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ROLE OF DAIRYING IN IMPROVING RURAL ECONOMY

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ABSTRACT

Today, when there is a growing concern for greater attention to our rural economy, the dairy sector offers a big opportunity to transform our economy by bringing prosperity to the rural sector. The dairy sector provides immense opportunities for eradicating poverty. The fact that dairying could play a more constructive role in promoting rural welfare and reducing poverty by generating employment at the farm level is increasingly being recognised. A sustainable and financially viable dairy processing sector will generate income and self-employment through entrepreneurship, which is the day's need.

INTRODUCTION

Indian economy is a perfect symbiosis of crops and livestock sectors. The rural economy is facing a greater challenge post covid situation; under this, the dairy sector offers a significant opportunity to transform our economy by bringing prosperity to the rural sector. The dairy sector provides immense opportunities for eradicating poverty. The fact that dairying could play a more constructive role in promoting rural welfare and reducing poverty by generating employment at the farm level is increasingly being recognised. A sustainable and financially viable dairy processing sector will generate income and self-employment through entrepreneurship, which is the day's need. In this context following are the ways which can be beneficial for improving the rural economy:

ENTREPRENEURSHIP OPPORTUNITIES IN DAIRY PROCESSING

Entrepreneurship has become the most important phenomenon for rapid progress in the dairy sector. Scattered milk production in remote areas, regional and seasonal surpluses, transportation difficulties, lack of suitable marketing structure, and its perishable nature provides an opportunity for rural entrepreneurs to go in for the production of s dairy products as a market for them already exists. Therefore, the processing and marketing of milk are critical for providing the enumerative price to millions of dairy farmers. According to an estimate, only half of the milk produced is sold, and the remaining is used for household consumption. The market for raw milk is mainly informal and is dominated by local vendors who collect milk from producers and sell it to urban consumers. Traditional milk markets are often unstable and

exploitative, particularly during the flush milk production season. Traders do not buy the entire marketable surplus during the flush season; milk is generally underpriced. The cooperative moment has led to the development of linkages between producers and consumers, which resulted in a tremendous impact on milk production and producers' income, particularly smallholders.

The art of preparing sweets and other dairy products from surplus milk was developed centuries ago. Lack of cooling facilities to keep liquid milk fresh in warm climates resulted in milk diversion to prepare indigenous milk products with comparatively longer shelf life. Most dairy food delicacies are value-added products generating high profits. The demand for milk sweets is influenced by the nutritional and social values attached to each of them. The market demand, quality of milk, the economics of operation and shelf life determine the type of products to be manufactured and marketed. The dairy market in India is quite huge, and according to an estimate, the unorganised milk & milk product market is to be around Rs. 470 billion.

In contrast, the processed organised dairy market is only Rs. 10000 crores. India, with its population of more than 1 billion and diverse food habits, cultures, traditions and religions, offers a great market for milk & milk products. Milk products with well-defined quality characteristics and packaged in attractive containers can be marketed at parlours, hotels and restaurants, departmental canteens, supermarkets, airlines, railway catering, hostels and other points of strategic nature.

POTENTIAL DAIRY PRODUCTS FOR RURAL ENTREPRENEURS

A) INDIGENOUS DAIRY PRODUCTS

A wide range of technological packages are available for rural entrepreneurs, and the adoption of these depends on several factors. It includes availability and type of milk, entrepreneurship skills, the market's location and size, and a capital requirement. Some of the dairy products that offer great potential are: Conversion of milk into indigenous milk products in and around milk production areas is the least expensive and more remunerative because of simple technologies, use of low-grade energy sources, inexpensive infrastructure and equipment and low operating and overhead costs as compared with European or western systems of dairy processing. In addition, these indigenous products have great social, religious, cultural, medicinal and economic importance and have been developed over a long period with the culinary skills of homemakers and *halwais*. In addition to preserving milk solids for a longer time at room temperature, manufacturing traditional dairy products adds value to milk and provides considerable employment opportunities to the rural population. These products include curd, ghee, *khoa*, *chhana*, *paneer*, *shrikhand* and a variety of milk sweets, some of which are now produced by the organised dairy industries as well. About 50% of the total milk produced in India is estimated to be converted into traditional milk

products..The market for traditional dairy products in India is US $ 10 billion, the largest and fastest-growing segment of Indian dairy. This figure underlines the significance of traditional Indian products in the national economy.

