A STUDY ON CONSUMPTION PATTERN AND CONSUMER PREFERENCES FOR FERMENTED FUCNTIONAL DAIRY FOODS IN METROPOLITAN MAHARASHTRA

THESIS SUBMITTED TO THE
NATIONAL DAIRY RESEARCH INSTITUTE
(DEEMED UNIVERSITY)
IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE AWARD OF THE DEGREE OF

MASTER OF VETERINARY SCIENCE
IN
LIVESTOCK ECONOMICS

BY

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B.V. Sc. & A. H.

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This is to certify that the thesis entitled, **"CONSUMPTION PATTERN AND CONSUMER PREFERENCES FOR FERMENTED FUNCTIONAL DAIRY FOODS IN METROPOLITAN MAHARASHTRA"** submitted by **Mr. HAMBARDE PANDURANG GOVINDRAO** towards the partial fulfillment of the award of the degree of **MASTER OF VETERINARY SCIENCE IN DAIRYING (LIVESTOCK ECONOMICS)** of the **NATIONAL DAIRY RESEARCH INSTITUTE (DEEMED UNIVERSITY)**, Karnal, Haryana, India, is a bonafide research work carried out by him under my supervision, and no part of the thesis has been submitted for any other degree or diploma.

Raka Saxena

Dated:

(RAKA SAXENA)
MAJOR ADVISOR & CHAIRMAN
(GUIDE)

Dedicated to my

Beloved parents,

family and

Late grandmother

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ABSTRACT

Today foods are not intended to only satisfy hunger and to provide necessary nutrients for humans but also to prevent nutrition related diseases and improve physical and mental well- being of consumers. Rising disposable incomes, changing dietary pattern, rapidly growing middle class and increasing awareness among Indian consumer has led to the diversification of the dairy category as consumers are looking beyond pouched milk and the occasional butter and cheese spreads. This give rise to value addition in dairy products and developing of functional dairy industry in India. Indian functional dairy sector is dominated by probiotic foods. Indian probiotic market is valued at $2 million as per 2010 estimates and is poised to quadruple by 2015. At present, India contributes less than 1 per cent of global probiotic foods market. Amul is the leader in Indian probiotic market shearing 70 per cent of market share. The present study was conducted in Maharashtra state as information available for functional dairy foods was very scanty for functional dairy foods in general and particularly in a progressive state like Maharashtra. Study was conducted with objectives as cited below: 1) Analysis of consumption pattern & consumer behaviour for fermented functional dairy foods, 2) Identifying major determinants of consumption of fermented functional dairy foods and 3) Determining consumer preferences for fermented functional dairy foods**.** A total of 120 respondents and the purchase locations for functional dairy foods were selected randomly and from these purchase locations, respondents were selected as 70 from supermarket, 30 from Amul parlour and 20 from retail dairy products stores respectively. Out of total, 83 per cent of respondents know the concept of functional dairy foods and 68.42 per cent of consumers were interested to know about the functional dairy foods. More than 76 per cent were consuming functional foods from less than one year. In all income groups highest consumption expenditure was on probiotic drinks while it was lowest on probiotic lassi. On an average, each household consumed Yakult as 0.77 kg/month while fortified dahi was consumed about 0.36 Kg/month. Low fat dahi consumption was 0.32 kg/month. About 51 per cent of consumers would like to consume conventional dairy foods on daily basis while functional dairy foods consumed as monthly. Supermarket was most preferred purchase location for both conventional and functional dairy foods. The income of household and dietary pattern had significant effect on consumption expenditure of functional dairy foods. Among the probiotic drinks, Yakult and in dahi, Mother Dairy's b-active probiotic dahi were most preferred brands. Danone low fat dahi was most preferred brand among the low fat dahi categories.

मैट्रोपोलिटन महाराष्ट्र में किण्वित कार्यात्मक डेयरी फूड्स के उपभोग पैटर्न और उपभोक्ता प्राथमिकतायें

शोधकर्ता
हम्बर्दे पी.जी.

मुख्य मार्गदर्षक
डॉ. राका सक्सेना

विभाग
डेरी अर्थशास्त्र

सारांश

आज खाद्य पदार्थ केवल भूख को संतुष्ट करने और मनुष्य को आवश्यक पोषकतत्व प्रदान करने के लिए ही नहीं, बल्कि पोषण संबंधी बीमारियों को रोकने के लिए और शारीरिक और मानसिक स्वास्थ्य में सुधार के लिए उपयोगी है । बढ़ती प्रयोज्य आय, आहार शैली में बदलाव, तेजी से बढ़ता मध्यम वर्ग और उपभोक्ता के बीच बढ़ती जागरूकता ने डेयरी श्रेणी के विविधीकरण के लिए प्रेरित किया है जिसकी वजह से भारतीय उपभोक्ता थैली वाला दूध, मक्खन और पनीर के प्रासंगिक उपयोग से ऊपर देख रहे हैं। यह भारत में डेयरी उद्योग से प्राप्त कार्यात्मक खाद्य पदार्थों के विकास का कारण बना है, जिसने डेयरी उत्पादों में मूल्यवर्धन को जन्म दिया है । भारतीय कार्यात्मक डेयरी क्षेत्र में प्रोबायोटिक खाद्य पदार्थों का बोल बाला है । भारतीय प्रोबायोटिक बाजार 2010 अनुमान के अनुसार $ 2,000,000 से अधिक मूल्यवान है और 2015 तक चौगुनी होने की आशंका है। वर्तमान में, वैश्विक प्रोबायोटिक खाद्य पदार्थ के बाजार में भारत का योगदान 1 प्रतिशत से भी कम है । अमूल जिसकी बाजार में ७० % तक की हिस्सेदारी है और भारतीय प्रोबायोटिक बाजार का प्रतिनिधित्व कर रहा है । वर्तमान अध्ययन महाराष्ट्र में नीचे दिए गए उद्देश्यों को ध्यान में रखकर आयोजित किया गया था : 1) किण्वित कार्यात्मक डेयरी खाद्य पदार्थ उपभोग के तरीको और उपभोक्ता व्यवहार की समीक्षा 2) किण्वित कार्यात्मक डेयरी खाद्य पदार्थ उपभोग के प्रमुख निर्धारकों की पहचान करना 3) किण्वित कार्यात्मक डेयरी खाद्य पदार्थों की उपभोक्ता वरीयता ओंका निर्धारण करना । किण्वित कार्यात्मक डेयरी खाद्य पदार्थ उपभोग के लिए तरीको का विश्लेषण करने हेतुकुल 120 उत्तरदाता ओंका मुंबई और पुणे से चयन किया गया था । मुंबई और पुणे से, कार्यात्मक डेयरी खाद्य पदार्थों के लिए खरीद स्थानों बेतरती बढंग से चयन किया गया था और उन खरीद स्थानों उत्तरदाताओं को क्रमशः सुपरमार्केट से 70, अमूल पार्लर से 30 और खुदरा डेयरी उत्पादों की दुकानों से 20 के रूप में चयन किया गया था। कुल उत्तरदाताओं में से 83% कार्यात्मक डेयरी खाद्य पदार्थ इस संकल्पना का ज्ञान था। 68.42% उपभोक्ता कार्यात्मक डेयरी खाद्य पदार्थों के बारे में पता करने के लिए रुचि रखते थे। 76% से अधिक उपभोक्ता करीब करीब एक साल से कार्यात्मक डेयरी खाद्य पदार्थों का सेवन कर रहे थे । सभी आय वर्ग में सबसे ज्यादा उपभोगव्यय प्रोबायोटिक ड्रिंक्स पर जबकि प्रोबायोटिक लस्सी पर सबसे कम उपभोगव्यय पाया गया । प्रत्येक घर में या कुल्टका प्रतिमाह सेवन 0.77 किलोग्राम, फोर्टीफाइड दही का प्रतिमाह सेवन 0.36 किलोग्राम तथा कम व सादही का प्रतिमाह सेवन 0.32 किलोग्राम पाया गया । 51% उपभोक्ता कार्यात्मक डेयरी खाद्य पदार्थों मासिक रूप उपभोग करने के लिए जबकि पारंपरिक डेयरी खाद्य पदार्थों का दैनिक आधार के रूप में उपभोग करना चाहते थे । सुपर मार्केट को दोनों पारंपरिकत था कार्यात्मक डेयरी खाद्य पदार्थ के खरीद के लिए सर्वोच्च वरीय स्थान रूप में पाया गया । घरेलू आय और आहार के तरीको का कार्यात्मक डेयरी खाद्य पदार्थों के उपभोग व्यय पर महत्व पूर्ण प्रभाव पाया गया । सभी प्रोबायोटिक पेयों के बीच या कुल्टकोत था सभी प्रोबायोटिक दही के बीच मदर डेयरीज बीएक्टिव प्रोबायोटिक दही को सबसे पसंदीदा ब्रांड के रूप में पाया गया । जबकि डानोंन लो फ्याट दही को कम व सादही के श्रेणियों बीच सबसे पसंदीदा ब्रांड के रूप में पाया गया ।

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INTRODUCTION

1. Introduction

Now a days, foods are not intended to only satisfy hunger and to provide necessary nutrients for humans but also to prevent nutrition related diseases and improve physical and mental wellbeing of consumers *(Indian Consumer Survey, 2010*). Changing dietary pattern, increase in per capita availability of milk, rapidly growing middle class and increasing awareness among Indian consumers show tremendous opportunities in Indian functional dairy foods market. Fermented dairy foods have played an important role in the human diet since time immemorial. The fermented foods are considered as natural functional foods because of wide array of novel therapeutic components contained by these and they have a long history of their well-established health benefits. The traditional fermented foods have also attracted the attention of the consumers, researchers and processors for delivering the disease alternatives or disease preventing components in diet. The consumers' increasing demand for dairy products with functional properties is a key factor driving sales growth. Thus, the markets for fermented dairy foods across the globe especially probiotics and those with special added ingredients are booming.

1.1. HISTORY OF FUNCTIONAL DAIRY FOODS

Initially, the concept of functional food was first promoted in 1984 by Japanese scientists who studied the relationships between nutrition, sensory, satisfaction, fortification and modulation of physiological systems. In 1991, the Ministry of Health of Japan introduced rules for approval of a specific health-related food category called FOSHU (Food for Specified Health Uses), which included the establishment of specific health claims for this type of food. The number of FOSHU items has progressively increased and 590 FOSHU products were available in Japanese market as on August, 2006.

India has a rich history of having a variety of traditional and ethnic foods with functional attributes. Health properties of various spices, herbs, whole foods, seasonal fruits and vegetables have been documented in the literature and even in ancient scriptures of India. There is no doubt that dairy products are functional foods, these are one of the best sources of calcium, an essential nutrient which

can prevent osteoporosis and possibly colon cancer. In view of the former, the National Academy of Sciences recently increased recommendations for this nutrient for most age groups. In addition to calcium, however, recent research has focused specifically on other components in dairy products, particularly fermented dairy products known as probiotics.

1.1.1 Definition of functional foods

Typically, a food marketed as functional contains added, technologically developed ingredients with a specific health benefit (Niva, 2007). Although the term ‘‘functional food’’ has already been defined several times (Roberfroid, 2002), so far there is no unitary accepted definition for this group of food (Alzamora et al., 2005). In most of countries there is no legislative definition of the term and drawing a border line between conventional and functional foods is challenging even for nutrition and food experts (Mark-Herbert, 2004; Niva, 2007). To date, a number of national authorities, academic bodies and the industry have proposed definitions for functional foods. These range from the very simple to the more complex; ‘‘Foods that may provide health benefits beyond basic nutrition’’ and ‘‘Foods similar in appearance to conventional food that are intended to be consumed as part of a normal diet, but has been modified to sub serve physiological roles beyond the provision of simple nutrient requirements’’ are good examples for the two approaches (Bech-Larsen & Grunert, 2003).

In India, there were multiple laws and regulations covering the foods, but there is no single law that could have significantly regulate the functional foods. In 2006, the Indian government passed Foods Safety and Standard Act (FSSA) to integrate and streamline the many regulations covering nutraceuticals, foods and dietary supplements. Once established, the FSSA will be charged with drafting rules and regulations for companies in the food sector to be licensed by local authorities, and a system of checks and balances, including product recall procedures enforcements and penalties.

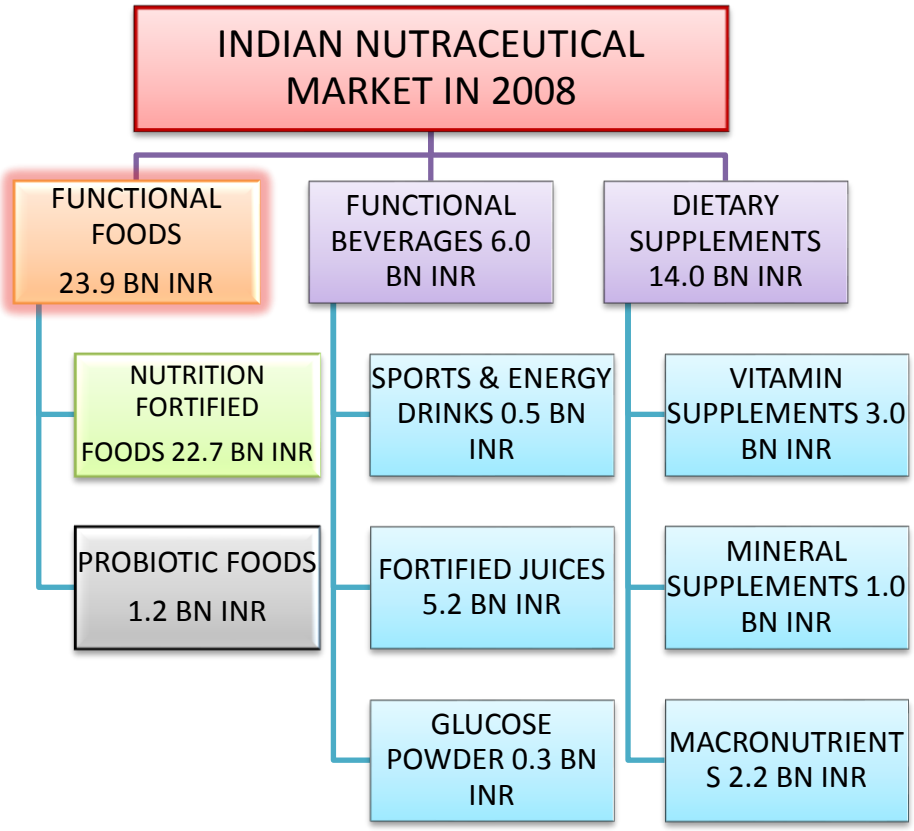
1.2 FUCTIONAL DAIRY FOODS IN INDIA

The rising disposable incomes of Indian consumers have led to the diversification of the dairy industry as consumers are looking beyond pouched milk and the occasional butter and cheese spreads. This has given rise to value

additions such as flavoured milk, vitamin enriched yoghurt, flavoured yoghurts, etc. Categories like probiotic-enriched milk and yoghurt are the rising new stars of the dairy industry. As the Indian consumers tastes evolve, so does the need for more flavours and variety and hence the need for wider range of choices. Also, with the advent of strong brands in the Indian marketplace, with companies launching new products followed by in-store promotions and advertisements, there is greater communication with the end-consumer. So, increased awareness has resulted in an increase in the basket of products that the consumer now buys. For example, cheese slices are now more commonly bought as compared to ten years ago when it was a rarely purchased food item. Even traditional products like dahi have got a new avatar in the packaged variety. Value additions have definitely had a positive impact on the dairy category. People started buying more cheese spreads because of relevant range and variations. In certain cases, a family's share of dairy spends went up because it found probiotic drinks useful for the children.

1.3 INDIAN NUTRACEUTICAL MARKET

Nutraceuticals, an emerging concept can be, broadly categorised as products which are extracted from natural sources or manufactured synthetically, which supplements the diet to provide nutrition over and above regular food and help prevent nutrition related disorders. The Indian nutraceutical market is broadly categorised as fallows - Functional foods (54 per cent), Dietary supplements (32 per cent) and Functional beverages (14 per cent). India has less than 1 per cent share of global nutraceutical market, but growing with CAGR (Compound Annual Growth Rate) of 18 per cent which is much greater than global nutraceutical CAGR of 7 per cent (Ghosh, 2009). The information regarding Indian nutraceuticals market is given in Fig 1.1.



Source: Ghosh (2009)

Fig 1.1. Indian nutraceuticals market at a glance

Most active area within the functional dairy foods market is probiotic dairy products. Indian probiotic market is valued at $2 million as per 2010 estimates and is poised to quadruple by 2015 (Raja and Arunachalam, 2011). The existing probiotic market in India majorly comprises of three segments, urban chain, young adults and people with special needs such as pregnancy, lactation, immunodeficiency, geriatric etc. India at present accounts less than 1 per cent of the total world market turnover in the probiotic industry. Probiotics in Indian market generally comes in two forms, milk and fermented milk products with the former occupying 62 per cent of the market share and later having 38 per cent market share. Currently Indian probiotic products are Dahi (Indian yoghurt), flavoured milk and butter milk.

1.4 MAJOR PROBIOTIC MARKET PLAYERS IN INDIA

Indian probiotic dairy food market is governed by major four market players, they are as fallows-

1. Yakult Danone India pvt Ltd: Yakult Danone India Pvt Ltd (YDIPL) is a 50:50 joint venture between Japan's Yakult Honsha and the French- DANONE Group. Yakult is a probiotic drink made from fermented milk, *lactobacillus* and some sugar. Yakult is a world leader in probiotic drinks and has a rich heritage. Yakult was launched in India in the late 2007. The brand was initially available only in Delhi. Now Yakult is being launched nationally in a phased manner in other parts of the country. Yakult is fermented milk that contains healthy bacteria *Lactobacillus casei* strain *Shirota*. According to the brand site, a 65-ml Yakult bottle of price Rs 10 contains 6.5 bn probiotic bacteria.

In Maharashtra, Yakult is available in all metropolitan cities within 114 supermalls along with many retail dairy stores. Pune is considered as test market by Yakult and ready to expand its market in it. The brand is currently available in Delhi, Mumbai, Chandigarh and Jaipur. The entry of Yakult is expected to increase the visibility and growth of probiotic category in India and Maharashtra. The brand is also making enough noise in the media. The brand predominately targets the health conscious ladies as the primary consumer. The brand has taken the positioning of a "health enhancer" and adopted the tagline "Daily Piyo, Healthy Jiyo" ("Drink daily, Win health"). But a product like a probiotic drink may not be easily adopted by the consumer since they may have lot of doubts about the product. It is in this context, the brand adopted its strategy of direct marketing where the consumers can order the product through home delivery. This generally ensures that the product is being regularly used by the consumers. The main challenge for this product is to make the consumers believe that the product is delivering benefit to them. The brand will be initially operating in a niche category and its strategy will be to expand the niche category into a main stream one.

