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Quality Assessment Of Developed Powdered Lassi

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Abstract: Lassi, one of the most enjoyed beverages in India made out of just two basic ingredients that is yogurt locally known as Dahi and sugar. This particular beverage can be stored at low temperatures for 8 to 10 days. In this following study we are going to study on how can we elongate the shelf life of that lassi by removing the moisture from it. the study includes drying of yogurt (Curd) in an spray drying machine and optimizing the amount of ingredients such as sugar, dried curd powder, flavoring substances and water to create a lassi made out of curd powder. The control sample and few trial samples are also illustrated in the study. All the physiochemical properties of the prepared lassi premix and microbial properties re tested according to the FSSAI guidelines and all the parameters are kept under the FSSAI rules and regulatory compliance.

I. Introduction

The curd is also known as yogurt. The term “yogurt” originates from the Turkish word “logomark” which is literally defined as coagulating, thickening or curdling. For a millennium, yogurt has been a part of human diet around the globe. The health benefits of yogurt go back to 6,000 BC. In the 20th century a Bulgarian medical student reported on the health promoting aspect and advantages of lactic acid bacteria. Because yogurt is a good source of protein with excellent bioavailability, a rich source of calcium, and a source of variety of health-promoting probiotics, low yogurt consumption deprives you of the opportunity to contribute to healthier lifestyle. All thought the shelf life of yogurt is not so long. The shelf life of curd can only extend up-to to 10 days maximum. After that number of all the nutrients and essential health-promoting nutrients become to fall down. Spray-dried curd powder (SDCP) has shelf stability and other functional properties that improve solubility and facilitate the use, processing, packaging, and transportation of other food derivatives, such as bread and pastries on a large scale. The present research was conducted to develop SDCP and further its utilization to prepare lassi.

II. Material And Methods

This prospective study was done by a student of B-tech in Food Technology for completion of his degree in the year 2023.

Study Name: Quality assessment of developed powdered lassi

Study Duration: August 2023-October2023

Curd was spray dried by employing different outlet temperatures and inlet temperatures in a spray drying unit. Spray dryer shows that increasing the temperature increases nutritional loss, whereas *S. thermophilus* culture shows resistance to the intensive heat approaches. On the other hand *L. delbrueckii* subsp. *Bulgarius* culture was found to be significantly affected. A total of 4 treatments, including one control for the lassi development were given to be product to make lassi from the dried curd powder. With this particular study I successfully were able to extend the shelf life of lassi in the form of powder for 5-6 months in an air tight package away from direct sunlight and in cool and dry place.

The raw materials used during this particular study was brought from Nagpur local market of highest possible quality. The total of 1,500 ml of milk sample was collected in sterilized bottles with capacity of 500 ml each. Particularly milk samples were stored in cool boxes. Reagents required in effort were directly purchased from the scientific store of highest possible quality. The collected raw material was further tested for determining and standardizing the contents in the milk.

Drying process were accompanied in this study the curd was dried using dryer unit. The other method of drying of curd is to expose the curd to higher temperature for certain duration of time to ensure the removal of moisture from the curd and making a fine powder from it by grinding the slabs formed after drying the curd.

FSSAI prescribed test procedures were accompanied while testing the physiochemical properties of the formed powder and also of the control sample. All the results of the test procedure are illustrated below.

Procedure methodology

Milk samples were pasteurized before the inoculation of starter culture by employing in to heat via [HTST/LTST] technique with some modification. The fats and SNF content of the milk is to be maintained. The fats should be from 5.5 to 5.7 and SNF content ranging from 10.0 to 10.5. for this purpose, accurately 200 ml of milk sample was taken in a graduated conical flask of container of 500 ml capacity and further placed into water bath and the content was allowed to heat up until required temperature (72°C) is achieved. After the pasteurization step, milk is placed in glass jar and starter culture comprising *L. bulgaricus* and *S. thermophilus* was introduced. The further fermentation process was carried out for 8-12 hrs. drying can be obtained from two ways first it can either be spray dried or oven dried during this study I used both the methods for drying the curd.

Both the studies are considered good for study but spray drying has low risks of burning or destroying the product the product to be dried because during oven drying the curd must be kept watch until it dries completely and lose all of its moisture.

The spray drying makes drying curd easy but is a costly method as it requires a specific dryer unit for drying the curd. In spray drying method the outlet and inlet air temperature has to be maintained to remove moisture from curd.

