International Journal of Veterinary Sciences and Animal Husbandry 2018; 3(4): 07-09

ISSN: 2456-2912
VET 2018; 3(4): 07-09

www.veterinarypaper.com
Received: 06-05-2018
Accepted: 08-06-2018

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Present need of organized manufacturing and marketing of milk-cereal based dairy product of north India

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Abstract
India is the top most milk producing country in the world with an annual production of 155.5 million tonnes having per capita availability of 337 g/day (NDDB, 2017) and accounting for 18.5% of world's production of milk. About 50-55 % of milk produced annually in India is converted into various Traditional Indian Dairy Products (TIDPs) (Bandyopadhyay and Khamrui, 2007, Patil, 2013). The market for TIDPs is the second highest after fluid milk both in value and volume having a market value of more than Rs. 100,000 crores with annual growth of 10-15 % (Patil, 2013). Unfortunately the technology for the production of most of the traditional Indian milk products is confined to local sweetmeat makers (*halwais*) and like many other traditional sweets. But the changing life-styles and increased purchasing power especially among urban population has necessitated the research efforts for organized manufacturing and marketing of traditional milk products with added convenience, enhanced shelf life and added nutritive value.

Keywords: TIDP, sweet, milk

Introduction
Advancements of economy, education and technologies have altered every facets of today world including lifestyles and eating habits. The traditional custom of only men working and women taking care of the household is no longer practiced, rather along with household responsibilities participation of women in the workforce has increased drastically in the past two decades which has drastically reduced time available for household work. Rapid lifestyle transformation has brought about a remarkable increase in the demand for processed, packaged and ready-to-eat food products. Urban consumers are typically more affluent but busier, thus more willing to pay for convenience. Technological advancements, changing household structures, multicultural societies as well as changing social norms and values have resulted in shifting demand for all types of consumer goods and convenience food (Buckley *et al*., 2007) [3]. The ready-to use and instant foods are meeting urgent situations as well as saving time for preparation (Bhikhabhai, 2014) [2]. Nowadays, major challenge is to achieve optimal processing to meet specific requirements for improving human health, nutrition and food quality. Hence, convenience type foods are rapidly emerging into the current market to meet the demands of the modern society.

India is top most milk producer in the world with an annual production of 155.5 million tonnes (NDDB, 2017) [8]. About 50-55 percent of milk produced annually in India is converted into Traditional Indian Dairy Products (Bandopadhyay and Khamrui, 2007) [1]

Milk, despite being a great source of nutrients, is deficient in some micronutrients like iron, copper and certain vitamins *viz*., Supplementing milk with required micronutrients from suitable sources will mitigate this deficiency will mitigate this deficiency (NAAS, 2012) [7]. Milk proteins are also deficient in sulphur containing amino acids like methionine and cysteine (NAAS, 2012) [7]. Cereals on the other hand are generally deficient in lysine, threonine and tryptophan. Thus in order to develop a balanced food, cereal protein should be supplemented with milk protein. The nutritional significance of cereals lies in their richness in micronutrients like iron, phosphorous, zinc, vitamins and sulphur containing amino acids (Rai *et al*., 2011) [12].

Cereals are also rich source of dietary fibre, proteins, energy and minerals, serve as ideal supplements for development of composite dairy products like *pinni*, *doda burfi*, ghewar and *kheer*, etc Fig.1 (Das *et al*., 2012) [5].

