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Production of Dahi Powder Using Vacuum Tray Drier.

KEYWORDS: Dahi powder, Vacuum tray drier, Dahi, Drying.

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ABSTRACT *Dahi powder is prepared by dehydrating Dahi. Freeze drying is the most accepted and studied method for dehydrating Dahi. Present study was undertaken to prepare Dahi powder by using vacuum Tray drier. Dahi (Total solids 10%, Acidity 0.25 % LA) prepared by traditional method was subjected to a vacuum of 580 mm Hg (Temperature inside the chamber was 40 ˚C) for a period of 18 hours. The final product was analyzed for its physical, chemical, microbial and sensory characterestics. A good quality final product was obtained with a slight brownish colour (b, coefficient of redness = 32.76), moisture content of 6.7 %, good chemical properties (Acidity 0.3% LA, pH 3.74), acceptable microbial count [Survival ratio (N/N0) 2.14×10-4] and average overall acceptability score (7.5/10).*

Introduction

Nowadays Fermented dairy products are gaining worldwide importance. The probiotic and other health beneficial properties of these products are recognized by the consumer market. India is the topmost producer of milk in the world. About 55 per-cent of total milk produced is converted to Dairy products. In this fermented products accounts for more than 20 per-cent. The important Dairy products popular in India includes Dahi. Shrikhand, Chakka, Makhan, Buttermilk and Yoghurt. Among these, Dahi is the most important and favorite product of India.

Dahi is a part of Indian meals since mythic times. The origin of this product is unknown, but the production and use of this product has been mentioned in many of the Puranas related to Indian tradition. From ancient times itself Dahi is an unavoidable dish in Indian meals. This can be consumed as fresh or can be used to prepare other dishes like Raita.

Drying or dehydration of any product ensures a long life stable product. The current study was undertaken to develop Dahi in powder form using a Vacuum Tray Drier. The risks of drying fermented products are on a higher side than other products. We have to ensure a minimum survival ratio of the culture bacteria without compromising the powder characteristics. Freeze drying is the most used and studied method for powdering products containing viable cells. But the huge investment required hinders its application in large scale processes.

Materials and Methods

Here a vacuum tray drier available in the university dairy plant was used for drying purpose. This drier uses the principles of convective air drying which is performed under reduced pressure (vacuum). Dahi was prepared from standardized whole milk with 3.5 per-cent fat and 8.5 per-cent solids- non fat using NCDC culture procured from NDRI. Dahi was spread in the trays of the Drier as uniform thin layer. The vacuum was adjusted to 580 mm Hg so that the temperature inside the chamber was 40˚C. The conditions were maintained till the product turns to solid state. 18 hours were taken for complete drying. After drying the product was removed from the trays as flakes and powdered using a miller or mixer grinder. The final powder was stored in an LDPE pouch laminated with aluminum foil. The experiment was repeated three times and the final powder was subjected to physical, chemical, microbial and sensory analyses using standard procedures. Results of analyses are summarized in the Table 1.

Results and Discussion

Table 1: Characteristics of Dahi powder prepared by Vacuum Tray Drier.

Characteristics	Vacuum Tray Dried Powder
Moisture content (%)	6.5±0.15
Titratable acidity(% LA)	0.3±0.01
pH	3.74±0.02
Survival ratio(N/N_0)	2.14±0.03
Yield (%)	12.5±0.5
Insolubility index(ml)	4.75±0.35
Coefficient of Redness (a*)	32.76±0.35
Sensory score for overall acceptability	7.5±0.25

Values are Mean±SE of three trials.

The final powder was slight brownish in colour, with a pleasant buttery aroma and slight sour flavor. The powder was reconstituted in warm water (40˚C) by dissolving 5g powder in 20 ml water. Upon reconstitution, the product resembled sour buttermilk. But the solubility was slightly less and was separated while keeping. All properties expressed in table are obtained after statistical analysis and expressed as mean ± Standard Error of three applications. The insolubility index obtained was 4.75, which is very much high as compared to recommended value for milk powders which is less than two (FSSAI, 2006). From the table, it is clear the moisture content obtained was higher as far as a powdered product is concerned, according to the standards the optimum value should be less than 4% (FSSAI, 2006). The final powder was having fair value for the survival ratio of Lactic acid bacteria. Survival ratio is calculated by dividing the viable count in the Dahi powder with the viable count of Dahi before drying. The coefficient of

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redness value was determined by using Hunters Colourlab. And the value was 32.76. The colour change is also determined from the parameters obtained from Hunters colourlab using the following formula.

$\Delta E = \sqrt{(L^*)^2 + (a^*)^2 + (b^*)^2}$

Where, L* [Lightness, ranges 0 (black) to 100 (White)], a* [Redness, ranges from +60 (red) to -60 (green)], and b* [Yellowness, ranges from +60 (yellow) to -60 (blue)].

Sensory analysis was performed by using a 9 point Hedonic scale. The evaluation was carried out by a panel of 5 judges. The tabled value represents the score for overall sensory acceptability of reconstituted Dahi. pH and Titratable acidity was determined by the standard methods. The percentage yield was 12.5.

Conclusion

Thus it can be concluded that the final powder was excellent in terms of Survival ratio of Lactic acid bacteria, average in chemical, physical and sensory properties, but poor in terms of moisture content and solubility. Increasing the drying time or adjusting the level of vacuum may be helpful in reducing the moisture content. For increasing the solubility of the powder, some gelling agents like maltodextrin or inulin may be added.

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