2. Amul: Amul is a leader in Indian probiotic market sharing 70 per cent of market in 2011, was the first to venture into the category with its probiotic ice creams prolife in February 2007. Amul, on the other hand, has tasted success in the probiotics category with its ice cream in earlier 2011 year, is already in the process of test-marketing pouched lassi (sweetened curd) in Gujarat and some parts of Maharashtra, with plans of introducing it in the other parts of the country soon. Probiotic products contribute to 10 per cent to its ice-cream sales and 25

per cent of its Dahi (Indian yoghurt) sales. Amul is leader in Indian probiotic market shared 70% of market in 2011 while Nestle India Pvt Ltd and Mother Dairy were at 2nd and 3rd place. Amul recently launched the sugerfree ice cream for diabetic patients. In Maharashtra, total 63 Amul Parlour are available as market outlets of functional dairy foods.

3. Nestle India Pvt Ltd: Nestle, having recently declared dairy as its key area of growth, is all set to introduce probiotics in its other dairy products as well. The total packaged curd market in India is estimated at 40,000-60,000 tonnes per annum, of which Nestle has a 30 per cent market share. Internationally, the average contribution of probiotic products to total dairy products was estimated between 10 and 20 per cent depending on the country and business. Nestle also has introduced flavoured milk varieties of probiotic nature. Nestle India Pvt Ltd has 30 per cent of market share in dahi business in six metros. Nestle recently launched Fruit yoghurt and low fat dahi in the Indian probiotic market.

4. Mother Dairy: Mother Dairy in Delhi was set up in 1974 under the Operation Flood Programme on a wholly owned subsidy of the National Dairy Development Board (NDDB). Currently, it is one of the largest milk plants in Asia selling more than 25 lakh liters of milk per day, having a market share of 66 per cent of the branded milk sales in New Delhi, capital of India. Other important markets include Mumbai, Saurashtra and Hyderabad. b- Active Probiotic Dahi, b-Active Probiotic Lassi, b-Active Curd and Nutrifit (Strawberry and Mango) are the company's probiotic products. Probiotic products are contributing to 15 per cent of the turnover of their fresh dairy products. Over the next 3-4 years, the contribution is expected to go up to 25 per cent and the urban acceptance is making the company to increase their focus on probiotic products. Out of total dahi business of Mother Dairy probiotic dahi contributes about 7-8 per cent.

Table1.1 Major market players and brands of fermented functional dairy foods available in India

Market supplier	Name of product	Brand name	Other information
Yakult-Danone India pvt.ltd	Probiotic drink	Yakult probiotic drink	65 ml in Rs.10

Danone	Fortified dahi	Danone fortified dahi	400g in Rs.27
	Low fat dahi	Danone low fat dahi	400g in Rs.50
Mother Dairy	Probiotic dahi	b-active probiotic dahi	Available in 200g, 400g
	Probiotic lassi	b-active probiotic lassi	Available in 90g tubs
	Probiotic drink	Nutrifit	80 ml in Rs. 10
Nestle India pvt.ltd	Low fat dahi	Nesvita	98% fat free, 200g in Rs.20
		Nestle actiplus	200g in Rs.27
Amul	Fruit yoghurt	Flaavyo	100g in Rs. 15
	Probiotic dahi	Prolife probiotic dahi	Available in 200g & 400g tubs
	Probiotic ice-cream	Prolife ice-cream	Recently launched
	Suger free desserts	Amul sugar free dessert	For diabetic patient
KDIL (Kwality Dairy India Ltd)	Low cholesterol dahi	Dairy best fresh dahi	Available in 200g & 400g tubs
	Low cholesterol ghee	Livlite	Developed in NDRI
	Pasteurized butter	White salted butter	Available in 200g & 400g
KMF (Karnataka Milk Federation)	Probiotic ice-cream	Sugerfree probiotic ice-cream	Available in 1kg packet
Lifeway foods	Probiotic drink	Probugs	Reduced sugar level
Britannia	Probiotic yoghurt	Daily fresh probiotic yoghurt	Available in 200g in Rs. 20

1.5 STATEMENT OF PROBLEM

The changing dietary pattern, increase in per capita availability of milk, rapidly growing middle class and increasing awareness among Indian consumers provide tremendous opportunities in Indian functional dairy foods market. The fermented dairy foods have played an important role in the human diet since time immemorial and are considered as natural functional foods because of wide array of novel therapeutic components contained by them. Changing dietary pattern & increasing health consciousness among Indian consumers have changed view of consumers for conventional dairy products, in that increasing middle class population & urbanization boosts up the fevorable environment for expanding of functional foods sector in India as well as in Maharashtra.

Functional dairy foods provide a very good opportunity to expand nutraceutical market and research. As studies on consumption and consumer behavior for functional dairy foods are practically non-existent in India and particularly progressive state like Maharashtra, therefore this study was conducted to understand consumption pattern and consumer preferences for fermented functional dairy foods in metropolitans of Maharashtra.

1.5.1 OBJECTIVES OF RESEARCH WORK

1. To analyse the consumption pattern and consumer behavior for fermented functional dairy foods
2. To identify the major determinants of consumption of fermented functional dairy foods
3. To determine consumer preferences for fermented functional dairy foods

1.5.2 Limitations of study: Great care has been taken to maintain the objectivity of the study, a few limitations could not be avoided such as:

1. Reliability of data totally depends upon the recall method i.e. memory of the respondents. However, every effort was made to get the accurate information.
2. Due to time and resource constraints on the part of research scholar, the study was confined only to Mumbai and Pune city of Maharashtra with sample size of 120.

CHAPTER – 2

REVIEW OF LITERATURE

2. Review of literature

Review of literature assists in delineation of the problem area and provides a basis for interpretation of empirical perspective of research. It has utmost importance in formulation of hypothesis, proper research design, conducting research and also for relating past findings with current study. Review of literature regarding a particular research problem thus helps the researcher immensely to set out objectives of research problem, and to follow the possible methodology to achieve the objectives.

A number of studies have been conducted in our country from time to time, on consumption pattern based on the family budget data published by National Sample Survey Organization (NSSO) and also primary data collected by researchers from individual households. Most of the studies were concentrated on consumption and expenditure pattern of broad commodity groups such as food and non-food items and milk and milk products but no studies were conducted on consumption pattern and consumer preferences for functional dairy foods in India and especially in progressive state like Maharashtra. Keeping in view the objectives and the nature of the present study, the relevant literature have been reviewed and presented in this chapter.

2.1 CONSUMPTION PATTERN STUDIES RELATING TO MILK AND MILK PRODUCTS:

Ganguly (1960) compared the consumption pattern of five food items including milk and milk products for the three occupational groups using 17th round NSS data for 662 rural households of Utter Pradesh. The Engle curves for three occupational groups were compared subjectively with the help of graphs. Considerable differences in the consumption pattern of different occupational groups were found for almost all the commodities. The consumption of milk and milk products were found to be least for agricultural laborers compared to other occupational groups, namely, farmers, cultivators, and other households. The limitation of the study was that the share croppers were also included in the farmers and cultivators category. It was pointed out that the estimates were

obtained by simple averaging without using the probability weights which are very essential for rigorous estimation.

Gupta (1963) analysed the pattern of food consumption among agricultural population in Budaun district of Uttar Pradesh. The study was based on 320 holdings distributed in various farm size groups. It was observed that there were some differences in the pattern of consumption between the rural and urban households and also between landless and landholders. The consumption of superior food grains, milk and milk products, vegetables, fats and oils was found to be increase with the increase in size of households.

Tendulkar (1969) made an attempt to construct a theoretical model of consumer behavior of rural households in a semi-monetized economy where the typical households had a stock of agricultural commodities and had to decide how much to retain for self-consumption. Attention was also focused on the cash and kind components of the expenditure on food articles and on total consumption expenditure. It was found that cash outlays were not an inventory adjustment mechanism, while non-cash expenditure indicates a habit formation process.

Jain and Tendulkar (1973) studied the difference among four broad occupational groups in India. The occupational groups considered were: (a) professional, technical, administrative, executives, managerial and clerical related workers; (b) sale workers; (c) farmers, fishermen and related workers; (d) workers engaged in services, sports, recreation and workers not classified anywhere. 19th NSS data formed the basis for the study. Six forms of item specific Engel curves, namely, linear, semi log, double log, log inverse, hyperbola and exponential were fitted for different occupational groups. These equations were fitted by weighted least squares. Analysis of covariance was applied for examining the homogeneity of Engel curves for different occupational groups. 12 out of 18 commodity groups including food grains, milk and milk products and clothing showed considerable inter-occupational differences in the consumer expenditure pattern for both the sectors. On further identification of dominant occupation groups, it was found that agricultural occupation in the rural areas and professional, technical and related workers in the urban areas are dominant groups in India. The demand for milk and milk products tended to be expenditure

elastic with a weak tendency to decline for all the occupations in rural and urban areas with the exception of urban professional group which exhibited less than unit expenditure elasticity. Major limitation of this study was that of lumping together of agricultural households in to a single group in rural areas which accounted approximately for 81 per cent of the estimated rural population. Even in the urban sector, the consumption of professional, technical and related workers was expected to differ from that of clerical and related workers which again were put into one group.

Patel *et al.* (1974) studied the occupation wise consumption pattern of milk and milk products on the basis of cross sectional data of 352 households obtained for Karnal district of Haryana. Lorenz curve technique was used to study the inequalities in the consumption of milk and milk products. The inequalities in milk consumption were more for service class families as compared to business class families.

Mehta and Gupta (1976) analysed the consumption pattern in rural Rajasthan utilizing the NSS data of 24th round covering the period 1969-70. Large inequalities were found in case of not only non-food items but also items like milk and milk products, sugar and guar. In all these cases, the inequality was greater than the overall inequality for total expenditure.

Vijaylakshmi and Sampath (1976) while studying the consumption pattern of bovine milk in Bangalore city based on 120 households data collected during 1973, observed that consumption of milk and milk products tended to increase with the increase in income.

Prabhaharan (1978) studied the consumption pattern of milk and milk products for madras city. The family budget data of 300 sample households for the year 1977-78 was analysed. The result of survey revealed that the per capita monthly income and food habits of the consumers had a positive and significant effect on the per capita monthly expenditure on milk and milk products. Higher income group people spent two and a half times more on the milk and milk products compared to the poor income group people. The family size was observed to have a negative impact on the expenditure in milk and milk products. The inequalities in the expenditure on milk and milk products and total expenditure were found to be very low.

Nair and Vaidyanathan (1978) examined the inter-state difference in milk consumption in India. The estimated quantity of milk consumed as such and the fluid milk equivalent to ghee and butter consumption. The analysis was based on 17th round NSS data (1961-92). It was found that the average monthly intake of milk in rural India was about 2.62 kg. The total consumption of milk was highest in Punjab, Rajasthan and Gujarat where as it was the lowest in Assam and Orissa. About 60 per cent of the total rural milk consumption was reported to be in the form liquid milk and the rest was converted in to products like ghee and butter. This percentage was found to vary between 12 per cent in Assam to nearly 60 per cent in Rajasthan. There was also significant variation in the average fat content of milk across the states ranging from 5.10 in Kerala to 7.60 in Andhra Pradesh. They also made an attempt to analyse some of the factors underlying inter-regional variation in per capita intake of milk.

Singh (1979) studied the consumption pattern of milk and milk products through the consumer expenditure data collected from 160 rural and 60 urban households of Muzaffarnagar district of Uttar Pradesh. Dummy variables were used to ascertain the variation in the consumption of milk and milk products due to season and socio-economic status. Lorenz curve technique was used to access the inequalities in the consumption and expenditure distribution of milk and milk products. Little difference were discernible in the absolute and relative spending behaviour on liquid milk between rural and urban sector. The consumption of specific dairy products and total expenditure were aptly standardised to eliminate age and sex variants.However, ghee, butter, and other milk products were observed to be luxury products. Labour and service class people in the rural areas and labour and business class peoples in the urban areas were found to be consume milk and milk products at a lower plane. No concrete conclusion could be drawn on the impact of season on the intake of milk and milk products. However, socio-economic status had a direct bearing on the consumption of dairy products. Rural inequalities for expenditure on milk and milk products were observed to be of lower magnitude as compared to urban inequalities.

Singh (1979) examined the impact of new agricultural technology on the consumption pattern of cultivator households in Sriganganagar district of Rajasthan. It was revealed that the adoption of new technology in that region had resulted in the increased consumption of all the commodities and improvements in the living standards of the adopters. However, the change in the consumption outlay was not very marked.

Singh *et al.* (1980) examined the regional disparities in the standard of living. The northern states like Punjab, Haryana, Himachal Pradesh, Rajasthan and Jammu and Kashmir were compared with respect to various aspects of livings. With respect to per capita income, Punjab maintained its lead over the other states during the period 1960-61 to 1975-76. Per capita consumption of cereals and its substitutes for year 1973-74 was the lowest for Punjab followed by Himachal Pradesh, Haryana, Rajasthan and Jammu and Kashmir. This was due to the fact that Punjab had diversified its consumption pattern under the impact of economic development in favour of milk and milk products, meat, fish and eggs, vegetables and fruits.

Sarkar (1981) studied the consumption pattern and demand for milk and milk products in Agra town of Uttar Pradesh based on 300 sample households and found that individual members of the households contributed differently to the household's consumption of specific milk and milk product items depending on age-sex structure. The consumption of milk and milk products was found to be more in the households with more income brackets compared to lower income brackets. Business executives, administrators and professionals appeared to be dominant group followed by businessman, retail traders, skilled, clerical and related workers. The vegetarian households showed higher consumption of milk and milk products compared to non-vegetarian households. It was observed that the inequality in the consumption and distribution tended to increase with a decrease in per capita monthly expenditure.

Swarnalata (1981) analysed the consumption pattern of milk and milk products in 100 rural and 140 urban households in Karnal district of Haryana. The overall average per capita consumption of milk was observed to be higher for urban areas than the rural areas. The proportion of total milk consumed in fluid

form was found to decrease and that on other milk products increased as the level of per capita total expenditure increased.

Rao (1982) examined the role of income and occupational factors on the consumption pattern of milk of 320 households in Tenali town of Andhra Pradesh. The average daily consumption of milk was found to increase with the increase in the level of income of the households. The lower middle income group people showed their preferences for dairy milk. Service group was found to consume the highest quantity of milk on an average followed by dairying, farming, business and labour class people. Service group of peoples showed the maximum preferences for dairy milk.

Jain and Patel (1984) studied the consumption pattern of milk and milk products in different income groups in Haryana state and observed that the per unit consumption of various milk items showed a rising trend with the increase in the income level of the consumers.

Pathak *et al.* (1989) conducted a study on food consumption of 156 Assamese sample households with a total population of 1054 from 9 villages. It was found that on an average, the quality and quantity of food consumed was not particularly low but the poorer households were unable to afford nutritionally adequate foods, and the consumption of pulses, milk and milk products were much below the estimated requirements. It was concluded that there was a need for structural changes to improve the food and nutritional status of the people of rural areas of Assam.

Batra (1990) made a study on the impact of Operation Flood on the Delhi milk market. Data from household's consumption survey indicated that the milk consumption was widespread among the poor of Delhi. Their level of consumption was however low and percentage of households not consuming the milk was the highest among the poorest. It was analysed that with the lowering of milk prices, there was an increased In the consumption of milk by the poor and on the other hand, any substantial increase in the milk prices resulted in the shifting of the consumption pattern of poor from milk to other source of vegetable protein.

Sarkar (1992) studied the consumption pattern and consumer preferences for milk and milk products in Nadia district of West Bengal. It was analysed that the average per capita per day nutrient intake was lower (67.87 g) in rural areas as compared to urban areas (76.96 g). The average per capita per day calorie intake was more (2884 Kcal) in rural areas than in the urban areas.

Birthal (1996) conducted a study on nutrient consumption and expenditure pattern in rural areas of Western Uttar Pradesh and reported that the average consumption of cereals and pulses was 358 g and 42 g per person per day and shared 19.15 and 8.54 per cent of total food expenditure, respectively. The average consumption of vegetables and fruits were 151.25 g and 28.29 g per person per day, respectively, with an average food expenditure share of 8.39 and 4.09 per cent respectively. Per capita consumption of milk and ghee were worked out to be 173.54 g and 6.56 g per day per person and these along with other dairy products accounted for 22.73 per cent of the total food expenditure.

Jain *et al.* (1998) conducted demand analysis of milk and milk products in India and revealed that there was higher relative expenditure on non-food items in all areas of northern regions of India as compared to southern region. The difference between the magnitude of per capita total expenditure and expenditure on non-food items across urban, semi-urban and rural areas was more pronounced in southern region than the northern region of India. They further found that the per capita expenditure on milk and milk products was much higher in the northern region as compared to southern region. The expenditure on milk and milk products was the lowest in labour category and the highest in the professional group in urban areas and cultivators in the rural areas. Milk and milk products, fruits and beverages were observed to be highly expenditure elastic while cereals, pulses, vegetables, sugar were inelastic. Demographic factors such as regionality, urbanisation, household size, education of the head of household and food habits are important factors explaining the variation in consumption pattern of food items as well as milk and milk products. Milk and milk products are highly expenditure elastic, while cereals, pulses, edible oils, vegetables, fruits and other foods were expenditure inelastic.

Rani *et al.* (2000) conducted a study in madras city on consumer behaviour and reported that the number of households consuming milk were 100 per cent in all six income groups. Total quantity of milk consumed varied per month varied from 4.38 kg to 22.52 kg per consumption unit. The monthly consumption of fluid milk per consumption unit varied from 3.61kg to 17.7kg. The expenditure of a consumption unit on milk and milk products varied from Rs. 42.04 to Rs. 215.22 per month among the different income groups. The preferences of households were found more for the toned milk in all income groups.