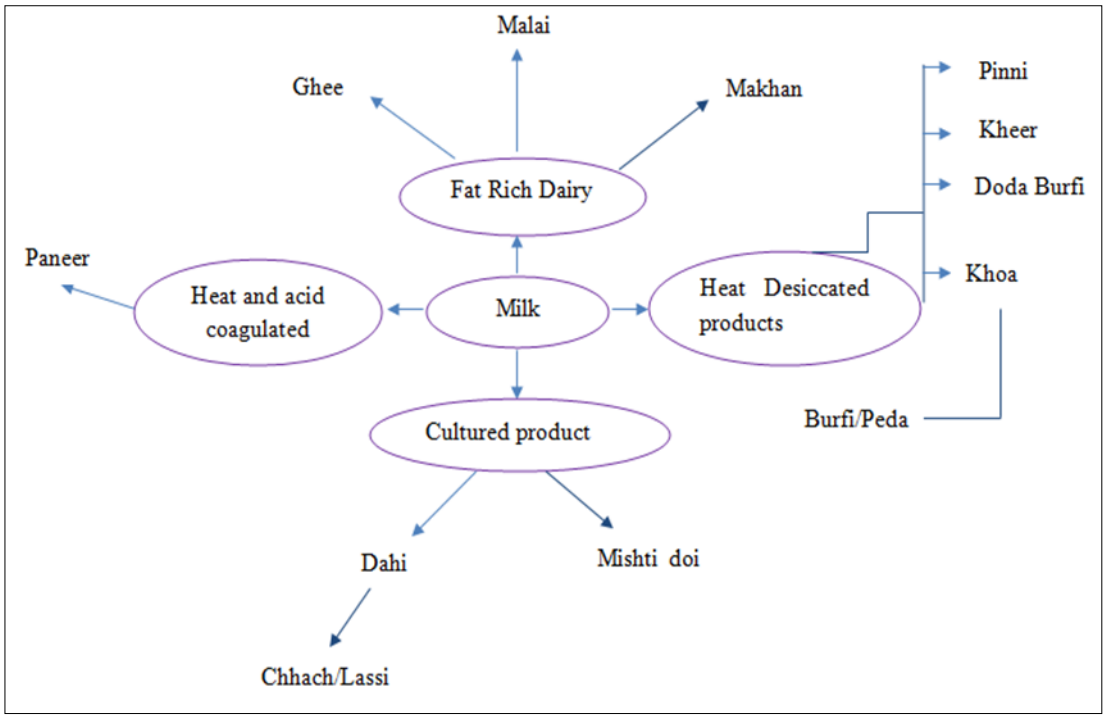

Fig 1: Classification of Traditional Indian Dairy Products of North India

Pinni is an immensely popular traditional milk-cereal based sweet of Northern states of India mainly Punjab, Haryana and Delhi. It is milk based composite sweet having dark brown colour and is granular texture. The product is a rich source of nutrients derived from milk solids as well as goodness of wheat or gram flour, nuts, dry fruits etc. It is also a rich source of fat, protein, minerals and energy. Considering its high nutritive value, traditionally *pinni* is considered as an ideal food for young ones in their growing stage, pregnant and lactating women (Singh *et al.*, 2018) [15].

India has the largest repertoire of milk based sweets and out of them *doda burfi*, simply called as "*Doda*" or "*Dhoda*", is immensely popular traditional milk-cereal based sweet of northern states of India like Punjab, Haryana, and Western U.P (Singh and Kumar 2006) [6]. The product is made from germinated wheat flour (*angoori atta*), buffalo milk, and sugar along with certain optional ingredients and characterized by dark brown colour, sticky granular texture having glossy surface covered with nuts with intact pleasant caramelized flavour (Chawla 2010) [4]. The attractive and salient feature of the product is the presence of most of the nutrients from cereals in pre-digested form, which also serves as an excellent source of dietary fibre absent in other dairy products. The product also has a longer shelf-life as compared to other milk based sweets.

There is a great demand of *pinni* and *doda-burfi* in other regions of India due to its unique taste and health benefits. Despite the fact that it is a common and popular product, very limited scientific information is available about average composition of its variants and product characteristics including sensory and physico-chemical properties.

Unfortunately the technology for the production of most of the traditional Indian milk products is confined to local sweetmeat makers (*halwais*) and like many other traditional sweets, the practice of *pinni* and *doda burfi* making has largely remained a cottage scale operation. Being prepared at small scale, the hygienic conditions are usually not maintained and thus inferior quality products are manufactured and marketed. At the same time due to lack of any prescribed standards laid down by any of the food standards authority, quality in terms of proximate composition, texture and microbiological counts vary a lot. Recently in order to tap the potential of traditional sweet markets, several dairies in private and co – operative sector have started their organized production. Today, a wide range of fresh as well as packaged ethnic milk products and convenience mixes are available in market. These products are also being exported to countries having large Indian ethnic population

Also the changing economic scenario offers new opportunities to Indian dairy industry, particularly organized sector, for expanding their product profile. Many of the traditional milk products such as *channa* based sweets, *mishit doi*, Shrikhand, basundi etc. which were manufactured at small scale in specific geographical locations, have now been introduced in other parts of the Indian subcontinent. These dairy delicacies have now been relished by the consumer as they possess excellent flavour, mouth-feel and exhibit characteristic textural profile. In absence of technical know-how, the large scale production of these region specific milk products in organized sector is a challenging task (Kumar *et al.*, 2006) [6].

A standard production protocol and well–defined ingredient formulation and processing parameters would facilitate large-scale production of *pinni* and *doda burfi* by organized dairy sector and also help to frame legal standards of the product Organized production of the product at industrial scale may provide product diversification and market expansion opportunities to the dairy industry. These products not only have established market in India but also great export potential because of strong presence of Indian diaspora in many parts of the world (Rao and Raju, 2003; Pal and Raju,

2007) [13, 9]. Following are the ways by which organization can manufacture wholesome traditional dairy products at competitive prices (Patil, 2006) [6].

1. Mechanization of Manufacture of Traditional Dairy Products
2. Developments in Preservation of Traditional Dairy Products
3. Developments in appropriate Packaging

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