B) KHOA AND KHOA-BASED SWEETS

Among the traditional dairy products, *khoa* – an intermediate concentrate that is the base material for a wider range of sweetmeats such as *burfi*, *peda*, *gulabjamun*, milk-cake, *kalakand* and *kunda* has great significance in India. According to one estimate, about 5.5% of total milk production is converted into khoa. The present milk production of about 96 million tons per annum is equivalent to about 14.7 million kg of *khoa* per day. *Khoa* is prepared by continuously boiling of milk with scrapping in a shallow pan (karahi). Milk thickens progressively as the evaporation of moisture takes place constantly. Vigorous stirring and desiccation continued until desired concentration (65 to 72% TS) was reached, and the product became viscous and pasty. Many khoa is being produced in various pockets around big cities. For example, to meet the great demand for *khoa* in Delhi, it is being produced in the interior villages of western Uttar Pradesh, Haryana and Rajasthan, where milk is comparatively cheaper, demand is less and availability is high. *Khoa*-based sweets can also be prepared and marketed without adding newer equipment, and the processing technologies are quite simple.



C) PANEER

Paneer, the indigenous variety of soft cheese, is obtained by the acid coagulation of heated milk. In the traditional process, buffalo milk is boiled in a vessel. A suitable coagulant (lime/citric acid/alum) is added with a slow stirring to coagulate the milk while still hot. The technology of manufacturing *paneer* from buffalo milk has been standardised to obtain the most acceptable and safe product with maximum solids recovery. Subsequently, the process of preparing *paneer* of acceptable quality from cow milk has also been developed. Irrespective of the type, milk should be standardised to a fat and SNF ratio of 1:1.65 so that the final product conforms to PFA requirements. Good quality *paneer* is obtained by heating milk

to about 90°C, and acidifying the hot milk by adding citric acid solution at 70°C. The formation of clear whey is indicative of complete coagulation. After the large lumps are formed, the vessel's contents are pored over muslin cloth to separate the coagulum from whey. The coagulum so obtained is highly pressed to facilitate the formation of paneer blocks, followed by their immersion in chilled water to impart a distinctive texture. Conventionally, citric acid is used for coagulating hot milk for *paneer* making, but certain non-conventional, low-cost coagulants have been suggested to manufacture *paneer* without any loss of yield and quality. The demand for value-added products with *paneer* as a base material is growing in urban areas. It is an excellent match for non-vegetarian food.

Moreover, paneer production costs are low because of its significantly higher yield and short preparation time. This is likely to increase the returns on investment. Therefore, there is a need to tap the market potential of *paneer* both for domestic consumption and export. The manufacture of *paneer*, therefore, has great social and economic significance in our country.

D) CHHANA

Chhana is another heat and acid-coagulated product which serves as a base product for a large variety of Indian delicacies, namely, *Rasogolla, Chhana gala, Sandesh, Cham cham, RasmaIai, Pantoha, Rajbhog, Chhana murki* etc. It differs from *paneer* as no pressure is applied to drain the whey, and its pH is slightly higher. *Rasogolla* is undoubtedly the king of all Indian sweets. Its production is largely confined to the cottage and small-scale industry. In the traditional production of *chhana*, a small portion of boiled milk is transferred to a small coagulating vessel. The required amount of coagulant (usually the previous day sour *chhana* whey) is added to the hot milk and stirred with a wooden ladle till the coagulation is complete. The contents are then poured over a clean muslin cloth held over another vessel where the whey gets collected. The muslin cloth containing the curd mass is hung to drain out whey further and to cool the *chhana* simultaneously.

E) GHEE

Ghee is heat-clarified butterfat derived solely from milk, curd, desi butter (cooking butter), or cream to which no colouring matter or preservative has been added. In India, *ghee* is considered an excellent cooking or frying medium. In addition, *ghee* is used for numerous religious rites by Hindus, and it also has many medicinal uses. It is usually prepared from cows, buffalo, or mixed milk. *Ghee* made from cow milk fat has a distinct golden yellow colour, attributable to carotene. On average, cow or buffalo ghee contains 99.0-99.5% fat and less than 0.5% moisture. Traditionally, *ghee* is produced by first converting milk into *dahi*, churning *dahi* to produce *makkhan*, and subjecting *makkhan* to heat clarification to yield the final product. *Hence, ghee* production forms the largest segment of India's milk consumption and utilisation

pattern. Hence, for obvious reasons, many efforts have been made by various workers to mechanise the process of *ghee* production.