Roy *et al.* (2002) while studying the consumption pattern of milk and milk products among different income levels in some selected areas of Bangladesh found that the major allocation was devoted to liquid milk followed by sweetmilk, powder milk, and other milk products. The municipality town households consume more milk, sweet milk and dahi than rural and metropolitan cities. On the other hand, metropolitan households consumed more powder milk, condensed milk, ghee and ice-cream. Milk and milk products consumption and expenditure increased substantially with the increase of income in all the areas.

Das (2008) studied the consumption pattern of milk and milk products in North Tripura District of Tripura state. Study was conducted in both rural and urban areas. 50 sample households were classified into different groups on the basis of various socio-economic characteristics such as 1) Per capita total monthly expenditure 2) Occupation groups 3) Education for both rural and urban households. In rural area it was observed that an increase in the expenditure on non-food items, meat, egg and fish would significantly decrease the expenditure on milk and milk products whereas, expenditure on cereals, other food items had a positive effect on the expenditure on milk and milk products. The educated people were found to spend more on milk and milk products. Age of the main earner of the households did not show any significant effect on the expenditure pattern on milk and milk products. On the other hand, in urban area it was observed that an increase in the expenditure on meat, egg and non-food items would significantly decrease the expenditure on milk and milk products, whereas, expenditure on vegetables, fruits, sugar, salt and jagerry, cereals and other food items had positive significant effect on the expenditure of milk and milk products.

2.2 STUDIES ON CONSUMER AWARENESS, ACCEPTANCE AND CONSUMPTION PPATTERN FOR FUNCTIONAL DAIRY FOODS:

West *et al.* (2002) assessed Canadian consumers' valuations of functional properties of food focusing on preferences for organic and GM foods with functional properties in relation to conventional foods. 1008 Canadian household food shoppers were surveyed via telephonic survey. The study showed that Canadian consumers generally have a positive attitude towards functional foods and were willing to pay a premium especially when the functional property was added to foods. The study concluded that, although the probability of purchasing both GM and organic products increased with the addition of a functional attribute but the gain is small such that the market for conventional food isnot likely to be significantly affected if current tastes and attitudes remain constant.

Larson and Grunert (2003) studied the effect of cultural values on the demand for functional foods using a sample of American, Danish and Finnish consumers. The primary grocery shoppers in five hundred randomly selected households in each country were surveyed. The researchers determined that a consumer's perception of functional food is dependent on the healthiness of the base product to a greater extent than the health claim or functional properties. Functional and novel foods with base products that have already been accepted by consumers for their nutritional content or healthiness are most likely to be accepted and stimulated a higher willingness to pay. Finnish respondents were generally more positive towards functional food than the Americans and the Danes, while Danish and Finnish consumers had a more negative attitude towards genetically modified products relative to the American consumers.

West and Larue (2004) identified the factors which influence the consumers desire to be among the first to try innovative functional foods. Ordered probit estimation technique was used for the data analysis. Demographic factors analysis of respondents showed that men, metropolitan consumers, consumers with children present in the household, and consumers residing in Quebec were then most willing to be innovative in the nutritionally enhanced food market. Women were seen to be hesitant when faced with novel foods. Finally, the study also showed that consumers of all ages will accept these products if there was

continuous assurance that the diet-related health claims were not bogus or in any way compromised.

Verbeke (2005) study primarily focused on consumer acceptance of functional foods. Data were collected from 215 grocery shoppers in Belgium households via personal interviews. Determinants for consumer acceptance were assessed by use of multivariate probit model. It is found that a health benefit was the paramount factor in the acceptance of functional foods. Socio demographic factors like age, income, literacy and location also had effect on consumer acceptance.

Peng *et al.* (2006) examined consumer attitudes toward the acceptance of (hypothetical) dairy products enriched with CLA. Data were collected from 803 consumers via telephonic survey. Maximum likelihood ordered probit model was used to estimate the probability of purchasing CLA-enriched milk products. Belief in the healthiness of conventional milk was found to be the main determinant of the acceptance of CLA-enriched dairy products in Canada. The analysis also suggested that interest in a product which was perceived by consumers to be less healthy can be increased through the introduction of a functional health claim. Interestingly, households with higher education level were less likely to accept functional foods, whereas high income households had a positive attitude towards functional foods.

Arnoult *et al.* (2007) surveyed 200 consumers by face-to-face interviews in UK. They examined willingness to pay as well as attitude towards number of functional food products. Highly skilled professionals in urban areas, women, and smaller households on lower incomes were more likely to be willing to pay for enhanced products. Larger households with higher incomes or higher education levels tended to exhibit a positive willingness to pay for supplements in the form of pills. Finally, it was concluded, somewhat surprisingly, that UK consumers tended to have a stronger willingness to pay for enhanced animal than for enhanced plant products.

Herath *et al.* (2008) surveyed over 1700 Canadian consumers to identify consumer segments that lead the consumption of functional food and nutraceuticals. Cluster analysis and analysis of variance (ANOVA) were applied to the data capturing attitudes, motivations and knowledge. The researchers

found that factors such as age, location, education and income were prominent determinants of functional food and NHPs consumption in Canada. The most receptive groups for functional food and NHPs were the elderly, the less educated and low income households. The less receptive group consisted of the younger population with higher education and incomes who mostly live in the urban areas.

Hailu *et al.* (2009) used Mall intercept survey for over 200 Canadian consumers. He examined the preferences for probiotics using conjoint analysis. Probiotic products were described in terms of four attributes: mode of delivery, the existence of a health claim, health claim source, and cost. The sample was segmented based on attitude towards the mode of delivery or carriers of the functional food ingredient since this was the most important attribute across the sample. However, the three segments differ significantly in the value they placed on this health claim source. The value placed on the health claim source was the strongest for ‘‘Pill lovers’’ and weakest for ‘‘Pill loathers’’.

Henson *et al.* (2010) investigated consumers’ willingness to purchase food and/or non-prescriptive pills that contained phytosterols as a means to reduce the risk of cardiovascular disease (CVD). Via mall intercept surveys, 446 respondents were selected from Canadian population. Determinants of purchase intentions were broadly grouped into “response efficacy” and “self-efficacy”. Surprisingly, it was shown that personal fear of CVD does not appear to significantly affect consumers’ purchasing intentions. The study concluded that functional foods and nutraceuticals should be promoted as part of strategies to reduce the incidence of CVD. Authors recommended that the communication should focus on the general population with little attention to the high risk segment.

Ares *et al.* (2010) examined the effect of price, brand and health claims on consumer choice of functional over regular yoghurt for 103 consumers in Uruguayan using conjoint analysis. Cluster analysis enabled the authors to identify the consumer with similar attitude. Multinomial logit model was used to estimate utilities of each of identified cluster. All four of the attributes: the type of yoghurt, brand, price, and health claim influenced consumers’ yoghurt choices. Adding a functional ingredient like fibre or antioxidants to the product increased

the probability of consumers in choosing functional yoghurt. Brands were important: consumers were more likely to choose a familiar brand of yoghurt with functional ingredients compared to unfamiliar brands. There were mixed reactions to price. Finally, health claims on functional yoghurt appeared to have little effect on consumers and was the least important of the four attributes. Consumers exhibited a stated willingness to purchase functional yoghurt over regular yoghurt even in the absence of health claims.

2.3 STUDIES ON DETERMINANTS OF CONSUMPTION PATTERN FOR FUNCTIONAL FOODS:

Thompson and Kidwell (1998) measured consumers' actual choices of organic and conventional products made in retail outlets, and accounted for effects of differences in cosmetic appearance. The products examined were fresh fruits and vegetables. Households with children were more likely to purchase organic products while more highly educated (graduate or professional degrees) consumers were less likely to do so. Cosmetic damage had a small effect on the probability of purchasing organic foods.

Carola Grebitus *et al.* (2004) collected data from 260 respondents of Germany in 2004, to analyse the impact of attitude, quality characteristics and socio-demographic on consumption of organic and conventional pork, potatoes and milk. An ordered logit model was used to analyse the data. Consumers showed an increased interest in organic foods and were willingness to pay premium for organic products. Conventional pork consumption showed the fewest number of statistically significant attributes of all analysed products. The results for potatoes showed that only one environmental quality factor was associated with conventional potato consumption which was related to the availability of information in the store. Both extrinsic and intrinsic quality cues were significant predictors of milk consumption and consumption frequency. The extrinsic cues related to the functional product characteristic of package size, and image related to brand both increase the frequency of consumption of conventional milk. Milk was the only product with a significant positive effect of brand. Among intrinsic quality cues, the nutrition information on fat content has a significant negative effect for conventional as well as for organic milk. The experience quality attribute related to sensory aspects of freshness has a

significant positive effect on conventional milk consumption. Among significant socio-demographics, women seemed to buy more organic milk than men. Older consumers buy less organic milk than others. Because organic products in Germany are often sold in specialty shops, it may be that older, less mobile consumers were less likely to purchase the organic product.

Bravo *et al.* (2005) surveyed 13,074 German consumers based on the information gathered through the representative German National Nutritional survey II. Comprehensive causal model was developed to analyse the data. The finding indicated that altruistic motives were the major factors affecting consumer attitude and purchasing behaviour than the socio-demographic factors. An altruistic factor included consumer's political attitude, social aspects, environment and animal welfare.

Hanna Stolz *et al.* (2007) conducted laboratory purchase simulations because there was less risk of interference compared to field studies. In the purchase simulations, consumers could choose between conventional, conventional-plus and organic milk, fruit yoghurt and apples. They chose these products to cover both animal and plant products as well as processed and unprocessed products. Data were collected from Switzerland and Germany. Consumers were selected only if they normally purchased fresh milk, fruit yoghurt and apples. Furthermore, quota sampling was applied with regard to age and gender. The samples were divided into two age groups of 18–44 and 45–75 years, with each containing about 50 per cent of the participants. For data analysis they used descriptive analysis and contingency tables of preferences. Results showed that in both countries, consumers most frequently chose the organic milk, fruit yoghurt and apple alternatives. The multinomial logit models showed that the consumers' attitude influenced their preference for conventional, conventional plus and organic food. Instead, increasing the perceived price-performance ratio of organic food by means of targeted communication was found to be a more promising marketing strategy. The preferences observed in the German purchase simulation were determined by selected socio-demographic characteristics, such as household size, having children under 18 years old and income class. In contrast, no significance of socio-demographic variables was found in the Swiss models.

Pieniak *et al.* (2007) conducted a study that investigated the association between consumers' subjective knowledge, objective knowledge, general attitude towards organic food and organic vegetables consumption. Consumer survey was carried out in Belgium from 1200 subjects. The questionnaires were circulated in shopping streets or at supermarket gates. In total, 553 questionnaires were returned of which 529 were filled in completely (44% net response rate) and were used for further data analysis. Data were analysed in SPSS software. Firstly, maximum likelihood model was used for factor analysis on pooled samples and later structural equations model parameters had been estimated and the general fit of the model has been assessed, with the use of structural equation modelling (SEM). Subjective knowledge was shown to be an important factor in explaining organic vegetables consumption. It is significantly, relatively strongly and directly associated with organic vegetables consumption. Objective knowledge, in contrast, is only indirectly associated with organic vegetables consumption, through increased subjective knowledge and more favourable general attitudes towards organic vegetables. Attitudes towards organic vegetables had a direct positive and relatively strong relationship with organic vegetables consumption.

2.4 STUDIES ON CONSUMER PREFERENCES FOR VARIOUS MILK AND MILK PRODUCTS AND ON FUNCTIONAL FOODS:

With the view to evolve better marketing strategy the dairy sector must have a thorough understanding of the needs and preferences of the consuming public. Consumer awareness and preferences are of great importance with respect to price, quality, packaging and mode of delivery etc. Pertaining to these aspect relevant studies conducted in India and also abroad, are reviewed in this section.

Parry and Childress (1966) carried out a survey on 15 schools in Hamilton, Tannessee. 273 people from 5^{th} grade, 93 from 8^{th} grade and 79 from 11^{th} grade were asked to indicate the extent to which they agreed and disagreed with selected statements on milk for growth, health and energy, milk as a refreshing or social drink and the need for consumption of milk in different age groups. The study revealed gradual decrease in milk consumption at higher grade levels.

Sound and Lal (1969) conducted a survey on the consumption of milk and milk products in rural community of Najafgarh in Union Territory of Delhi. A healthy feature about the mode of milk consumption was that a majority of the people did not like to take raw milk which they think gives rise to number of complaints. Another interesting feature the study brought out was that while a large majority of the respondents possessed buffaloes, their attitude towards cow's milk is more favourable, which they regarded was light and pure. This may be because of religious sentiments which Hindus had for the sacred cow.

Ratnam and Spielman (1972) estimated the influence of attitudinal factors and socio economic variables on the consumption of fresh milk, skim milk and filled milk in Honolulu metropolitan area, using component factor analysis. Consumer attitude were collected on a seven point experimental scale for 20 attitudinal test grouped under acceptability, taste, nutritional, health academic and social images of the products.

Marketing Research Corporation of India (1973) with a view to evolve better marketing policy, ascertained consumer reaction and preferences relating to quality and packaging of dairy milk in Madras city. Over 65 per cent households rated the quality of dairy milk as average indicating the need to improve their quality. Nearly 69 per cent of the respondents indicated their preferences for getting their suppliers of milk delivered at home preferably at the same price or only with a nominal increase. Almost all households responded frequent delays in delivery of milk.

Prabaharan (1978) studied the consumer's awareness and preferences for milk products supplied by Tamil Nadu Dairy Development Corporation in Madras city. The result showed that about one third of the households had no knowledge of the two important products, ghee and butter. Majority of consumers appreciated the hot milk sold by corporation but more than half of them did complain about the unhygienic conditions of cups in which it was currently served. About 77 per cent of households were found satisfied with the present fat content in standardized milk supplied by the dairy corporation.

Tuorila (1987) surveyed on the preferences of milk with varying fat contents and related overall liking, attitudes, norms intensions on 236 subjects and revealed that 0.2 per cent used non-fat 1.9 per cent low fat and 93.3 per cent

regular fat milk. All the users groups indicated a reluctance to shift from the usual milk type but were, however, aware of nutritional recommendations as to which milk type they should use. The predictive power of attitudinal was greater than of norm component. The use of a certain milk type was highly supposed by a consistent belief structure and positive attributes.

Booth (1988) assessed the choices between sweet and non-sweet foods, the ideal sugar concentration in a lime drink and the tolerance of deviations from the ideal for each individual in an unstratified sample of 344 children's and adults of both the sexes. Results showed that flavoured milk was preferred over ice-cold milk. The men showed greater sweetness preferences than the women. Women & younger showed an average greater preferences for carrot and orange juice over the alternatives.

Gandhi and Rao (1989) found in their study the preferences for dahi over acidophilus milk. Acidophilus milk due to its higher acidity and not having the typical buttery flavour was not accepted by Indian consumer yet. In recent years an attempt have been made to improve the taste of acidophilus milk by adding flavour and producing it in several forms like paste, concentrates and had shown significant consumer acceptance.

Singh (1989) compared the consumer perception of milk products manufactured by organised sector and unorganised sectors. Data were collected from 394 households in Chandigarh. Milk products were perceived to be more reliable in quality, cleanly packed and delicious in taste in organised sectors compared to unorganised sectors. Differences in income and education did not influence perception in the study area.

Thraen *et al.* (1990) analysed 1600 samples observed over period 1976-86 in USA. The results showed that an advertising campaign aimed at changing consumer attitudes towards milk taste would be most effective for increasing consumer frequency of consumption. Consumption was less sensitive to health variables as compared to product taste. The consumers found the flat, watery taste of low fat/skim milk to be objectionable.

Wang and Sun (2002) data from 519 respondents were collected in state of Vermont via mailed survey. Study provided information about consumption

pattern, preferences and their willingness to pay for organic products along with household demographic information. They used conjoint analysis method for analysis of the consumer preferences for organic apples and milk. Results showed that there was no significant difference between the whole sample and the sample used in this study. The percentage of people's average organic food expenditure ($72.7) was 20% of their average total food expenditure ($354.9) per month in Vermont. Results from conjoint analysis showed that price was considered as an important attribute for Vermont consumers, followed by production method and location for apple consumers and production location and certification for milk consumers. The results from the regression model with demographic variables indicate that young people with higher income, smaller household size and fewer children were willing to pay more for organic food.

Rani (2006) data was collected from 80 households via personal interview method in Karnal city of Haryana. Data was analysed by tabular and regression analysis. Results showed that consumer preferences towards value added dairy products. It also revealed that the hygienic packaging was the major quality consideration followed by fat content and colour. Among the perception of benefits, freshness and nutrition were perceived important benefits in purchase of VADPs.

Singh *et al.* (2007) a sample of 100 household was taken using convenience sampling method. Samples were taken from two cities of Punjab named Patiala and Ludhiana. The method of scaling was used for studying the buying behaviour of consumers. Chi-Square was used comprehensively for analysing association among various parameters. Also Z-test (one-tailed) was used for comparing consumers' perception in Patiala and Ludhiana cities. Analysis revealed that there was a strong association between Income & use of Branded Milk, While choosing a brand the consumer does not consider factors like packaging, price, nutrition, taste etc. Effectiveness of media has no bearing on age, it was construed that profession does have a bearing on the choice of branded / unbranded milk. There was no association between Income & the factors affecting the Consumer buying behaviour, thus, leading to the conclusion that Income level does not affect consumers' choice regarding quality, packaging,

price etc. There is no statistically conclusive evidence that there was any association between the age of a respondent and the choice of a milk product.

Bidwe *et al.* (2007) conducted a study in Maharashtra to investigate the consumer's preferences for different species (cow/buffalo) of milk on Buldana district of Maharashtra. A total of 200 samples were interviewed for from 10 municipal wards of Buldana. Data was analysed by chi- square test and coefficient of correlation. Results show that, majority (73 per cent) of families preferred buffalo milk over cow milk. Most of the families consumed milk in the form of tea or coffee rather than as such**.** All the families preferred to purchase milk from milk vendors rather than maintaining self milch animal or purchasing the milk from government milk scheme. A significant no of families consumed dahi fallowed by ghee and occasionally preferred to consume Shrikhand, basundi and ice-cream. The per cent expenditure on milk and milk products was more in lower income groups as compared to higher income groups. Expenditure incurred on milk and milk products increase with increased in family size.

Ashok and Srivastava (2010) conducted study of the consumer's preferences for dairy products. Objective of the study was to provide for an improved understanding of those factors influencing factors of purchasing behaviour of consumer, for this researcher had collected 225 respondents from Bettiah district of West Champaran, Bihar. The sample covered both urban and rural areas as well as represents all occupational groups. Data was analysed by use of per cent analysis, Chi square test and weighted average method.