Statistical analysis

Data was described in this report was analyzed using FSSAI standard methods for determining the values of the following physiochemical factors. All the results were repeated thrice to get a average value of the factors in the product. The standard values were determined by comparing the standard factors from the FSSAI manual. The studies sample were made with accordance with those standard values and all the physiochemical testing values described with in the report is true.

III. Result

In this study firstly dried curd powder was tested for some physiochemical properties such as moisture content, protein content, lactose content and also for basic microbial analysis. All the results were good and was under the average value. The properties of the prepared powdered curd meet the standard value prescribed by the FSSAI. after the development of lassi from that powder the prepared sample were tested for each and every

possible characteristic such as moisture, total solids, ash, fats, pH, acidity etc. all of the results are shown below in the form of a table.

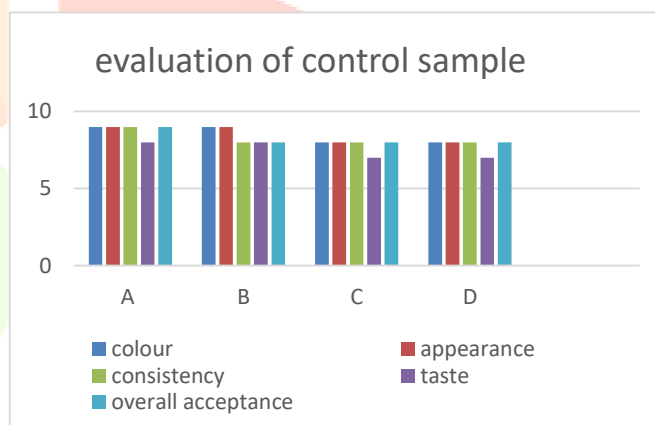
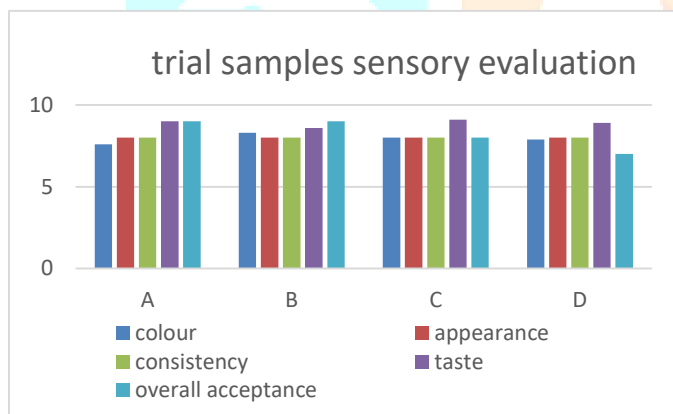
A standard measure of the ingredients was made by varying the amount of the ingredients in four different samples. After taking in account of their sensorial test, a standard sample were made in which all the ingredients were taken in a standard amount and in a controlled amount as shown in Table 1. The control sample was made.

Table no 1: control sample formation

| Sr. No. | Ingredients | Quantity (g/ml) |
|---------|-------------------------|-----------------|
| 01 | Spray dried curd powder | 75 grams |
| 02 | Water | 100 ml |
| 03 | Sugar | 10 grams |
| 04 | Flavouring substances | 15 grams |

The following sample sensorial analysis was best as compared to all the other samples made with varying concentration of ingredients. The sensorial analysis of the control sample was done by making 4 different control samples with different flavoring.

Ingredients concentration was varied within all control samples forming 4 different samples with four studies



the control samples were decided the sensorial changes were categorized in the below graph

The culture survival in spray drying

Two different strains were added for fermentations A: *S. thermophilus* and B: *Lactobacillus delbrueckii* in the current studies. Further, each treatment (T1, T2 and T3) curd powder was examined for both A and B strains which are depicted from on average in the in trial sample 9.5×10^8 log cfu/mL was detected for both A and B strains as far the A culture reduction was concerned, on average in T1, T2 and T3 the survival rate was 55.62% and in culture B on average 15.8% was observed.

| | Culture A | Survival% | Culture B | Survival% |
|---------------|--------------------|-----------|--------------------|-----------|
| Initial value | 9.5×10^8 | NA | 9.5×10^8 | NA |
| T1 | 5.8×10^8 | 61.1 | 1.7×10^8 | 17.9 |
| T2 | 5.2×10^8 | 54.17 | 1.5×10^8 | 15.8 |
| T3 | 4.9×10^8 | 51.6 | 1.3×10^8 | 13.7 |
| Average | 6.37×10^8 | | 3.52×10^8 | |

Table no 2: culture survival rates at different temp.

