectively on 7th day. The SPC count of Shrikhand stored at 30 °C was decreased for 17.50 x 10^7 CFU/ml to 12.25 x 10^7 CFU/ml in 24 hrs. It was observed that the storage temperature increased the SPC count also decreased.

Yeast and mould count: Yeast and mould may enter milk products during the manufacturing process or afterward by improper handling. The yeast and mould of fresh Shrikhand was 4.25 x 10^7 CFU/ml (Table 2). The yeast and mould count decreased up to 7 days during storage at 5-7 °C temperature but it increased after 7 days. Whereas the yeast and mould count of Shrikhand stored at 5-7 °C was 4.25 x 10^7 CFU/ml on first day and it increased to 5.50 x 10^7 CFU/ml on 7th day making the product acceptable.

Table 2: Showing yeast and mould count (x10^3 CFU/ml) of developed Shrikhand during storage at 5-7 °C.

<table>
<thead>
<tr>
<th>Days</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>0th Day</td>
<td>4.25</td>
</tr>
<tr>
<td>Seven Day</td>
<td>5.50</td>
</tr>
<tr>
<td>Fourteen Day</td>
<td>8.50</td>
</tr>
<tr>
<td>Twenty One Day</td>
<td>9.25</td>
</tr>
<tr>
<td>Twenty Eight Day</td>
<td>9.50</td>
</tr>
<tr>
<td>Thirty Five Day</td>
<td>10.50</td>
</tr>
<tr>
<td>Fourteen Two Day</td>
<td>11.25</td>
</tr>
</tbody>
</table>

Fig 1: Showing the graph for SPC (10^7 CFU/ml) count of developed Shrikhand during storage at 5-7 °C.