A number of studies have been conducted on analysis of consumption pattern of milk and milk products in India and abroad. Function dairy products are emerging novel dairy food products in India. Though, a few studies have been conducted on consumption pattern and consumer behaviour of probiotic dairy foods in Western Countries, such studies are practically non-existent in India. This study is an attempt in this direction and will throw light on the consumption pattern and consumer behaviour for functional dairy foods.

CHAPTER – 3

METHODOLOGY

3. Research Methodology

Methodology is the blue print of research investigation. It refers to the processes, methods and procedures to approach research problem and seek answer. This section describes the methodology adopted in conducting the research under the following sub-heads:

3.1 Study Area

3.2 Sampling Design

3.3 Data Collection

3.4 Analytical Framework

3.1 STUDY AREA:

3.1.1 Selection and Description of the Study Area

The study was conducted in the Mumbai and Pune districts of Maharashtra state which were selected purposively due to fallowing reasons:

i) The information available is very scanty for functional dairy foods consumption in general and particularly in Maharashtra.

ii) Maharashtra has 5.08 crore people living in urban areas with an urban population of 45.23 per cent. *(Indian Census, 2011)*

iii) Maharashtra is third most urbanized state in India.

iv) Total milk production of Maharashtra for year 2011-12 was 8.5 MMT as against 127.08 MMT of total India. *(Economic survey, GOM, 2012)* and Per capita milk availability in Maharashtra for the year 2011-12 was 206 (g/day) while India had 290 (g/day).

v) Maharashtra is one of the wealthiest state in India and ranks first among the larger Indian states for per capita income with Rs. 74,027.

vi) Familiarity of the area to the investigator, which made possible for the investigator to get the information from the respondents within the limited time.

vii) Since local language is well known to the investigator, which is an added advantage and many a times quite essential to excavate accurate information by developing rapport with the respondent.

3.1.2 An Overview of Maharashtra State

Maharashtra occupies the Western and Central part of the country and has a long coastline stretching nearly 720 kilometers along the Arabian Sea. Positioned between 16° N and 22° N latitude and 72° E and 80° E longitude. The Sahyadri mountain ranges provide a physical backbone to the state on the West, while the Satpuda hills along the North and Bhamragad-Chiroli-Gaikhuri ranges on the East serve as its natural borders. Maharashtra is the second largest state in India both in terms of population and geographical area (3.08 lakh sq. km). The state has a population of around 11 crore *(Indian Census, 2011)* which is 9.3 per cent of the total population of India. The state has a large urban population (45.2 per cent) with high purchasing power.

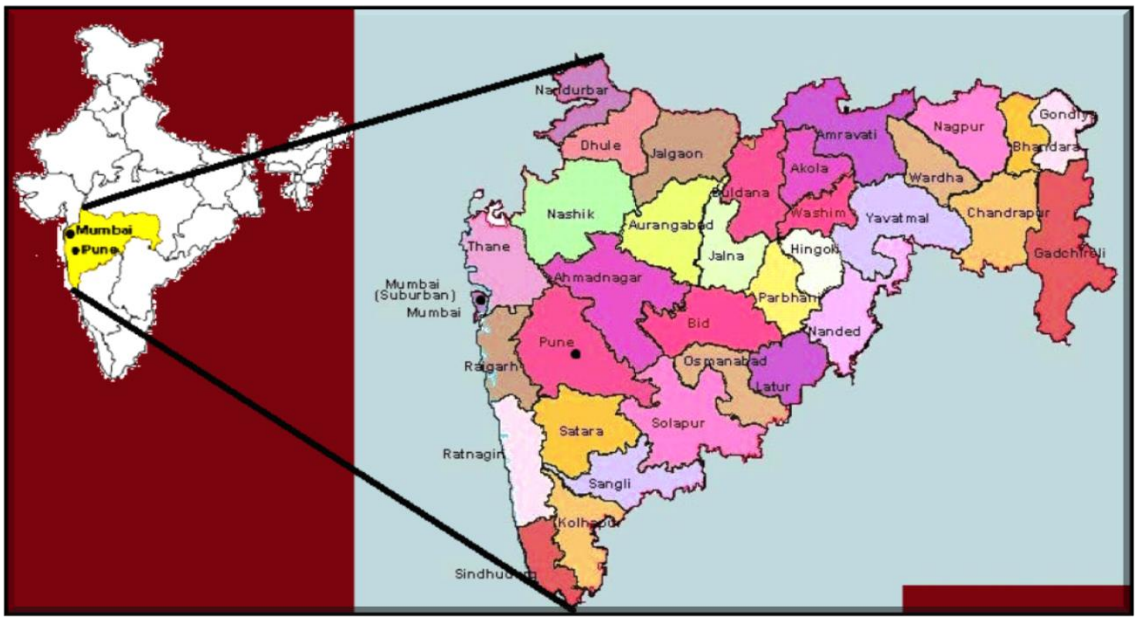


Fig 3.1. Map of Maharashtra state

The state borders are encircled by the states of Gujarat, Madhya Pradesh, Chhattisgarh, Goa, Andhra Pradesh, Karnataka andunion territory of Dadra and Nagar Haweli. Maharashtra's topography is diverse.The state has 35 districts which are divided into six revenue divisions viz. Konkan, Pune, Nashik, Aurangabad, Amravati and Nagpur for administrative purposes.

The agriculture sector of state is highly volatile due to fluctuating monsoon conditions. Presently industrial and services sector both together contribute about 87 percent of the state's domestic product. The agriculture & allied activities sector contributes 13 per cent to the State's income. The agriculture and allied sector, which has contributed about 12.4 per cent to GSDPat current prices in 2011-12, grew at an average growth rate of 4.3 per cent up to first four years of XI five year plan *(Economic survey, GOM, 2012-13).*

Animal husbandry in Maharashtra is closely interwoven with agriculture since ages and plays an important role in the rural economy of the state. Besides its vast employment potential, this sector has helped in stabilising the farm income. The share of Animal husbandry in GDSP of agriculture and allied activity sector during 2009-10 was 7.8 per cent *(Economic survey, GOM, 2011)*. The state is pioneer in the field of dairy development and it is one of the leading states in terms of milk production in the country. During the period between 1985 and 2005, the total milk production in the state registered a much faster growth rate as compared to India. In the year 2009-10, milk production in Maharashtra state was 8.5 million tonnes with per capita availability of milk of 206 g per head while total Indian milk production was 127.9 MMT and per capita milk availability was 290 grams per head, (*Economic Survey of Maharashtra, 2012*). During 2011-12, there were 73 milk processing plants and 141 chilling centers with capacity of 74.73 lakh liters per day under government and co-operative sector respectively *(State Economic Survey, 2012).* The average dairy collection of milk by the government and co-operatives dairies taken together was 38.57 lakh liters during 2011-12. The National Dairy Development Board (NDDB) has proposed around $4 billion draft National Dairy Plan (NDP) to increase the country's milk production from the current level to meet the projected demand of 180 million tonnes by 2021-22. Co-operatives cause easier marketing of end product, provide stable rate to farmers even if surplus supply, Payments are guaranteed to milk producers and ensured with in maximum 30 days. The co-operative movement in Maharashtra has not only improved the lives of the people here but has made significant contribution to the economy of the state itself. Today Maharashtra is considered as the land of opportunities as it is one of the most developed states not only economically but also in terms of infrastructure.

Without doubt a major credit goes to the co-operative sector which has not only promoted and developed rural leadership, which can certainly be termed as the leadership of the masses but also has been involved in promoting the development of infrastructure in the State.

Changing dietary pattern & increasing health consciousness among Indian consumers have changed view of consumers for conventional dairy products, in that increasing middle class population & urbanisation boosts up the favourable environment for expanding of functional foods sector in India as well as in Maharashtra. Liberalisation policy has invited many foreign ventures to invest in Indian functional foods market. From the description of Maharashtra with regard to increasing milk production of state, larger market for dairy foods, plenty of natural resources and institutional supports, it is amply clear that this state occupies a prominent role for newly expending functional dairy foods market.

3.1.3 An Overview of Mumbai and Pune Districts

Both Mumbai and Pune are considered as well known metropolitans of not only Maharashtra but also of India. Mumbai is capital of Maharashtra and financial capital of India. It is the most populous city of India and fourth most populous city in the world, with a total metropolitan area population of approximately 20.5 million. It is one of the most populous urban regions of the world. Mumbai lies on the west coast of India and has a deep natural harbor. In 2009, Mumbai was named as Alpha world city *(www.maharashtra.gov.in).*It is also the wealthiest city in India and has the highest GDP of any city in South, West or Central Asia. Mumbai is the commercial capital of India. It is also world's top 10 centers of commerce in terms of global financial flow, generating 5 per cent of India's GDP, and accounting 25 per cent of industrial output, 70 per cent of maritime trade in India and 70 per cent of capital transactions to India's economy. Mumbai consists of two distinct regions: Mumbai City district and Mumbai Suburban district, which form two separate revenue district of Maharashtra. Total area of Mumbai is 603.4 km^2 (233 sq. mi) of this; the island city spans 67.79 km^2 (26 sq. mi), while the suburban district spans 370 km^2 (143 sq. mi), together accounting for 437.71 km^2 (169 sq. mi) under the administrative of Brihanmumbai Municipal Corporation (BMC). According to 2011 census, the population of Mumbai was 12,479,608. The population density is estimated to be

about 20,482 persons per square kilometer, has a literacy rate of 94.7 per cent, higher than the national average of 86.7 per cent. The sex ratio was 838 (females per 1000 percent males) in the island city, 857 in the sub urbans, and 848 as a whole in Greater Mumbai, all numbers lower than the national average of 914 females per 1000 males. Mumbai has a tropical climate specifically wet and dry climate. The average annual temperature is 27.2^{0}C.

Pune is the eighth largest metropolis in India and the second largest in the state of Maharashtra. It is situated 560 meters (1,837 feet) above sea level on the Deccan plateau at the right bank of the Mutha river and on leeward side of the Sahyadri mountain range. Pune city is the administrative head quarter of Pune district. In the recent census on 2011, the total population of the district was 9,426,959 making it fourth populous district in India. Urban population comprises 58.08 per cent of the total population *(Indian census, 2011).* Administratively the district is divided into 15 talukas and 13 Panchayat Samitis. The current population of Pune agglomerate is over 5 million. The district has a population density of 603 inhabitants per square kilometers. Its population growth rate over the decade 2001-2011 was 30.34 per cent. Pune has the sex ratio of 910 females for every 1000 males and literacy rate of 87.19 per cent. Average rainfall in the district is 600 to 700 mm. The temperature ranges from 20^{o}C to 38^{o}C, though at the peak they may reach 40 ^{o}C.

3.2 SAMPLING DESIGN:

The sampling design adopted for the selection of market outlets and respondents from market outlets was purposive multistage random sampling.

3.2.1 Selection of the State

The study was conducted in Maharashtra as information available is very scanty for functional dairy foods consumption in general and particularly in Maharashtra. In state 5.08 crore people (45.2 per cent) lives in urban areas. State has overall 77 per cent literacy rate and 89.8 per cent urban literacy rate *(Indian census, 2011).*With increasing population and urbanization, the state has shown consistent increase in milk production and per capita availability of milk. For the year 2011-12, state has 8.5 MMT of milk production and per capita availability of milk as 206 g per head *(State Economic Survey, 2012).*

The selected cities of Maharashtra are the well-known metropolitan of Maharashtra. Both of the districts have high level of urbanisation and diversified population across all income groups. Mumbai has 117 purchase locations and Pune has 60 purchase locations for the purchase of functional dairy foods which show that state has very good network for supply of functional dairy foods.it is found that the consumer's attitude for functional dairy foods is more favourable in metropolitan which leads to increasing of functional dairy foods market in the metropolitan cities. Recently Pune has been declared as the test market for yakult danone pvt. Ltd which is one of the giant supplier for probiotic milk in India. Due to increase in numbers of supermalls in Pune and Mumbai, it is easy for the functional dairy foods market players to launch new products as well as to increase awareness among them. In Pune, it was found that in super market at every Sunday and Saturday the newly launched functional dairy foods were tasted to consumers. Mumbai already has super malls of well-known multinational companies engaged in functional dairy foods market and population of all variety income groups which favour to study consumption of functional dairy foods among all income groups of peoples. Major market outlets for supply of functional dairy foods are the super market, amul parlours and retail dairy products shops, which all are abundant in both Mumbai and Pune districts.

3.2.2 Selection of Market outlets from Mumbai and Pune

Both Mumbai and Pune have wide network for supply of functional dairy foods. Consumers in metropolitan are more aware about health aspects and Mumbai is one of the largest metropolitan of India therefore, awareness as well as supply network of functional dairy foods is well developed. Though functional dairy foods are available at variety of locations, 117 outlets in Mumbai are solely dedicated to the dairy products in general and functional dairy foods in particular. Out of total locations, randomly, the purchase locations had selected and from all purchase locations 120 respondents were covered. Out of 120 respondents, 35 were selected from supermarket, 15 from Amul parlours and 10 from retail dairy products shops. Details about purchase locations have been given in Table 3.1.

Table 3.1 Stores in Mumbai selling functional dairy foods

Name of stores	Number of stores	Name of stores	Number of stores
Food Baazar	18	Easy day	3
Sahkarbhandar	12	Star baazar	3
D mart	11	HYPERCITY	3
Reliance	6	More	2
Natures basket	4	Spencers	2
Total number of amul parlors having functional dairy foods were 53			

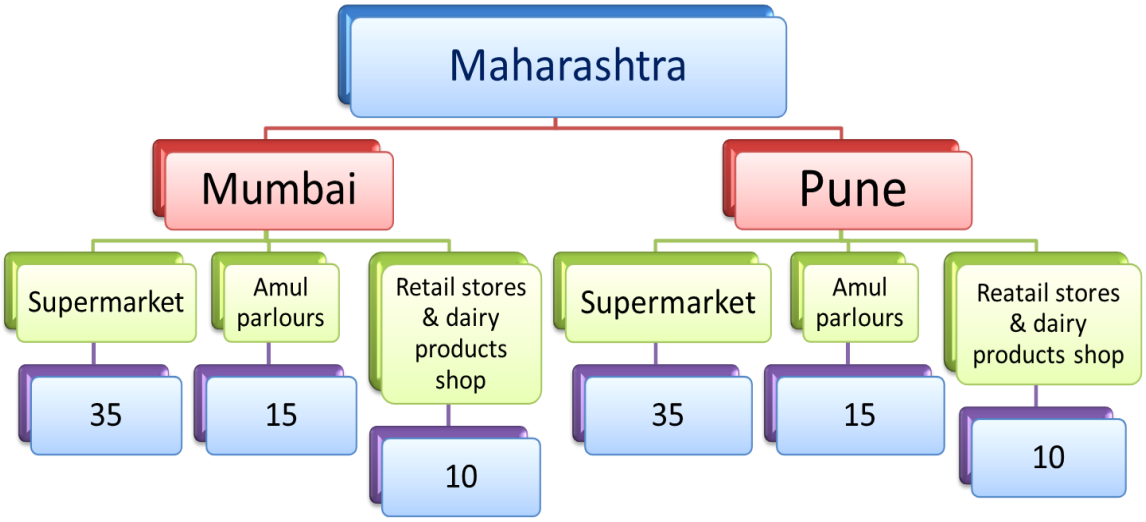
Pune is the second largest metropolitan of Maharashtra and eighth largest metropolitan of India. Pune is considered as land of opportunity for expending of functional dairy foods market. Yakult danone pvt. Ltd which is one of the major suppliers of probiotc milk has recently declared Pune as test market. Along with yakult danone pvt. Ltd., many other market players has increased supply network in Pune. Currently Pune have about 60 purchase locations of functional dairy foods. Being a metropolitan and close to Mumbai, Pune consumers have also shown significant awareness about health and diet. Total 120 respondents from different purchase locations were randomly selected. Out of total 120 respondents, 35 were selected from supermarket, 15 were from Amul parlors and 10 from retail dairy products shops. The details of purchase locations of functional dairy foods have shown in Table 3.2

Table 3.2. Stores in Pune selling functional dairy foods:

Name of store	Number of stores	Name of store	Number of stores
Reliance fresh	16	Natures basket	1
Spencer	11	HYPERCITY	1

Food Bazaar	10	Spar	1
D mart	9	easy day	1
Total amul parlours having functional dairy foods were 10			

Sampling Design



Total 120 consumers were selected randomly from Mumbai and Pune from three market outlets

3.2.3. Terms and concepts used in the study:

The different concepts and definitions relating to consumers expenditure, consumption pattern, consumer behavior etc. used in the present have been described below in brief:

Household:

Household can be defined as a group of persons normally living together and taking food from a common kitchen constitutes a household. The word normally means that temporary visitors are excluded but temporary stay-a ways are included.

Household size:

The size of household can be defined as the total number of persons in the household

Household Consumer Expenditure:

The expenditure incurred by a household on domestic consumption during the reference period is the household's consumer expenditure. Household consumer expenditure is the total of the monetary values of consumption of various groups of items covering all food and non-food items including durable articles and services.

3.3 DATA COLLECTION:

The data for the present study were collected by direct personnel interview method on a well-developed and pre-tested structured schedule. The data was collected from respondents who visited supermarket, Amul parlours and retail dairy products shops. Total 120 respondents were selected randomly from different purchase locations. From each respondent, the data for whole household was collected. Data on consumption of functional dairy foods was collected for various socio-demographic information of household and along with it consumer preferences for various combinations of attributes for functional dairy foods were noted down.

Various published sources of information were used such as Economic Survey of Maharashtra, Integrated sample Survey of Maharashtra and various reports published by the State Agriculture and Dairy Department for the secondary information like the geographic and demographic particulars, land holding pattern, milk production and milk yield of animals. Information about functional dairy foods, market players, different products details etc. were collected from various articles and websites.

3.4 ANALYTICAL FRAMEWORK:

To achieve the objectives of the study, the data collected from 120 respondents were scrutinised, tabulated and analysed by employing varies analytical tools. The techniques so employed are discussed in the present section.