T1, OAT 65°C: IAT 150°C: FT 9°C; T2, OAT 70°C: IAT 155°C: FT 9°C; T3, OAT75°C: IAT 160°C: FT 9°C

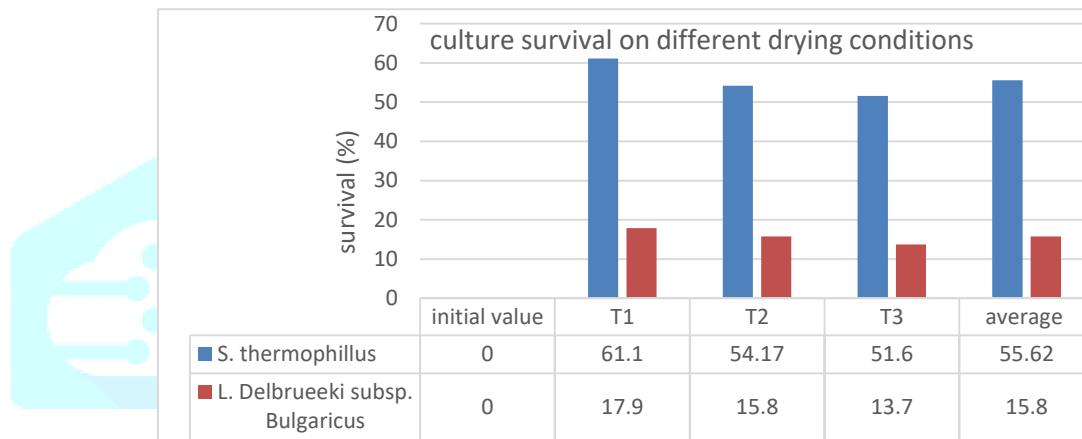


Table no 3: physiochemical properties of prepared control samples

| Sample Name | pH | Acidity (%) | Specific gravity | moisture | Total solids (%) | Ash (%) |
|-------------|------|-------------|------------------|----------|------------------|---------|
| Sample 1 | 4.67 | 1.35 | 1.065 | 90.50 | 25.50 | 0.50 |
| Sample 2 | 4.59 | 1.31 | 1.068 | 90.36 | 25.64 | 0.70 |
| Sample 3 | 4.58 | 1.28 | 1.069 | 90.20 | 24.80 | 0.77 |
| Sample 4 | 4.60 | 1.19 | 1.070 | 90.15 | 24.85 | 0.80 |

| Sample Name | carbohydrate | Protein (%) | Fat (%) | Viscosity (cp) | Dispersibility (sec) | Sedimentation value (%) |
|-------------|--------------|---------------------|---------|----------------|----------------------|-------------------------|
| Sample 1 | 5.32 | 3.43 | 3.60 | 28 | 65 sec | 55 |
| Sample 2 | 4.94 | 3.46 | 3.67 | 30 | 64 sec | 57 |
| | 01 | pH | | 4.61 | +0.10 | |
| Sample 3 | 4.82 | 3.50 | 3.59 | 33 | 64 sec | 59 |
| | 02 | Acidity (%) | | 1.30 | +0.10 | |
| Sample 4 | 4.64 | 3.53 | 3.61 | 34 | 60 sec | 58 |
| | 03 | Specific gravity | | 1.068 | +0.020 | |
| | 04 | Moisture (%) | | 90.30 | ±2% | |
| | 05 | Total solids (%) | | 25.44 | ±2% | |
| | 06 | Ash (%) | | 0.70 | ±2% | |
| | 07 | Carbohydrate | | 4.93 | ±2% | |
| | 08 | Protein (%) | | 3.48 | ±2% | |
| | 09 | Fats (%) | | 3.61 | ±1.5% | |
| | 10 | Viscosity(cp) | | 32 | ±5% | |
| | 11 | Dispersibility(sec) | | 63 | ±5sec | |
| | 12 | Sedimentation (%) | | 57.25 | ±5% | |

Table no. 4: standard physiochemical properties for current study

The sample preparation for microbial analysis was carried out by using serial dilution technique. The sample was prepared in dilutions of 10^{-2} , 10^{-3} , 10^{-4} , 10^{-5} and 10^{-6} for measurement of total plate count, yeast and Mold count and total coliform count. The results of microbial quality evaluation are reported in table.

| Dilution | No. of colonies (Total plate count) | No. of colonies (yeast and mould) | Coliform count |
|-----------|-------------------------------------|-----------------------------------|----------------|
| 10^{-2} | 32×10^2 | 9×10^2 | Nil |
| 10^{-3} | 24×10^3 | 8×10^3 | Nil |
| 10^{-4} | 16×10^4 | 6×10^4 | Nil |
| 10^{-5} | 14×10^5 | 5×10^5 | Nil |
| 10^{-6} | 12×10^6 | 3×10^6 | Nil |

Table no 5: Microbial analysis of prepared samples

IV. Discussion

During the spray drying of yogurt, it was observed that by increasing the outlet and inlet temperatures while keeping feed temperature constant, the protein and lactose content in the spray dried curd powder tends to increase significantly. In contrast, a reduction in moisture content was investigated. In addition, there was no significant effect on pH readings examined.

