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LABORATORY PREPARATION OF SHRIKHAND: A DELICIOUS FERMENTED DAIRY PRODUCT

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Abstract

Purpose: Shrikhand Spread, a unique sweetened fermented Indian milk product is made by separation of whey from dahi, the Indian counterpart of Western yoghurt, followed by addition of sugar. Production of dahi employing traditional method involved undefined mixed starter cultures, uncontrolled fermentation and longer production time resulting in wide variation in its chemical and microbiological qualities. In order to cater to a product with desirable properties like lower post-acidification, higher flavor profile, firm body and lower syneresis coupled with shorter production time, conjugated application of yoghurt cultures and dahi cultures were tried. Since the shelf-life of dahi is limited, conversion into Shrikhand spread may be used as a tool to extend the shelf-life and therefore the market reach towards commercialization into the global market as a potential functional food. Design/Methodology/Approach: Different batches of dahi were made from homogenized (Stage I – 2500 psi, Stage II - 500 psi) and pasteurized (74-78 °C/16-19 Sec) milk, pre-adjusted to 3.15-3.20% fat and 11.40% snf with diverse starter combinations selected upon the extent of post acidification, volatile acid production, syneresis and rheological characteristics. Homogenized, pasteurized, and regulated milk was further subjected to a heat-treatment (90°C/10 min) and seeded with selected starter combinations to obtain firm curd intended for shrikhand spread manufacture. Shelf-life of Shrikhand spread was evaluated in terms of chemical and microbiological criteria upto 7 days of storage at 8±1°C. Findings: Starter combination of eXactDahi 2+YoFlex Express 1.0 at an incubation temperature-time combination of 45°C/5h was found most suitable for producing dahi with smooth body, higher volatile acidity and low syneresis. Utilization of dahi obtained employing the above starter combination for the manufacture shrikhand spread was suggested and the product was found to retain its goodness when stored for 7 days at 8±1°C. Originality/Value: Conjugated use of yoghurt cultures with dahi cultures was suggested to overcome the drawbacks of traditional process of dahi manufacture suitable for conversion into shrikhand spread. This dahi was found capable of enhancing its dietetic value in addition.

Key words: *Lactic acid bacteria, Dahi, Chakka, Shrikhand spread, Shelf-life.*

Introduction

Elaboration of biologically active peptides exhibiting both functional and physiological roles *in vitro* and *in vivo* by lactic acid bacteria (LAB) have been drawing serious interest for its applications in food and nutrition science, resulting in consumer's inclination towards healthful foods [1]. The three major Indian fermented milk products namely dahi (curd), Shrikhand (sweetened concentrated curd) and lassi (stirred curd), might be considered as the Western counterpart to yoghurt, quarg and stirred yoghurt, respectively [2]. Nutritional and therapeutic significance of dahi and shrikhand is well documented. Reviewed literature indicated that functional properties of traditional dahi could be enhanced either by manipulation of fortifying ingredients of basic mix, starter combinations and incubation temperature and time coupled with the adoption of appropriate packaging material and their subsequent use for the manufacture of shrikhand spread would help towards process standardization and project them into the global market as a functional food [3-6]. Traditional method of dahi production involving natural culturing of boiled cow, buffalo or mixed milk with undefined starter cultures and uncontrolled long fermentation could not be practical for industrial production. Conjugation application of yoghurt cultures capable of elaborating exopolysaccharides (ESP) along with normal dahi cultures might result in more acceptable product in terms of body, texture and flavor and greater antibacterial activity against pathogenic organism [7-11]. Microstructural study showed that dahi made with EPS-producing strains had relatively compact linear structure with more open structure and pores having discontinuous casein matrix than the controlled dahi [12-15]. Shelf-life of dahi is longer than milk but it is still limited. Shrikhand is known for its extended shelf-life mainly due to its higher acidity & One of the major causes of mortality in the reduced water content and change in osmotic concentration due to addition of sugar and therefore have greater market reach [16-20]. Traditionally made shrikhand has very high total solids and sugar content and is not preferred by the health-conscious consumers of present generation [21-22]. In the present study an endeavor has been made to develop a proprietary fermented dairy product named as shrikhand spread to reciprocate the consumer's demand for a shrikhand variety with lower total solids and sugar [23-24]. Compensation of comparatively lower fat, protein and total solid in shrikhand spread has been conceptualized in the current study by application of ESP producing starter cultures [25-26]. Yoghurt cultures (Streptococcus thermophilus and Lactobacillus delbrueckii subsp. bulgaricus) were capable of producing ESP but they failed to produce diacetyl whereas dahi cultures had characteristic diacetyl flavour therefore in the present investigation attempts were made to obtain dahi employing mixed cultures of dahi and yoghurt cultures and their subsequent utilization for the production of shrikhand spread with diacetyl flavor and enhanced shelf-life [27-32].