3.4.1 Tabular Analysis

To examine the consumption pattern of functional dairy foods among the consumers of metropolitan Maharashtra, descriptive analytical statistics was used. In that data on socio-demographic profile of household, consumer awareness, consumer behaviour for functional dairy foods and conventional dairy foods, per cent consumption expenditure of households for food and non-food items, on conventional and functional dairy foods etc. were analysed via simple tabular analysis. The entire sample of 120 households from both Mumbai and Pune were pre stratified into different income groups using cumulative frequency approach (Dalenius, T. and Hodges, J. L. Jr., 1957[*]) as follows:

$$\boldsymbol{Li = Yi - 1 + \frac{Yi - Yi - 1}{\sqrt{fi}}\left(\frac{Sk}{L} - Si - 1\right)}$$

Where,

L= no of strata, L_i = i^{th} strata, Y_i-1 = lower limit of the class in which L_i lies.

$\sqrt{fi}$ = square root of the frequency of i^{th} class in which Li ($\frac{Sk}{L}$) lies,

S_i-1 = cumulative square root of the frequency of preceding class in which Li ($\frac{Sk}{L}$) lies, Y_i = upper limit of the class in which L_i lies, $Y_i - Yi - 1$ = width of the class in which Li ($\frac{Sk}{L}$) lies.

3.4.2 Functional Analysis:

The present study was attempted to explain some of the factors which influenced food consumption by using primary data collected from Mumbai and Pune. The required data for this investigation was obtained by a survey of 120 respondents. Here, the monthly consumption expenditure of households (Y) on functional dairy foods was considered as dependent variables and the factors like income of household (x_1), age of head of households (x_2), education of head of households (D_1), occupation of head of household (D_2) and Dietary pattern of head of household (D_3) are considered as independent variables. There is an

assumption of linearity in the dependant and independent variables. The reason behind selecting of independent variables like income, age of head of household, education of head of household, occupation and dietary pattern was that all above enlisted variables have significant effect on consumption of functional dairy foods. Linear multiple regression model was selected for analysis since it was the best fitted model.

Mathematically the multiple regression model is represented as follows:

$$Y = a + b_1x_1 + b_2x_2 + b_3D_1 + b_4D_2 + b_5D_3 + u$$

Where,

Y = Monthly consumption expenditure of households on functional dairy foods.

X_1 = Monthly income of household (in Rupees)

X_2 = Age of head of household (in years)

D_1 = Education of head of household as dummy variable (value 0 for below graduation and value 1 for above graduation)

D_2 = Occupation of head of household as dummy variable (value 0 for business and other while value 1 for service sector)

D_3 = Dietary pattern of head of household as dummy variable (value 0 for vegetarian and 1 for non-vegetarian).

Along with the use of multiple regressions, the coefficient of variation was also estimated by using data of each independent variable and Y (dependant variable). The coefficient of variation refers to a statistical measure of the distribution of data points in a data series around a mean. The coefficient of variation is commonly applied in reliability theory. In this distribution, the exponential distribution is generally more important than normal distribution. The distribution with a coefficient of variation less than 1 are considered to be low

variance, whereas those with a CV higher than 1 are considered to be high variance. The formula applied for the estimation of coefficient of variation was –

CV = Standard deviation / (Average) × 100

3.4.3 Descriptive analysis for analysis of consumer preferences: In this statistics, the consumer's preferences were analysed for a particular combination of product. The consumer's preference for particular characteristics attribute was ranges from extremely agreed to dis-agreed or extremely high to extreme low type of rating scale. For analysis of consumer preferences for probiotic drink and dahi, the preferences was studied for 2 brands of probiotic drink named Yakult and Nutrifit while for dahi, 5 brands of dahi were selected named Danone fortified dahi, Nesvita, Danone low fat dahi, b-active probiotic dahi & Nestles actiplus dahi. For studying of consumer preference, the select the products attributes according to brand and analyse the consumer response for characteristics like -

i) Price of probiotic drink & dahi

ii) Quantity of probiotic drink & dahi

iii) Health claims related to probiotic drink & dahi

iv) Availability of probiotic drink & dahi

v) Shelf life of probiotic drink and dahi

vi) Taste and preferences for probiotic drink and dahi

vii) Packaging of probiotic drink and dahi

The descriptive analysis for consumer preferences was analysed to know consumers preferences for different brands of probiotic drink and dahi. Another method to collect the consumer preferences is in which by using of orthogonal design, preparation of different product attributes has to be carried out and later collect preferences for the products combinations.

Table 3.3 Products profile for probiotic drink:

Product profile	Brand	Price (Rs)	Container size	Packaging & labeling	Health & nutritional claims	Purchase location	A	B	C	D	E
1	Nutrifit	10	80ml	Single plastic bottle	Daily immune booster	Other retailer shops					
2	Yakult probiotic drink	10	65ml	Single plastic bottle	No preservatives	Other retailer shops					
3	Nutrifit	10	100ml	Single plastic bottle	Daily immune booster	Supermarket					
4	Yakult probiotic drink	10	65ml	Single plastic bottle	No preservatives	Supermarket					
5	Yakult probiotic drink	10	100ml	Pack of 5 plastic bottles	No preservatives	Supermarket					
6	Yakult probiotic drink	10	65ml	Pack of 5 plastic bottles	Daily immune booster	Other retailer shops					
7	Yakult probiotic drink	10	65ml	Pack of 5 plastic bottles	Daily immune booster	Supermarket					
8	Nutrifit	10	65ml	Pack of 5 bottles	Daily immune booster	Supermarket					

(A to E represents rating scale for each product combination of probiotic drink)

In this technique, for each product like milk and dahi, the different levels of attributes were selected and various combination of product profile was obtained. For both probiotic drink and dahi, different type of attributes and their levels were selected. After selecting of attributes levels, the numbers of product combination were prepared in SPSS software using orthogonal design technique. For probiotic drink, we were getting 16 while for dahi we were getting 64 combinations of product attributes. From these so many attributes, only desired and suited combinations were selected and consumer preferences for various combinations were noted. The selected attributes for milk are presented in table 3.3

Product profile for Dahi:

This product profile for dahi consist different combination of dahi prepared by orthogonal design technique and later consumers were allow to note their rating for each product combination. This type of combinations of products will help to collect the overall consumer preferences if consumer was facing problem of choice. The various type of combination made for the dahi are presented in the table 3.4 as below:

Table 3.4 Product profile for dahi:

Product profile	Brand	Price (Rs)	Container size	Health & nutritional claims	Purchase locations	A	B	C	D	E
1	Danone fortified dahi	39	400 gm	Boosts immunity	Super market					
2	b-active probiotic dahi	26	200 gm	Improve digestion	Super market					
3	Danone fortified dahi	20	400 gm	Improve digestion	Super market					
4	Danone fortified dahi	50	200 gm	Improve digestion	Amulparlour					
5	Nestle actiplusdahi	27	400 gm	Fat content	Super market					
6	Danone low fat dahi	50	200gm	Fat content	Other retailer shops					
7	Danone low fat dahi	20	400 gm	Fat content	Amulparlour					
8	Nestle actiplusdahi	26	200 gm	Fat content	Amulparlour					
9	Nesvita	26	200 gm	Fat content	Amulparlour					
10	Nesvita	27	400 gm	Fat content	Other retailer shops					

(A to E represents the consumer rating scale for each combination of dahi)

CHAPTER – 4

RESULTS AND DISCUSSION

4. Results and Discussion

In the light of the objectives set forth for the study, the data collected from the selected respondents were analysed by using appropriate statistical techniques. The results have been presented and discussed in following sub sections as follows:-

4.1 General information of the respondents

4.2 Consumption expenditure on food and non-food items

4.3 Analysis of consumption pattern and consumer preferences for functional and conventional dairy foods

4.4 Major determinants for consumption of fermented functional dairy foods

4.5 Consumer preferences for fermented functional dairy foods

4.1 GENERAL INFORMATION OF THE RESPONDENTS

This section provides general information about the selection of respondents, categorisation of households, socio-demographic characteristics of households, composition of households etc.

4.1.1 Selection of respondents

For the selection of consumers, different purchase locations of functional dairy foods were identified, and 120 consumers were selected from Mumbai and Pune. Table 4.1 provides details of selected consumers from different locations.

Table 4.1 Respondents selected from market outlets

Particulars	Number of respondents selected	
	Mumbai	Pune
Supermarket	35	35
Amul parlors	15	15
Retail stores and dairy products shops	10	10

Since the income plays very important role in determining the consumption expenditure, the consumers were classified into three income groups by using cumulative square root frequency method. The obtained income groups and number of respondent according to their class intervals are presented in Table 4.2

Table 4.2 Classification of sample households in different income groups

Category	Income (Rs per month)	No of sample households
Income group I	25,000 to 47,259	36
Income group II	47,260 to 80,649	60
Income group III	80,650 to 1,13,000	24

4.1.2 General information of households

The characteristics of households are assumed to have profound effect on consumption pattern and consumer behaviour of consumers for functional dairy foods. The general information of all the households was analysed and presented in Table 4.3

Table 4.3. Basic information of the selected households

Duration of stay (Years)		19.5
Household income per month (Rupees)		61,158
Size of households (No.)		5
Type of family	Nuclear (Per cent)	91.66
	Joint (Per cent)	8.33

The average duration of stay of consumer households, was 19.5 years, having household income of Rs.61,158 per month with the average family size of

5. Being the metropolitan cities, majority of households were nuclear (91.66 per cent) families.

4.1.3 Socio-demographic characteristics of consumers

Socio-demographic characteristics of households from different income groups have significant effect on the awareness, consumption behaviour and consumption pattern for functional dairy foods. Information relating to age of head of household, family composition of households and their dietary pattern along with education and occupation of head of household has been analysed and presented in Table 4.4 and Table 4.5 respectively.

Table 4.4 Family size and composition of households (number of members)

Income group	Adult			Children(< 18 years)			Average size of household
	Male	Female	Total	Male	Female	Total	
I	1.13	1.11	2.25	1.25	0.86	1.91	4.33
II	1.38	1.35	2.73	1.21	1.18	2.38	5.11
III	1.5	1.79	3.29	1.29	1.37	2.66	5.83
Overall	1.33	1.36	2.7	1.24	1.12	2.3	5.0

The average size of household was 5, consisting of 2.7 adults and 2.3 children. Highest number of family members was in income group III while lowest number of family members was found in income group I. Highest number of adult male and females was in income group III while lowest number of adult male and females were found in income group I. The average number of children for each household was found to be 2.3, consisting of 1.24 male children and 1.12 female children.

Dietary pattern of consumers was assumed to have significant effect on consumption pattern and preferences of consumers for functional dairy foods. The dietary pattern of member households is found varying with the age and sex of member households. On average, 54.16 per cent of adult males were non-vegetarian and 45.83 per cent of them were vegetarian. In adult females, 74.16 per cent were vegetarian and 25.83 per cent were non-vegetarian. It was found that, irrespective of income groups, the vegetarian food was more preferred by females. Non-vegetarian food was mostly preferred in income group I and income

group III. In case of male children, about 64.16 per cent consumed non-vegetarian food while 35.83 per cent consumed vegetarian food.

Table 4.5 Dietary pattern of households in different income groups

Income group	Adult				Children			
	Male		Female		Male		Female	
	Veg (%)	Non-veg (%)	Veg (%)	Non-veg (%)	Veg (%)	Non-veg (%)	Veg (%)	Non-veg (%)
I	33.33	66.67	61.11	38.89	47.22	52.78	55.55	44.45
II	73.33	26.67	83.33	16.67	81.66	18.34	83.33	16.67
III	41.66	58.34	70.83	29.17	45.83	54.17	66.66	33.34
Overall	54.16	45.84	74.16	25.84	64.16	35.84	71.66	28.34

The head of household is considered as the decision maker of the household. The education status, age, occupation of heads of households will have significant impact on the consumption pattern of functional foods. The average age of head of household was 45.46 years and majority (83.33 per cent) of head of households were males. Nearly 2.25 per cent of head of household had education status of SSC (10^{th}), 18.33 per cent had HSC (12^{th}) and majority of head of households (79.16 per cent) had education status of above graduation level. Along with education, the occupation of head of household was supposed to affect the consumption pattern and preferences for functional dairy foods. About 58.33 per cent of head of households were of service class having jobs while 41.66 per cent was having business and other occupations (Table 4.6)

Table 4.6 Socio-demographic characteristics of head of households:

Age of head of household (Years)		45.46
Education of head of household (Percent)	SSC (10^{th})	2.5
	HSC(12^{th})	18.33
	Graduation & above	79.16
Occupation	Job	58.33
	Business & any other	41.66

4.2 CONSUMPTION EXPENDITURE ON VARIOUS FOOD AND NON-FOOD ITEMS

This section presents the consumption expenditure of household on various items. The expenditure on various food and non-food items across different income groups were worked out to understand the share of food and non-food items in total expenditure of households. Several studies have examined consumption expenditure on food and non-food items. Kaur and Gupta (1996), conducted a study in Chandigarh city and found that the percentage expenditure on food was 35 per cent while that on non-food items was 65 per cent. The relative expenditure on food items decreased as income increased. In present study, the results for household's consumption expenditure were analysed according to the three income groups along with the overall analysis. The data were analysed on monthly basis and the shares are provided in Fig 4.1

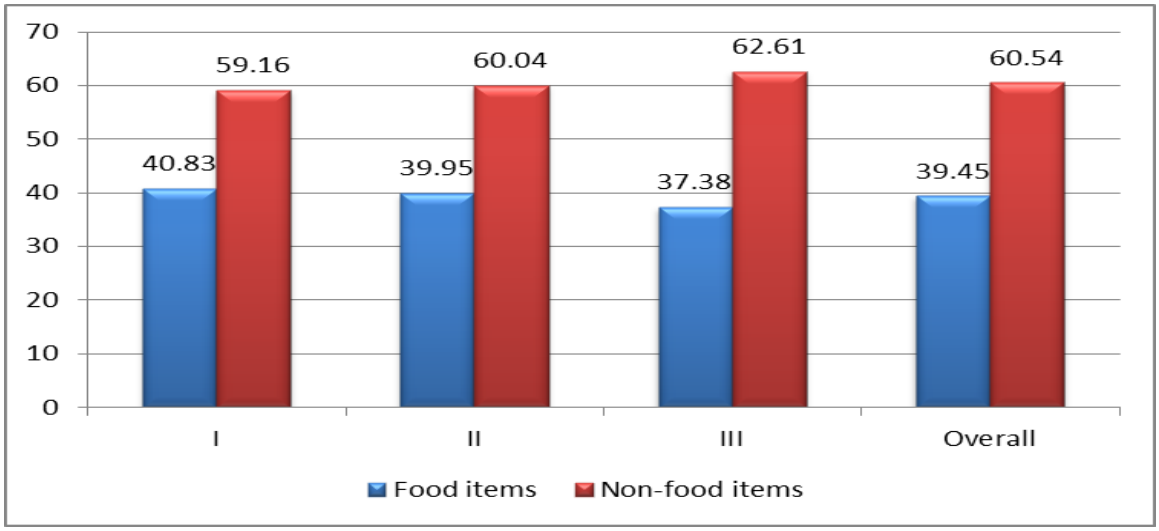


Fig. 4.1 Per cent consumption expenditure of households on food and non-food items across different income groups

As income increased, the household expenditure on food items decreased while it increased on non-food items. An average household was spending 39.25 per cent on food items while 60.54 per cent on non-food items.

4.3 CONSUMPTION PATTERN AND CONSUMER BEHAVIOUR FOR CONVENTIONAL AND FERMENTED FUNCTIONAL DAIRY FOODS

Analysis of consumption pattern and consumer behaviour for functional dairy foods is very important in today's health conscious era from the point of view of both producers as well as consumers. The analysis of consumption pattern for functional dairy foods would help in designing the policies concerned to consumer awareness and consumption of functional dairy foods.

4.3.1 Awareness status for functional dairy foods

The analysis of consumer awareness relating to functional dairy foods is considered as key success factor for Indian functional foods market orientation, consumer-led products development and assessing opportunities for growth of functional foods market under dairy sector. It was found that about 83.03 per cent of consumers knew about functional dairy foods, while 16.93 per cent consumers were not aware about functional dairy foods. The consumers were consuming the functional dairy foods due to health benefits provided by these foods. The consumers who did not know about functional dairy foods, the researcher had provided information related to functional dairy foods and it was reported that after knowing about functional dairy foods, 68.42 per cent of respondents were interested to consume such novel dairy products.

4.3.1.1 Source of information for functional dairy foods

Growing concern about the health has led a strong focus on information about the functional dairy foods. Therefore, analysis of sources of information of such health conscious consumer about functional dairy foods has prime importance. In the present study, analysis of source of information was carried out and is presented in Fig. 4.2 which shows that the major source of information (31 per cent) for functional dairy foods was the television advertisements, followed by staff of supermarket and friends contributing 25 per cent each, staff of company contributed 14 per cent and banner advertisement contributed 4 per cent share. Newspaper was the lowest (1 per cent) contributor as a source of information of functional dairy foods.

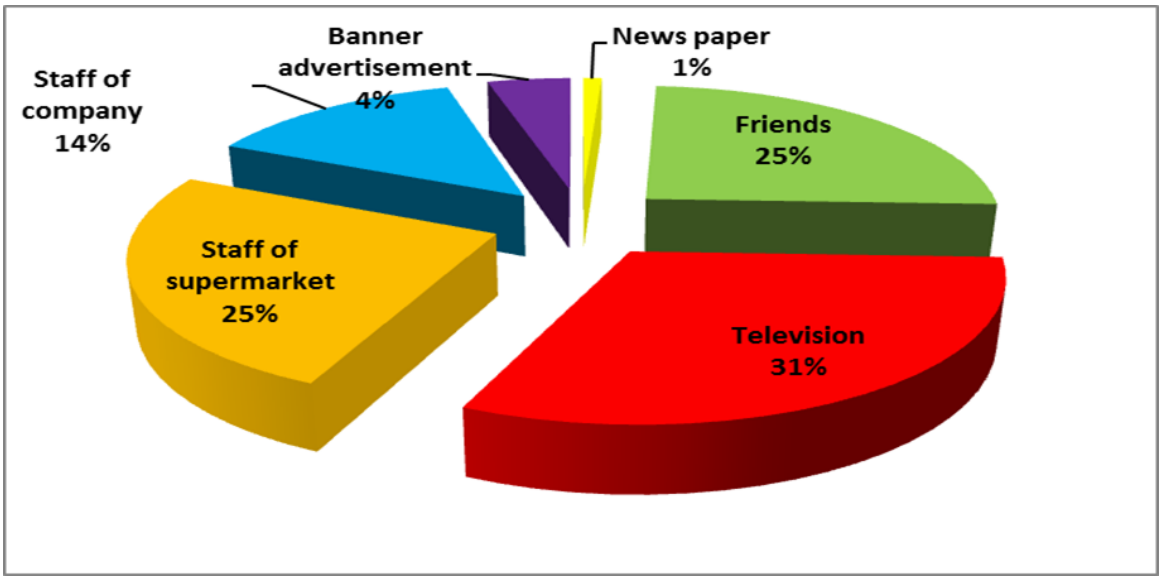


Fig. 4.2 Analysis of source of information for functional dairy foods

Many of Indian functional dairy food market players has declared Pune as the new test market. Therefore, on each week-end in Pune, the supermarkets used to conduct free sampling taste for functional dairy foods as well as provide information about different varieties and offers on functional dairy foods.