These results were found after being analyzed with the help of **FSSAI** standard testing procedures. Protein is a heat-sensitive counterpart of a food system.

In conclusion, mastering the preparation of powdered lassi opens up a world of convenience without sacrificing the authentic taste and texture of this beloved Indian beverage. Through the simple steps outlined, anyone can create a delightful glass of lassi with ease, whether at home or on the go. By experimenting with variations in flavors and ingredients, individuals can tailor their lassi experience to suit their preferences,

ensuring a refreshing and satisfying drink every time. So, whether you're seeking a quick refreshment or a taste of Indian tradition, powdered lassi offers a delicious solution that's sure to please.

In conclusion, this research report has shed light on the preparation of powdered lassi, offering insights into its ingredients, methods, and potential variations. Through an examination of traditional recipes and modern adaptations, we've explored how powdered lassi provides a convenient and versatile option for enjoying this classic Indian beverage. By combining yogurt powder, sugar, spices, and flavorings, individuals can create a delicious and refreshing drink that retains the authentic taste and texture of lassi while accommodating busy lifestyles. Moreover, the versatility of powdered lassi allows for experimentation with different flavors, textures, and dietary preferences, making it accessible to a wide range of consumers. As powdered lassi continues to gain popularity both domestically and internationally, further research into its nutritional profile, market potential, and consumer preferences could provide valuable insights for the food and beverage industry. Overall, this research contributes to our understanding of powdered lassi as a convenient, flavorful, and culturally significant beverage option.

To conclude, preparing powdered lassi is a simple and convenient way to enjoy this refreshing drink anytime, anywhere. By following the steps outlined, you can create a delicious and flavorful beverage that captures the essence of traditional lassi while offering the convenience of a powdered mix. Whether you're craving a cool treat on a hot day or looking to add a touch of Indian flavor to your routine, powdered lassi is sure to satisfy. Experiment with different flavors and ingredients to customize your lassi experience, and enjoy the creamy, tangy goodness with every sip.

V. Conclusion

This research report has proven that powdered lassi can be offered as a potential variable for a refreshing summers drink for adults, children's overall this research contributes to our understanding of powdered lassi as a convenient, flavorful and culturally significant beverage option.

The development of lassi powder represents a significant innovation in the dairy and beverage industries, providing a convenient and shelf-stable alternative to traditional liquid lassi. The project has successfully navigated various stages, from conceptualization and formulation to testing and optimization, resulting in a product that retains the authentic taste and nutritional benefits of traditional lassi.

Key achievements in this development include:

1. **Formulation Success:** The creation of a powder that, when reconstituted, offers the creamy texture and tangy flavor characteristic of traditional lassi. This was achieved through the meticulous selection of ingredients and advanced drying techniques.
2. **Nutritional Integrity:** Ensuring that the powder maintains essential nutrients found in traditional lassi, such as probiotics, proteins, and vitamins, was a priority. The final product delivers comparable nutritional value, promoting digestive health and overall well-being.
3. **Consumer Acceptance:** Extensive sensory evaluations and consumer testing have confirmed that the lassi powder meets consumer expectations for taste and quality. Positive feedback indicates a strong market potential.
4. **Shelf Stability:** One of the major advantages of the lassi powder is its extended shelf life compared to liquid lassi. This stability reduces spoilage and waste, making it an economically and environmentally advantageous option.
5. **Convenience and Versatility:** The powder format offers unparalleled convenience for consumers, allowing for easy storage, transportation, and quick preparation. It also provides versatility in usage, catering to various culinary applications beyond just a beverage.

In conclusion, the successful development of lassi powder addresses several consumer needs, including convenience, shelf stability, and nutritional benefits, while preserving the traditional qualities of lassi. This product is well-positioned to capture a significant market share, appealing to both traditional lassi enthusiasts and new consumers looking for healthy, convenient beverage options. Moving forward, continued focus on marketing strategies, consumer education, and potential product line extensions will be critical to leveraging the full potential of this innovative product.

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