Materials and Methods

Ingredients:

- Milk- 2.5 litres
- Inoculum- bacteria isolated from curd
- Sugar powder
- Strawberry
- Pista
- Almonds
- Cashew
- Cardamom
- Gulkand
- Desi rose petals

Type of Milk

Raw mixed milk received from dairy farms the milk which is used for this purpose is

fresh to obtain dahi intended for shrikhand spread manufacture [33].

Starter Culture

The starter culture which is used for the preparation of curd is *Lactobacillus* spp. which is isolated from the different curd samples of dairy farms and characterized. These bacteria introduce to the milk and with the action of these bacteria's the formation of curd takes place [34-36]. After the curd formation the extra water content of curd has been removed to obtain "chakka" Now the milk is treated at 90°C/10 min, followed by cooling to 30 to 45°C for inoculation with selected starter combinations [37-40]. Inoculated milk was then incubated for 4 to 5h to obtain firm curd intended for shrikhand spread manufacture [41]. Dahi obtained by the above method was strained for 12h under refrigerated condition (5 + 2°C) through polyethylene filter bags, pre sterilized using 0.1% Suma Bac (Sealed Air) to obtain chakka. Chakka was then admixture with 40% boiled sugar syrup to obtain shrikhand spread. Shelf-life study of shrikhand spread was carried at 8±1°C/7days [42-44]. Flow diagram for the process is following:

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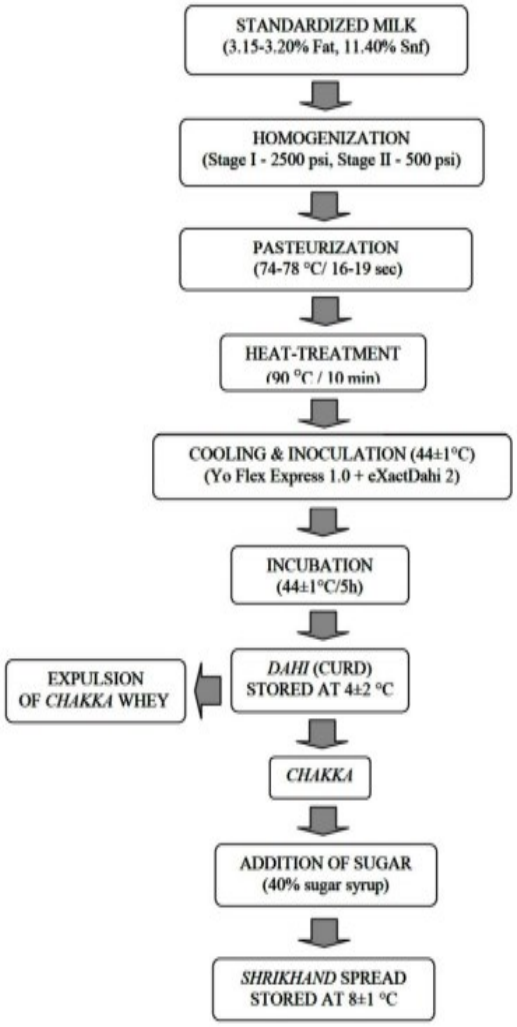
Production of Shrikhand spread flow chart:



Addition of flavors to Shrikhand

After the preparation of "chakka" the sugar powder is added to that so by adding natural flavours to the shrikhand makes its taste better and also increases its nutritious values.
Hence, the prepared flavors are listed below

1. Dry fruit flavour

In this flavour different dry fruits are added like almonds, cashew nuts etc. which increases the nutrition value of shrikhand.

2. Kesar-Elaichi flavour

In this flavour kesar (Saffron) and elaichi (cardamom) is added to Shrikhand to

enhance the aroma and taste with the heathy benefits.

3. Strawberry flavour

In this flavour the strawberry pulp is added to shrikhand for enhancing the antioxidants.

4.Gulkand flavour

The fresh gulkand and rose petals is added to make shrikhand more delicious and healthy.

5. Pishta flavour

In this the pishta is added to enhance the flavor of shrikhand

Conclusions

Fermented milk products are beneficial and play an important role in day-to-day life as synthesis of vitamin B complex in human body and in the prevention of stomachic diseases, due to the action of several lactic organisms that produce natural antibiotics. As the cost of animal milk is very high, the scientists are trying to switch over to the utilization of plant proteins. Fermentation of soy milk is good alternative as it improves the flavor, also enhances the nutritional quality of food, known to increases the digestibility, eliminates the anti-nutritional factors from diet, prolongs shelf life, and valued as therapeutics and is relatively economic compared to dairy milk products. Fruits pulp can also be used in order to enhance its vitamin A, C and mineral contents, sweetness and masks the beany flavor of soy milk to some extent. So, in future we can enrich the flavor of Shrikhand with medicinal plants to make it healthy and protective.

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