4.3.2 Consumption pattern for conventional and functional dairy foods

The study of consumption pattern or consumption expenditure of households for the functional dairy foods has prime importance in order to expand the Indian value added dairy foods sector. The Increasing middle class population, coupled with increased health consciousness among the metropolitan consumers will definitely act as key factors for growth of functional dairy foods sector. The study of consumption pattern for functional foods will be helpful for designing various foods and marketing policies by the producers. In present study, analysis showed that 95.83 per cent of households regularly consumed dairy foods in their routine diet, while 4.17 per cent were not regular consumers of dairy foods. For functional dairy foods, it was found that out of total respondents, 60.83 per cent of households consumed the functional dairy foods and among total consumers, about 76.88 per cent of consumers used to consume functional dairy foods for less than one year while 23.62 per cent for more than one year. The quantities of foods items consumed by the households across different income groups were examined and results are presented in Table 4.7

Table 4.7 Average quantity of food items consumed by households across different income groups (Kg/household/month)

Food items	Income group I	Income group II	Income group III	Overall
Cereals	144.72	122.21	130.22	135.86
Pulses	5.72	6.23	7.8	6.40
Edible oils	5.58	6.13	7.8	6.31
Fish	1.34	0.85	1.26	1.07
Egg (Nos)	30.00	32.00	40.00	33.00
Meat	1.90	1.56	1.91	1.73
Fruits	5.52	6.21	8.08	6.38
Vegetables	34.19	33.88	44.83	36.16

The analysis of consumption of food items across different income groups showed variation in quantity of food items consumed. Several studies have reported that among all food items, cereals was the one on which major consumption expenditure has occurred irrespective of rural or urban household. Rup Kumar *et al.* (1995) reported that in Vidharbha region of Maharashtra, the major expenditure was incurred on food items *viz,* cereals followed by edible oils and lastly on protective foods like fruits and vegetables, meat, milk and milk products. In present study, analysis showed that cereals were major expenditure component followed by pulses and edible oils. Highest quantity (144.72 kg/month) of cereals was consumed in income group I while lowest quantity (122.21 kg/month) of cereals was consumed by income group II. The third income group consumed 130.22 kg/month of cereals which was nearly equal to average cereals consumption of household. A diversification in the consumption basket had been noted with increase in income and the quantity consumption of cereals decreased from income group I to income group III. Cereals were

consumed in the highest quantity among all food items across all income groups. For pulses, consumption increased with the increase in household income. The average quantity of pulses consumed by each household was 6.4 kg/month. The quantity of pulses consumed by different income group was 5.72 kg/month, 6.23 kg/month and 7.8 kg/month respectively.

Recently, a general tendency towards decline in consumption of edible oils is being noticed in different sections of society. In present study, it was examined that highest quantity (7.8 kg/month) of edible oils was consumed in income group III, followed by which the income group II which was consuming 6.13 kg/month and lowest quantity (5.58 kg/month) of edible oils was consumed in the income group I. It indicates that the consumption of edible oil was more in higher income groups. On an average, each household consumed 6.31 kg/month quantity of edible oils.

Sekar and Senthilnatham *et al.* (1994), studied the consumption pattern in Coimbatore city using 150 households and post classified into three income groups. The study revealed that both the per capita consumption and expenditure increased with increase in income. The percentage consumption expenditure on fish to total expenditure was showing declining trend. This indicated that lower income group gave more importance to fish vis-a-vis expenditure on other items. In present study, the analysis of fish consumption showed that income group I consumed highest (1.34 kg/month) quantity of fish while income group II consumes lowest (0.85 kg/month) quantity of fish which was lower than even average quantity (1.07 kg/month) of fish consumption in household. Regarding the eggs consumption, highest consumption (42eggs/month) of eggs was in income group III while lowest consumption (30eggs/month) of eggs was in income group I. the income group II consumed 32eggs/month while average no. of eggs consumed by each household was 33eggs/month. The quantity consumption of eggs increased with increase in household income.

The consumption of meat across three income group households was 1.90 kg/month, 1.56 kg/month and 1.91 kg/month respectively. On an average, each household consumed 1.73 kg/month of meat. Fruits consumption was considered as symbol of higher income status. In India, several studies examined the

consumption for fruits and vegetables. Srivastava (1991) analysed the regional imbalance in production and consumption of fruits and vegetables in India. Examination of consumption data showed that very little was spent on fruits and vegetables. However, in all the regions of India, the consumption of fruits and vegetables was higher in urban areas than in rural areas. In present study, the consumption of fruits and vegetables increased with rise in level of income of households. The highest quantity (8.08 kg/month) of fruits was consumed in income group III while the lowest quantity (5.52 kg/month) of fruits was consumed in income group I. On an average, each household consumed 6.38 kg fruits per month. The vegetables are also one of the important food item contributing major shares in consumption expenditure of households especially in metropolitan households. The highest quantity (44.83 kg/month) of vegetables consumed in income group III while lowest (34.19 kg/month) quantity of vegetables was consumed in income group I. On an average each household was consuming 36.16 kg/month quantity of vegetables.

This section focused on per cent consumption expenditure of households on dairy products and compared conventional with functional dairy foods. Several studies have examined consumption pattern of food and non-food items. Jain and Patel (1996), studied consumption pattern of food and non-food items in Haryana state using NSSO data. The average per capita expenditure of urban households was higher compared to rural households. The expenditure on food was 71 per cent and 64 per cent in urban and rural areas of Haryana. About one-fourth of the total consumer expenditure was allocated to milk and milk products. Among the dairy products, major allocation was towards liquid milk, followed by ghee, butter and other dairy products. In present study, the per cent consumption expenditure on dairy products across different income groups was analysed and shown in Figure 4.3. It was found that the share of expenditure on functional dairy foods increased with rise in the income level of consumers. The highest (16.57 per cent) consumption expenditure on functional dairy foods was in income group III while lowest (3.98 per cent) consumption expenditure was in income group I. The per cent consumption expenditure of income group II households was 12.39 per cent. It was examined that on an average each household spent about 11.59 per cent on functional dairy foods.

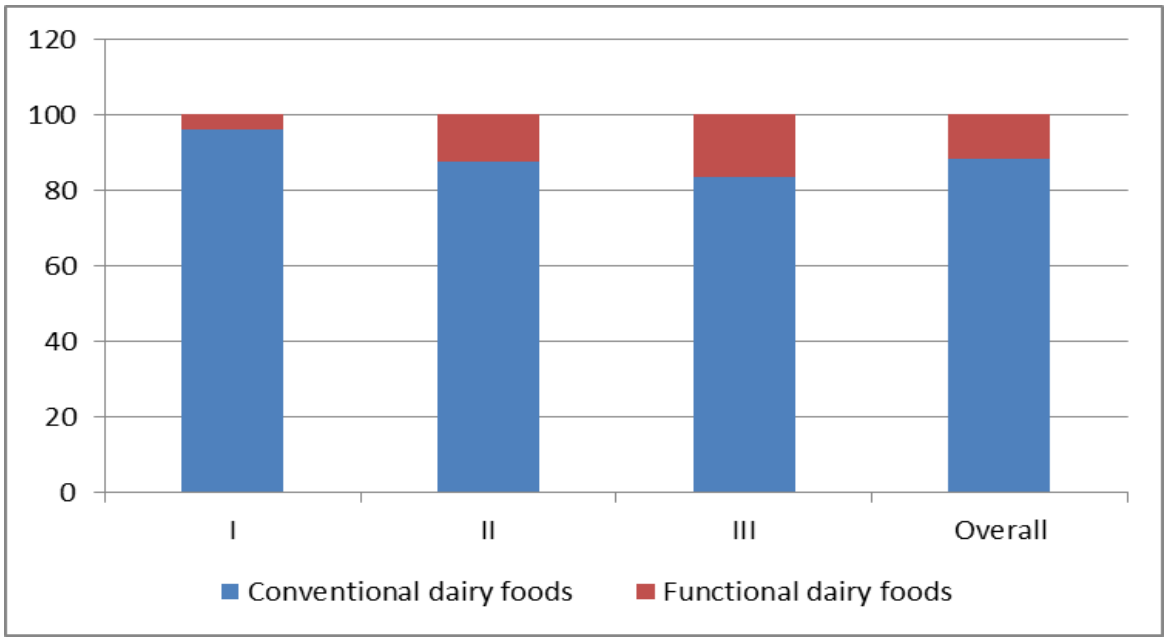


Fig. 4.3 Share of conventional and functional dairy foods in total dairy products expenditure of households across different income groups

In present study, analysis reported that milk and milk products consumption increased with rise in income of households. Jain and Patel (1984) studied the consumption pattern of milk and milk products in different income groups in Haryana state and observed that the per unit consumption of various milk items showed a rising trend with the increase in the income level of the consumers. Another study which was carried in Chandigarh by Kaur and Gupta (1996), reported that among the food items, the largest expenditure was on milk and milk products. Among the milk & milk products, the expenditure on liquid milk accounted for 75 per cent and other milk products accounted for 25 per cent of total expenditure. The present study showed that among the dairy products, milk was highest consumed product than any other conventional dairy product. Among all income groups, highest quantity (31.75 kg/month) of milk was consumed in income group III while lowest quantity (23.44 kg/month) of milk was consumed in income group I. The income group II consumed about 27.26 kg/month quantity of milk which was nearly equal to average household consumption of 27.01 kg/month. The Table 4.8 analyses the quantity of conventional dairy products consumed by households across different income groups.

Table 4.8 Average quantity of conventional dairy foods consumed by households across different income groups (Kg/household/month)

Dairy products	Income group (I)	Income group (II)	Income group (III)	Overall
Milk	23.44	27.26	31.75	27.01
Dahi	0.62	0.54	0.75	0.61
Paneer	0.32	0.27	0.34	0.30
Ghee	0.39	0.74	0.49	0.37
Ice-cream	0.63	0.47	0.82	0.59
Lassi	0.14	0.17	0.25	0.18
Cheese	0.17	0.17	0.22	0.18
Buttermilk	0.15	0.23	0.17	0.19
Other dairy products	0.23	0.24	0.27	0.24

In case of dahi, highest (0.75 kg/month) consumption was in income group III, while lowest quantity (0.54 kg/month) of dahi was consumed in income group II. The quantity of dahi consumed in income group I was 0.62 kg/month which was nearly equal to average household consumption of 0.61 kg/month dahi. As paneer is one of the high price dairy products, the analysis of its consumption in all income groups has prime importance. The quantity of paneer consumed by households showed that highest quantity (0.34 kg/month) of paneer was consumed in income group III, while lowest quantity (0.27 kg/month) of paneer was consumed in income group II. Quantity of paneer consumed by income group I was be 0.32 kg/month which was nearly equal to average consumption (0.30 kg/month) of paneer by households. Ghee is one of the high price dairy product among all dairy products. Highest quantity (0.74 kg/month) of ghee was consumed in income group II, while lowest quantity (0.39 kg/month) of ghee was consumed in income group I and which was nearly equal to average quantity (0.37 kg/month) of ghee consumption. The consumption of ice-cream was chiefly

governed by number of children in households and the household family size analysis showed that number of children was highest in income group III. Therefore, the ice-cream consumption was highest (0.82 kg/month) in households of income group III. The consumption of ice-cream in income group I was 0.63 kg/month. The consumption of lassi increased with rise in income level of consumers. Highest quantity (0.25 kg/month) of lassi was consumed in income groups III. The average quantity of cheese and lassi consumed by household was 0.18 kg/month. The average consumption of buttermilk was 0.19 kg/month while for other dairy products it was about 0.24 kg/month. Birthal (1996) conducted a study on nutrient consumption and expenditure pattern in rural areas of Western Uttar Pradesh and reported that the per capita consumption of milk and ghee were 173.54 g/day and 6.56 g/day per person and these along with other dairy products accounted for 22.73 per cent of the total food expenditure.

4.3.2.1 Consumption expenditure of households on various functional dairy foods:

Figure 4.4 focuses on the average expenditure of households on various functional dairy foods across all three income groups. On an average, the highest (43 per cent) consumption expenditure among all functional dairy foods was on probiotic drinks, followed by which desserts (17 per cent). The consumption expenditure on probiotic yoghurt was 12 per cent and on probiotic lassi 2 per cent, which was lowest among all functional dairy foods. The per cent expenditure on both type of dahi i.e. low fat and fortified fat was 9 per cent each.

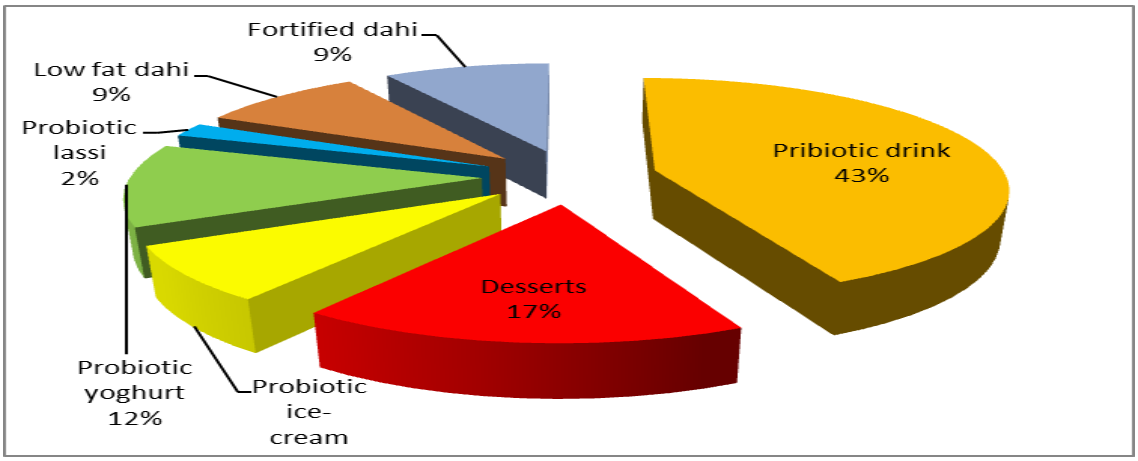


Fig. 4.4 Average consumption expenditure of households on various functional dairy foods

The analysis of consumption expenditure on various functional foods across different income groups will help in understanding how the consumption expenditure on different functional dairy foods was varying across different income groups, which were the preferred functional dairy foods, how the change in income level of households altered the consumption of functional foods etc. The per cent consumption expenditure on income group I, II and III were analysed and presented in Figures 4.5, 4.6 and 4.7 respectively.

The per cent consumption expenditure for income group I showed that highest (39 per cent) consumption expenditure among functional dairy foods was on probiotic drink followed by which desserts (23 per cent), probiotic yoghurt (17 per cent), and probiotic ice-cream (12 per cent). For fortified and low fat dahi, it was 6 per cent and 2 per cent, respectively. In income group I, the lowest (1 per cent) consumption expenditure was on probiotic lassi. The analysis of expenditure in income group II showed that on probiotic drink highest (45 per cent) consumption expenditure on functional dairy foods while 14 per cent for desserts.