F) DAHI AND OTHER FERMENTED MILK PRODUCTS

Dahi is a well-known fermented milk product consumed by the majority of the population in India. It is used either as a part of the diet or as a refreshing beverage. It is a mildly sour product with a pleasant flavour formed by the combined action of acid-producing and flavour-producing lactic acid bacteria. The choice of the majority of consumers of Dahi lies in a product with a glossy to semi-glossy velvety appearance, medium firm body, moderately acidic and delicate flavour.

Dahi is prepared using starter cultures, growing at appropriate temperatures depending on the strains used. Therefore, the production of the product varies from place to place. The types of organisms include *Lactococcus lactis* ssp. *lactis*, *Lactococcus lactis* ssp. *cremoris*, *Lactococcus lactis* ssp. *lactis* var. *diacetylactis*, *Leuconostoc mesenteroides* ssp. *cremoris*. Dahi is also prepared by using thermophilic starter, viz., *Streptococcus thermophilus*, *Lactobacillus delbrueckii* ssp. *bulgaricus* and other *Lactobacillus* species.

Shrikhand is a semi-solid, sweetish-sour fermented milk product prepared from dahi (curd). Shrikhand is a popular dessert and forms a part of a meal on festive occasions, particularly in the states of Gujarat and Maharashtra. Like dahi, it is very refreshing, particularly during the summer months. Whey is drained from dahi to yield chakka, sugar, flavour, colour and spices are thoroughly mixed into chakka to form a soft homogeneous mass resembling Germany's sweetened quarg.

G) DAIRY BEVERAGES

Milk-based beverages have emerged as one of the most promising segments among value-added dairy products. Milk processors must exploit the opportunities to keep pace with the changing product consumption pattern. Apart from traditional milk beverages like lassi, flavoured milk etc., a wide range of fruit-based dairy beverages could be added to the product portfolio. Milk-fruit-based beverages are another range of products that offer the tremendous market potential for the Indian dairy industry because they are nutritionally rich. Similarly, minor cereals and millet-based milk beverages seem lucrative for school feeding programmes. Recent statistics suggest that around one million tons of whey are produced in India annually, corresponding to approximately 70,000 tons of whey nutrients. Liquid whey has also been utilised to manufacture a wide range of beverages and soups. As a result, many such products are available to consumers. The ready-to-serve (RTS) type beverage may be prepared by mixing an appropriate fruit juice or concentrate and minimally processed whey along with other minor additives to improve the sensory characteristics and thermally processed to make it shelf-stable.

A process has been standardised to manufacture whey-fruit beverages using cheese or paneer whey with three different fruits: banana, lemon and pineapple. Among the beverages, the mango beverage scored a maximum for all sensory attributes, and it contained 15% mango pulp, 7% sugar, and 78% whey and the beverage's pH was kept below 4.5.

H) WHEY-BASED SOUPS

Soups are served as appetisers before meals as they stimulate the secretion of gastric enzymes that leads to a feeling of hunger. In the market, many ready-to-make soup mixes are available to suit the palate of consumers. Moreover, they do not seem to provide quality nutrients and utilising whey for soup preparation is an attractive possibility.

Producing whey-based soup involves blending vegetables in whey and cooking corn flour, followed by heating. The time-temperature combination of cooking vegetables, corn flour and seasoning is important for the dispersion of vegetables, gelatinisation of starch and flavour perception of soup, respectively. The developed product could be stored for a week under refrigeration, and UHT treatment can be adopted to improve the shelf-stability. Paneer and cheese whey were utilised for the potato-carrot-tomato and spinach soups. Cheese whey was preferred for the manufacture of vegetable soups over paneer whey. The reason could be the low pH of paneer whey, resulting in an acidic product not usually compatible with most vegetables. Whey-based soups have been reported to be more viscous than water-based, most probably due to the gelation of whey proteins on heating. Whey-based soups require less salt, thickener and fat and technology for manufacturing retort processed low-fat tomato-whey soup has been developed recently at our Institute. These products can be marketed through retail outlets, hotels & restaurants.

CONCLUSION

The dairy sector offers a big opportunity to transform our economy by bringing prosperity to the rural sector. Moreover, the dairy sector provides immense opportunities for eradicating poverty. The fact that dairying could play a more constructive role in promoting rural welfare and reducing poverty by generating employment at the farm level is increasingly being recognised. A sustainable and financially viable dairy processing sector will generate income and self-employment through entrepreneurship, which is the day's need.

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