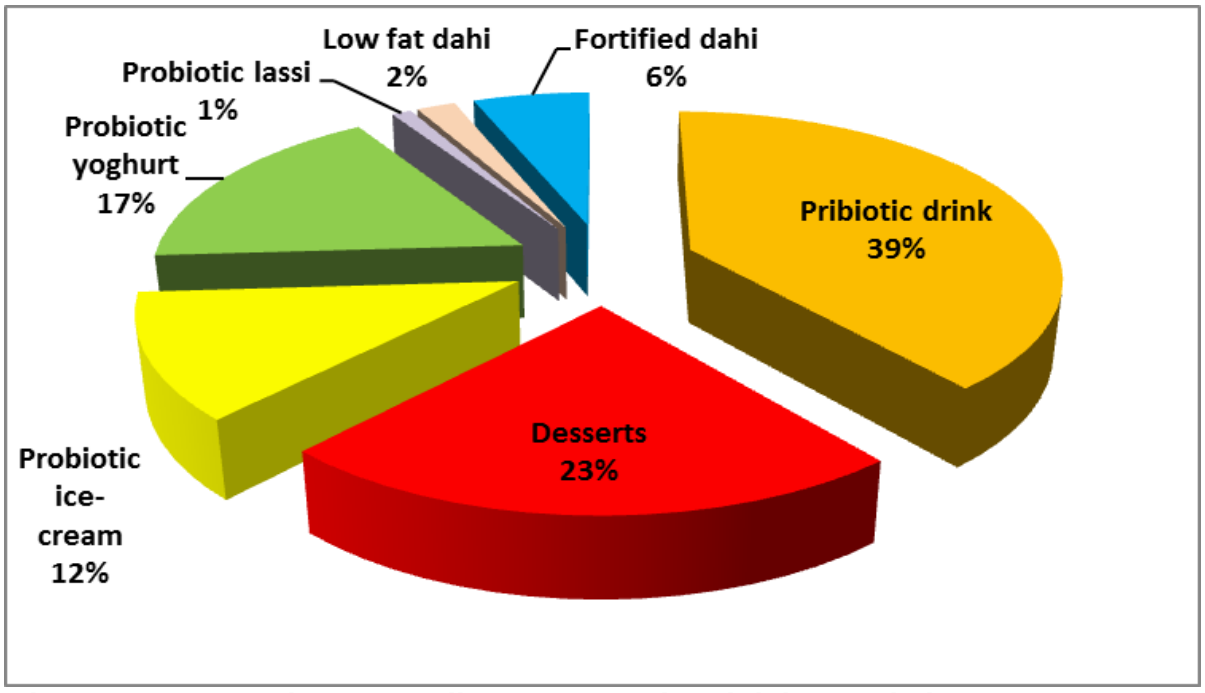


Fig. 4.5 Consumption expenditure on functional dairy foods income group I

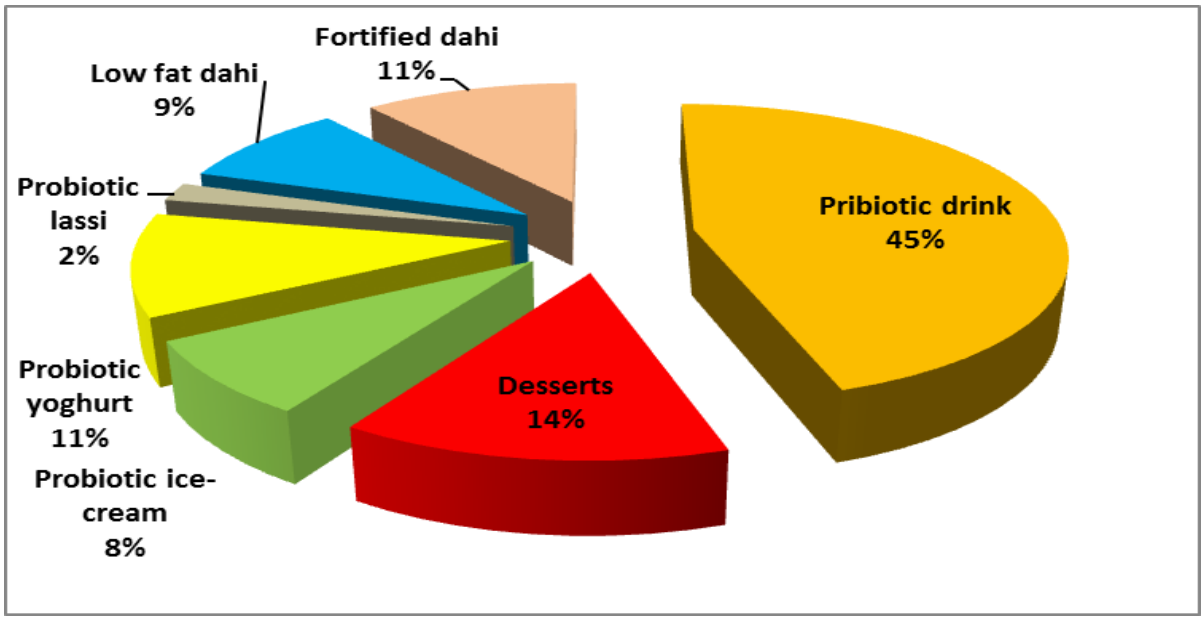


Fig. 4.6 Consumption expenditure on functional dairy foods income group II

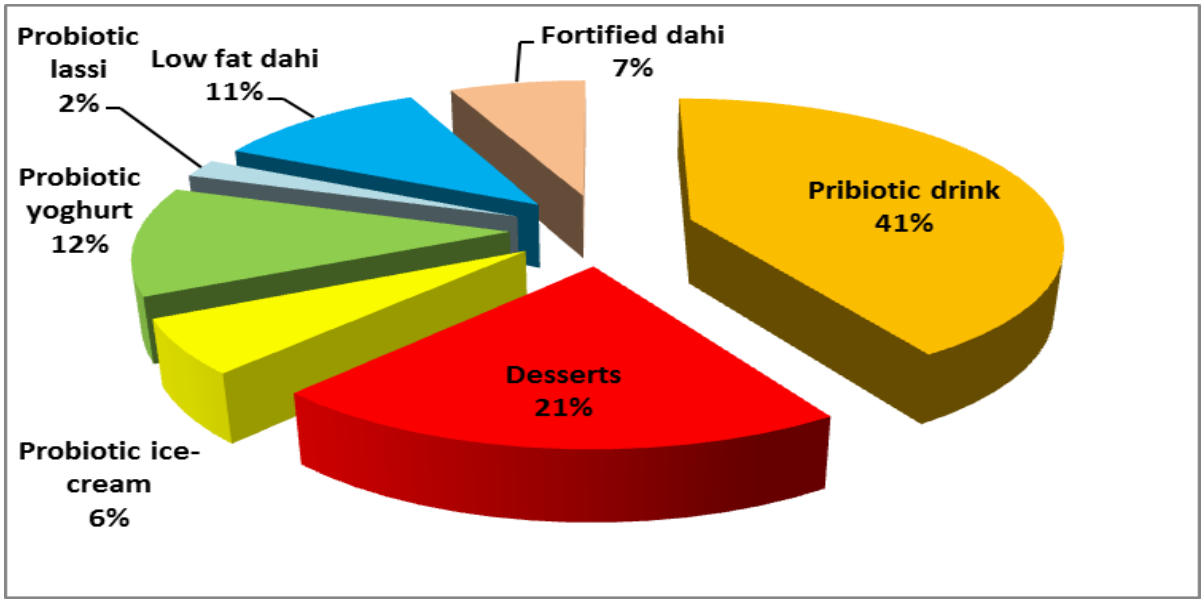


Fig. 4.7Consumption expenditure on functional dairy foods income group III

The overall comparative analysis for all three income groups showed that probiotic drink was the highest food expenditure item contributing 39 per cent, 45 per cent and 41 per cent across three income groups, respectively. The expenditure on probiotic drink increased with rise in income of household. Among all, the lowest consumption expenditure on probiotic drink was in income group I and highest in Income group II. Followed by probiotic drink, the desserts were the second major expenditure item among all functional dairy foods. The highest (23

per cent) consumption expenditure for desserts was in income group I while lowest (14 per cent) was for income group II. In all income groups, probiotic yoghurt was the third functional dairy food item having higher consumption expenditure except income group II, in which along with probiotic yoghurt, fortified dahi (11 per cent) was also third most expenditure food item.

Highest (17 per cent) consumption expenditure on probiotic yoghurt was in income group I (11 per cent) while lowest was in income group II. For income group I, fourth functional food item was probiotic ice-cream (12 per cent) while for income group II and III, low fat dahi ranked third contributing 9 and 11 per cent, respectively. For all income groups, the least expenditure was incurred on probiotic lassi among all functional dairy foods.

4.3.2.2 Brand wise average quantity of functional dairy foods consumed

The brand of product has significant effect on the consumption of particular product. Kumar (1987) examined the factors influencing the buying decision of 200 respondents for various food products. Country of origin and brand of the products were cross-tabulated against age, gender and income. Results revealed that the considered factors were independent of age, education and income. The brand image seemed to be important than the origin of the product, since the consumers were attracted by the brand. In present study, the average quantity of various brands of functional dairy foods consumed by households across different income groups was examined. As brand preference is considered as symbol of higher income, so it was necessary to analyse which brands of functional dairy foods were preferred by which income group households. Brand wise quantity of consumption of functional dairy foods across different income groups are presented in Table 4.9.

Among the probiotic drink, Yakult was the most preferred brand irrespective of the income of households. As compared to Nutrifit, more quantity of Yakult was consumed. This may be due to more availability and marketing strategies adopted by Yakult. As income of households increased, the consumption of Yakult increased. Highest (0.91 kg/month) quantity of Yakult was consumed in income group III while lowest (0.51 kg/month) quantity of Yakult was

consumed in income group I. The average quantity of Yakult consumed by households was 0.77 kg/month while average quantity of Nutrifit consumed by households was 0.66 kg/month.

In case of fortified dahi, total three brands were more preferred. Average quantity of Danone and Nestle's fortified dahi was 0.36 kg/month each. Among all three brands, Danone fortified dahi was consumed in highest quantity of 0.38 kg/month while Nestle's fortified dahi was consumed in lowest quantity of 0.2 kg/month. The quantity of Danone fortified dahi was consumed highest in all income groups since it has lowest price. For the low fat dahi, total five brands were analysed and it showed that average quantity of low fat dahi consumed was highest (0.32 kg/month) for Amul brand and lowest for Danone low fat dahi. The reason behind it may be that among all probiotic low fat dahi, the Danone low fat dahi was having highest price. The average quantity of Danone and Nestle low fat dahi was consumed about 0.3 Kg/month. The average consumption of Britannia low fat dahi was about 0.24 kg/month while Mother Dairy's b-active probiotic dahi was consumed with an average consumption of 0.30 kg/month.

Table 4.9 Brand wise quantities of functional dairy foods consumed across different income groups (kg/month)

Brand name of functional foods		**Income group I**	**Income group II**	**Income group III**	**Overall**
Probiotic milk	Yakult	0.51	0.74	0.91	0.77
	Nutifit	0.8	0.66	0.5	0.66
Fortified dahi	Danone	0.24	0.38	0.38	0.36
	Mother dairy	0.0	0.22	0.29	0.25
	Nestle	0.2	0.46	0.2	0.36
Low fat dahi	Danone	0.0	0.3	0.3	0.3
	Nestle	0.2	0.25	0.4	0.31
	Britannia	0.0	0.26	0.2	0.24
	B-active MD	0.0	0.28	0.35	0.30
	Amul	0.0	0.3	0.33	0.32

Probiotic lassi	Amul prolife	0.1	0.2	0.22	0.2
Probiotic yoghurt	Mother dairy	0.15	0.16	0.13	0.15
	Nestle	0.33	0.24	0.26	0.25
Pro. Ice-cream	Amul prolife	0.16	0.15	0.13	0.15
Desserts	Flaavyo	0.05	0.02	0.02	0.02
	Nestle	0.03	0.03	0.04	0.03

Amul was the first market player which has launched probiotic lassi in Indian functional dairy foods market. The average quantity of Amul prolife probiotic lassi was 0.2 kg/month for all income groups except for first income group which consumed 0.1 kg/month. For probiotic yoghurt, two brands Mother Dairy and Nestle were analysed. It showed that in all income groups, average consumption for Nestles probiotic yoghurt was more (0.25 kg/month) than that of Nestle's yoghurt. In case of probiotic ice-cream also, Amul was the single brand and which became India's first probiotic ice-cream launcher. In all income groups except income group I, average quantity of probiotic ice-cream consumed was 0.02 kg/month and 0.05 kg/month for income group I. For desserts consumption, there were two brands which provided desserts in various fruit flavours. The average quantity of consumption for Nestle desserts was more (0.03 kg/month) than that of Amul desserts. The consumption of newly launched products like probiotic ice-cream, probiotic lassi and desserts were more only in higher income group.

4.3.3 Consumer behaviour for conventional and functional dairy foods

In order to know more about the consumption pattern for functional dairy foods, it is of prime importance to know about the behaviour of consumers for both conventional and functional dairy foods. The study had analysed what were the purchase locations, reasons behind the consumption, consumers expected frequency of consumption etc. for both conventional and functional dairy foods. The reasons behind consumption of conventional dairy foods had showed that about 58.49 per cent of consumers were consuming conventional dairy foods due to health consideration, while 41.51 per cent of consumers were consuming as

their regular food habit. For the functional dairy foods consumed, the main reason behind the consumption was health benefits provided by functional dairy foods.

The figure 4.8 shows expected frequencies of purchase for conventional dairy foods. The conventional dairy foods were purchased by the consumers on daily basis (51 per cent) while functional dairy foods were largely purchased on monthly basis (61 per cent). For conventional dairy foods, following to daily as major purchase frequency, once a week (36 per cent), twice a week (12 per cent) and alternative days (1 per cent) were the respective expected purchase frequencies.

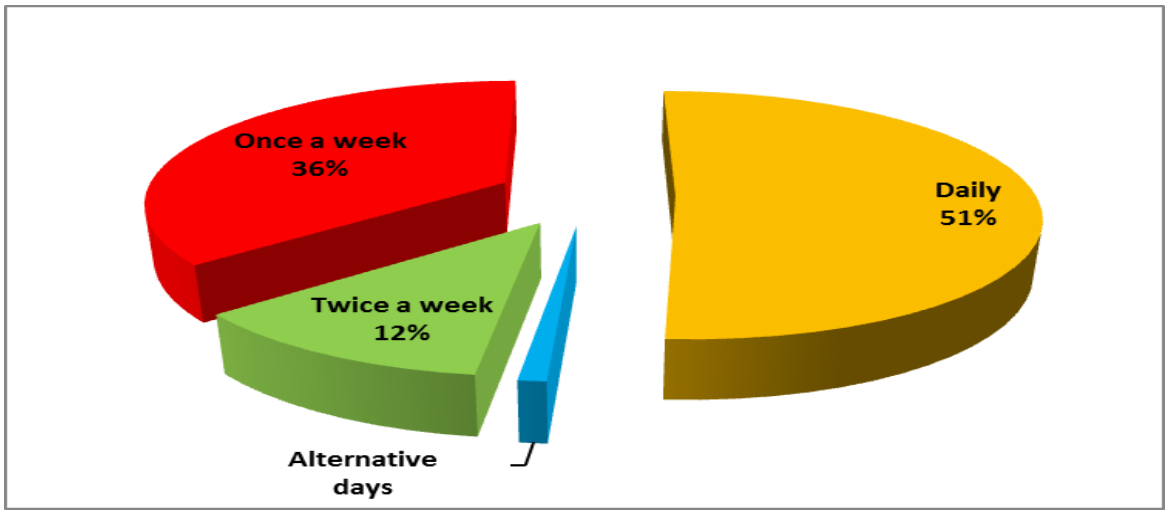


Fig. 4.8 Expected frequency of purchase for conventional dairy foods

The analysis of expected purchase frequencies for functional dairy foods would be helpful to assess the behaviour of consumer related to purchase of different functional dairy foods. For functional dairy foods, followed by monthly basis as major purchase frequency, twice a week (35 per cent), alternative days (3 per cent) and daily (1 per cent) are the respective purchase frequencies. The analysis for expected frequencies of purchase for functional dairy foods is presented in Figure. 4.9.

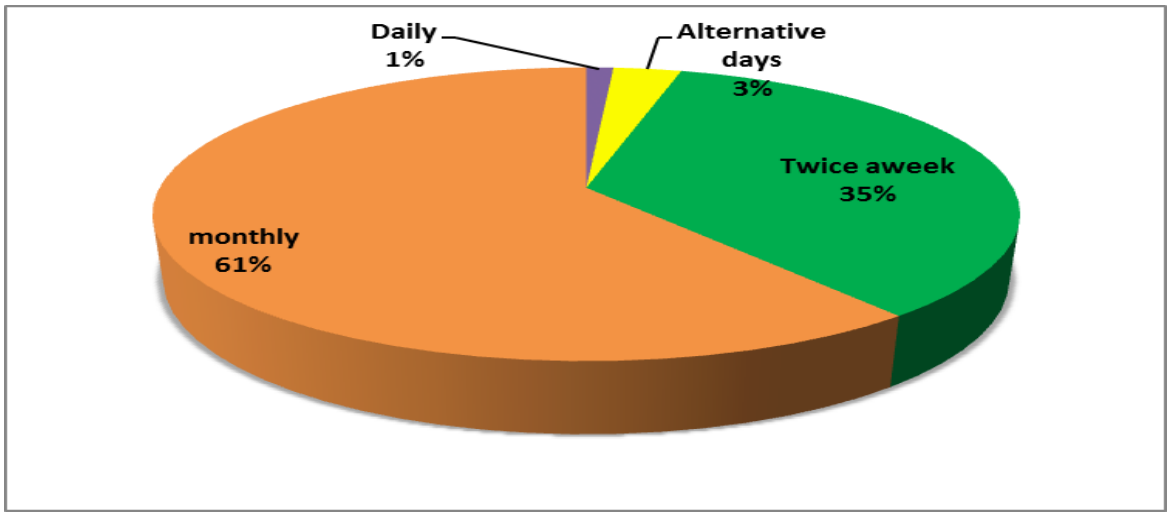


Fig. 4.9 Expected frequency of purchase for functional dairy foods

The analysis of purchase locations for both conventional and functional dairy foods was of prime importance to know which purchase locations were preferred by consumers. The purchase locations examination for conventional and functional dairy foods showed that supermarket was most preferred purchase location for both conventional and functional dairy foods.

Dairy products' shop (30 per cent) and milk venders (26 per cent) were the second and third ranked preferred purchase locations for conventional dairy food while Amul parlours (28 per cent) and retail shops (9 per cent) were the second and third ranked preferred purchase locations for functional dairy foods. The findings for conventional and functional dairy foods purchase locations are presented in the Figure 4.10, 4.11 respectively.

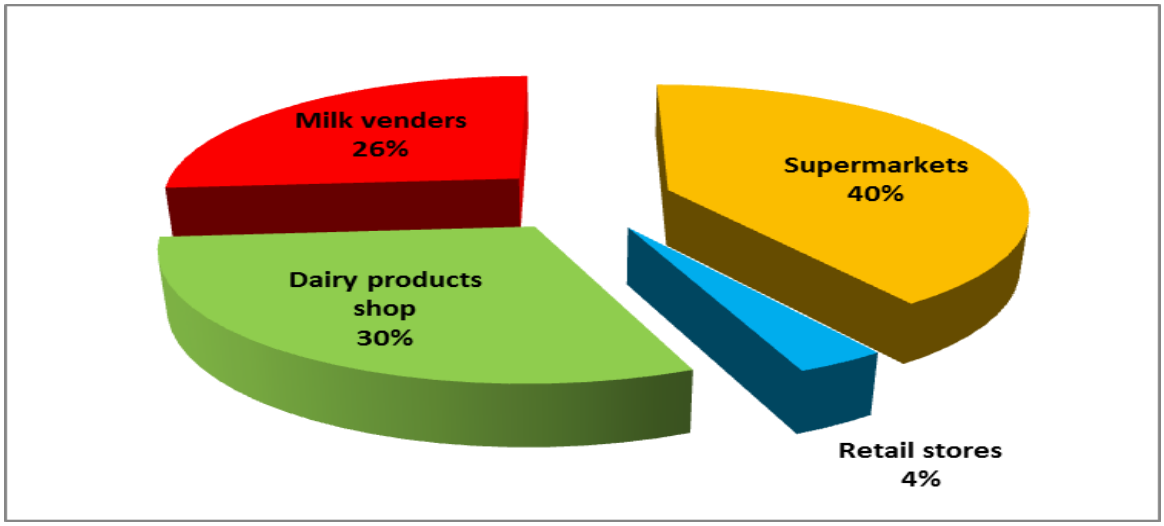


Fig. 4.10 Purchase locations for conventional dairy foods

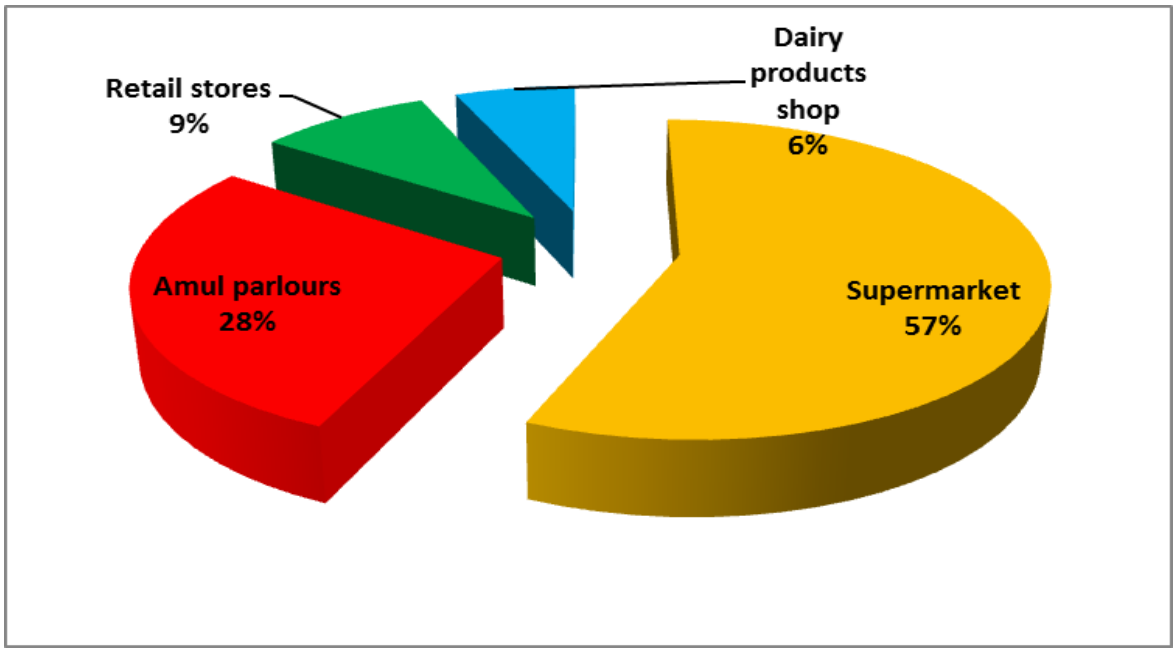


Fig. 4.11 Purchase locations for functional dairy foods

The decision about purchase of functional dairy foods varied from household to household. In the present study, the respondents consuming the functional dairy foods were asked for the decision making for purchase of functional dairy foods and it was reported that in many of cases (66 per cent) respondent itself was the decision maker for purchase of functional dairy foods while only 34 per cent of respondents said that other members of household were decision maker for purchase of functional dairy foods.

4.4 MAJOR DETERMINANTS FOR PURCHASE OF FUNCTIONAL DAIRY FOODS

The present study has also attempted to explain some of the factors which influence functional food consumption. In general, it is believed that income of household, age of head of household, education of head of household, occupation, education of head of household and dietary pattern of head of households affects consumption of fermented functional dairy foods. In the present study, the education, occupation and dietary pattern of head of households have been considered as dummy variables. Here, the monthly consumption expenditure of households (Y) on functional dairy foods was considered as dependent variable and the variables like income of household (x_1), age of head of households (x_2), education of head of households (D_1),

occupation of head of household (D_2) and Dietary pattern of head of household (D_3) were considered as independent variables. There was an assumption of linearity in the dependant and independent variables.

To carry out the functional analysis, different models were applied and multiple linear regression model was selected as best fitted model. The regression model can be represented as:

$$\mathbf{Y = a + b_1x_1 + b_2x_2 + b_3D_1 + b_4D_2 + b_5D_3 + u}$$

Where,

Y = Monthly consumption expenditure of households on functional dairy foods.

X_1 = Monthly income of household (in Rupees)

X_2 = Age of head of household (in years)

D_1 = Education of head of household as dummy variable (value 0 for below graduation and 1 for above graduation)

D_2 = Occupation of head of household as dummy variable (value 0 for business and 1 for service sector)

D_3 = Dietary pattern of head of household as dummy variable (value 0 for vegetarian and 1 for non-vegetarian)

The analysis by multiple regression indicates that the income of household has significant effect on consumption of functional dairy foods. A unit increase in household monthly income was causing an increase in household expenditure on functional dairy foods by 0.0023 Rupees (Table 4.10). Roy (2002), while studying the consumption pattern of milk and milk products among different income levels in some selected areas of Bangladesh, found that the milk and milk products consumption expenditure increased substantially with the increase of income in all the areas.

Table 4.10 Factors influencing the functional food consumption expenditure

Sr.no	Variables	Coefficients
1)	Intercept	180.374 (67.350)
2)	Monthly income of households (x_1)	0.00228** (0.00058)
3)	Age of head of household (x_2)	-0.70668 (1.231)
4)	Education of head of household (D_1)	-22.198 (15.454)
5)	Occupation of head of household (D_2)	-13.627 (19.197)
6)	Dietary pattern of head of household (D_3)	40.386 (20.750)
	R^2 value Sample size (n)	0.24 120

Note: **indicates level of significance at 1%
Figures in parentheses indicate standard error

Along with multiple regressions, we have also tried to analyse the consumption pattern by analysing each attribute (independent variable) separately. The average expenditure according to the selected attributes and coefficient of variation for each attribute are given in Table 4.11. The consumption expenditure is found to be low in the middle age group. Interestingly, the consumption of functional dairy foods was found to be higher in the non-vegetarian class of consumers. The expenditure increased marginally with improvement in education status. Das (2008) studied the consumption pattern of milk and milk products in North Tripura District of Tripura state and concluded that the educated people were found to spend more on milk and milk products.

Table 4.11 Influence of various consumers attributes on consumption of functional dairy foods

Attributes		Average monthly expenditure on functional dairy foods (Rs)	Co-efficient of variation
Age (Years)	26-35	282.23	29.48
	36-39	248.28	30.69
	51-59	280.45	4.06
Education	Below graduation	264.39	40.76
	Above graduation	272.22	34.23
Occupation	Service sector	273.61	33.60
	Business & other	261.87	41.69
Dietary pattern	Vegetarian	243.23	35.57
	Non-vegetarian	292.87	34.60

4.5 DETERMINING THE CONSUMER PREFERENCES FOR FERMENTED FUNCTIONAL DAIRY FOODS

The present study was conducted to analyse the consumer preferences for fermented functional dairy foods named probiotic drink and probiotic dahi. The analysis of consumer preferences was carried out by two ways –

1) By descriptive analysis of preferences given by consumers for particular functional dairy foods or for particular attributes of functional dairy foods.
2) Analysis by use of orthogonal designing technique.

In both of the techniques the respondent was asked to note the rank for particular products attributes. The lowest rating scale was 1 while the highest rating scale was 5.

4.5.1 Analysis of consumer preferences for different brands of probiotic drink and dahi

For such analysis, two brands of probiotic drink i.e. Yakult and Nutrifit were selected, while for dahi five renowned brands of dahi named Danone low fat dahi, Nestle actiplus dahi, Nesvita, Mother dairies b-active probiotic dahi and Danone fortified dahi were selected. After selection of brands, the consumers were asked to note their ranking for a particular product attribute. Totally for seven products attributes the consumers ranking were noted, analysed by descriptive analysis and the preferences of consumers for each brands was analysed.

4.5.1.1 Consumer preferences about price for probiotic drink and dahi

For Yakult, about 82 per cent of respondents noted that price for Yakult was reasonable while for Nutrifit, about 87 per cent of respondents said that Nutrifit had reasonable price. For the Danone fortified dahi, about 77 per cent of respondents said that Danone has reasonable price while 20 per cent of respondents think that Danone was having high price. For Nesvita, majority (80 per cent) of respondents noted that it has reasonable price. For Mother Dairy's b-active probiotic milk only 40 per cent of respondents had said that it was having reasonable price because 38 per cent of respondents have noted that b-active probiotic dahi has high price (Fig 4.13). Ares (2010) examined the effect of price, brand and health claims on consumer choice of functional over regular yoghurt for 103 consumers in Uruguay and found that adding a functional ingredient like fibre or antioxidants to the product increased the probability of consumers choosing functional yoghurt and consumers exhibited a stated willingness to purchase functional yoghurt over regular yoghurt even in the absence of health claims.

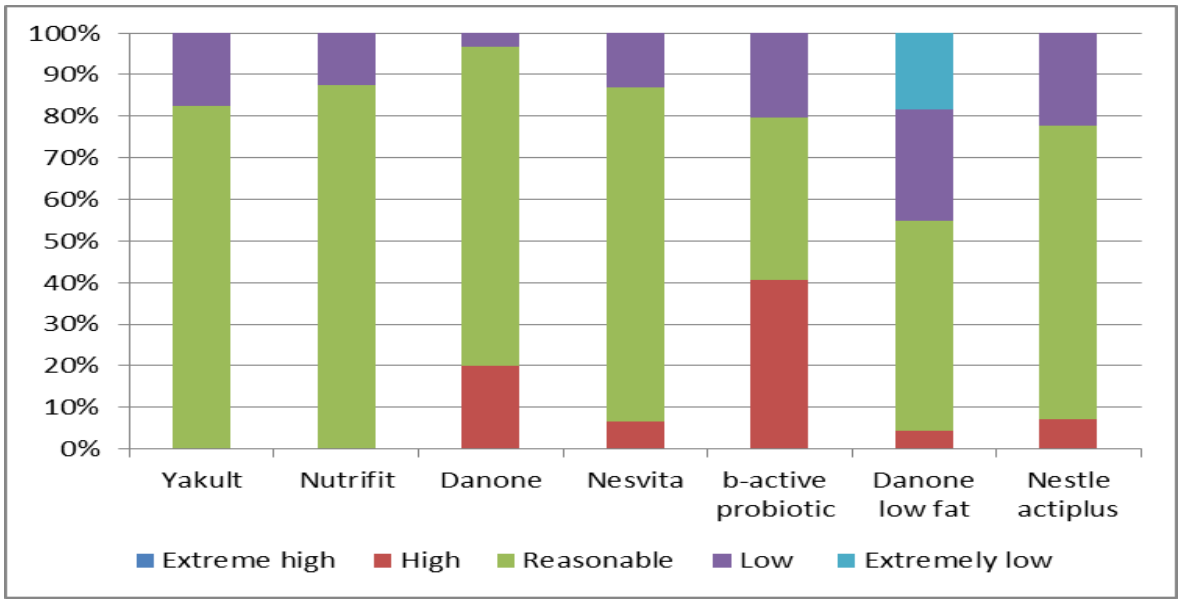


Fig. 4.12 Consumer preferences for price of probiotic drink and dahi

4.5.1.2 Consumer preferences about quantity for probiotic milk and dahi

For Yakult, the analysis of consumer preferences has showed that for about 72 per cent of respondents, Yakult gives high quantity of probiotic drink. It was found that many of them were consuming high quantity due to the lower price of Yakult and nutritive benefits provided by Yakult. For Nutrifit, many (55 per cent) of consumers responded that it has desirable quantity as compared to price of 10 Rupees. For Danone fortified dahi, according to 54.76 per cent consumers, Danone provided desirable quantity as compared to its price. For Nesvita, about 75 per cent of consumers said desirable quantity, it means Nesvita was more preferred than that of Danone low fat dahi, even though they have same nutritional benefits. For mother dairy product b-active probiotic dahi, there was mixed preference as 50 per cent of consumers said desirable quantity while among other, some of them said low quantity and some said high quantity. About 60 per cent consumers were satisfied with the quantity given by Nestle's newly launched Nestle actiplus dahi (Fig 4.14).

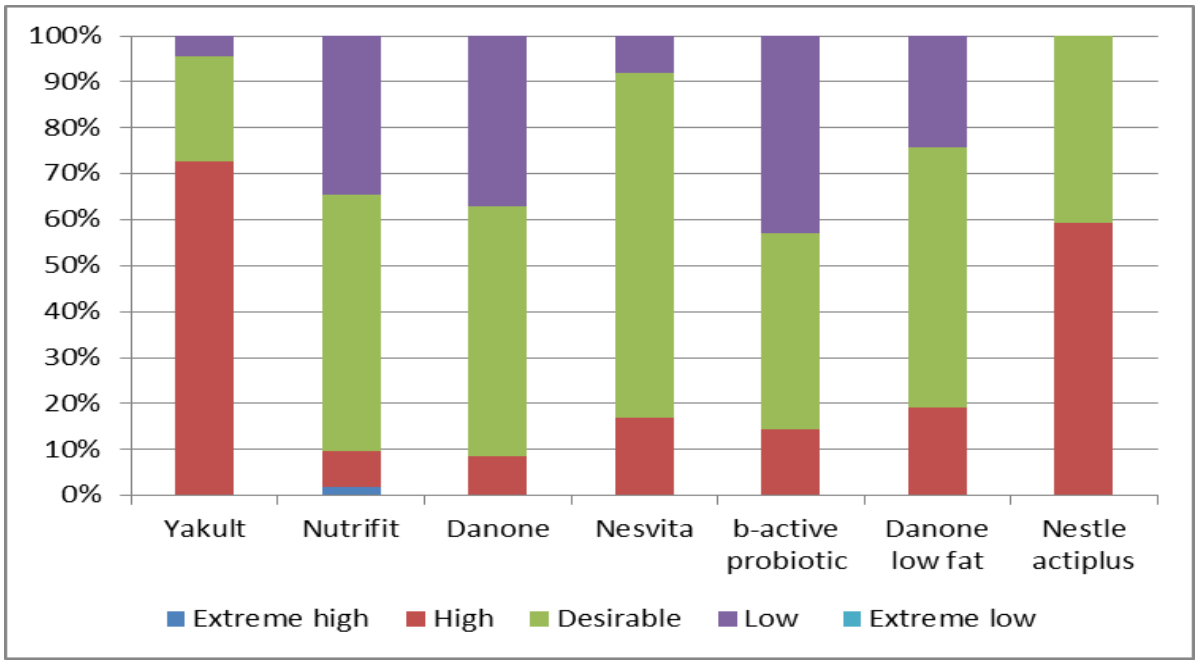


Fig. 4.13 Consumer preferences for quantity of probiotic drink and dahi

4.5.1.3 Consumer preferences about health claims of probiotic drink and dahi

The analysis of consumer preferences about the health claims of functional foods showed that health claims declared by Yakult was almost accepted by all of the consumers. For Nutrifit, 78 per cent of consumers have accepted health claims. It indicates that among probiotic drinks, Yakult health claims were more believed than that of Nutrifit. For Danone fortified dahi, it was found that 51 per cent of consumers unaccepted the declared health claims. Among the probiotic dahi named b-active probiotic dahi and Nestle actiplus, the health claims for b-active probiotic dahi was easily (70 per cent) accepted. Among the low fat dahi of Danone and Nestle actiplus, about 63 per cent of consumers accepted health claims of Nesvita, which indicates that among low fat dahi, Nesvita was more preferred in relation to health claims declared by producers (Fig 4.14). Hailu (2009) using Mall intercept survey, over 200 Canadian consumers, examined preferences for probiotics using conjoint analysis and found that the value placed on the health claim source is the strongest for ‘‘Pill lovers’’ and weakest for ‘‘Pill loathers’’.

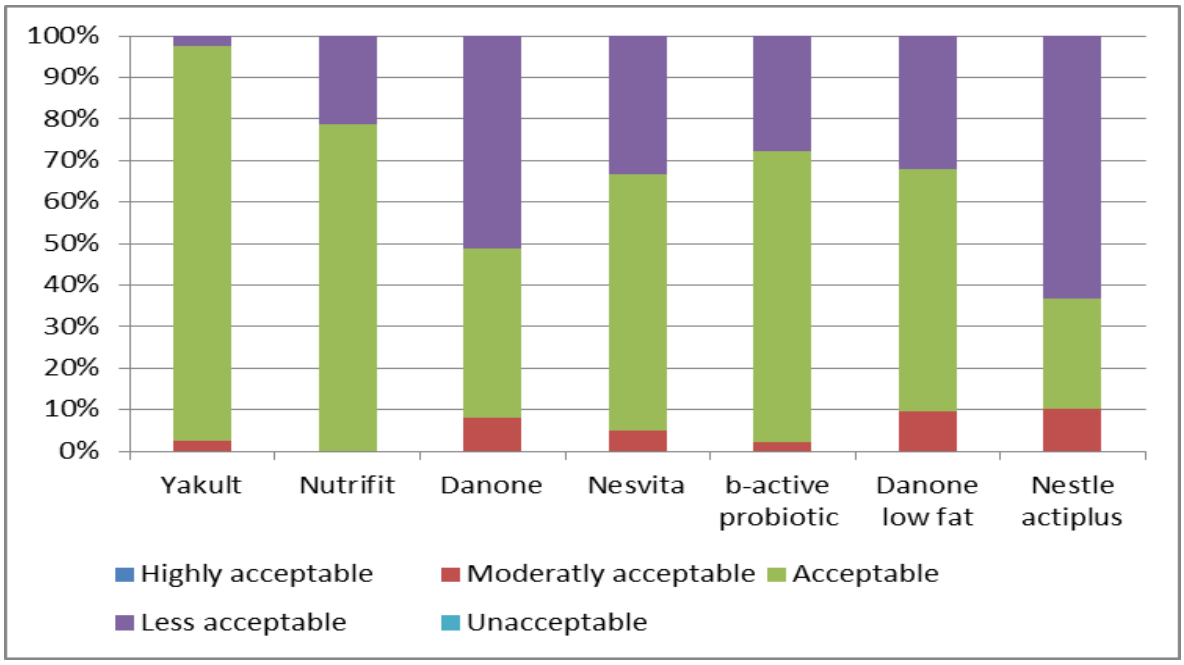


Fig. 4.14 Consumer preferences about health claims of probiotic drink

4.5.1.4 Consumers preferences about availability of probiotic drink and dahi

The analysis has shown that among the probiotic drink, Yakult was most regularly and easily available brand. For Yakult, only 2 per cent has said that Yakult was not available while for Nutrifit about 13 per cent said it was not available and 16% were saying Nutrifit was available very rarely. Danone fortified dahi was easily available since only 3 per cent of consumers were saying Danone fortified dahi was not available. Among the probiotic dahi, Mother Dairies b-active probiotic dahi had regular availability. For low fat dahi, Nesvita was more easily & regularly available than Danone low fat dahi (Fig 4.15).

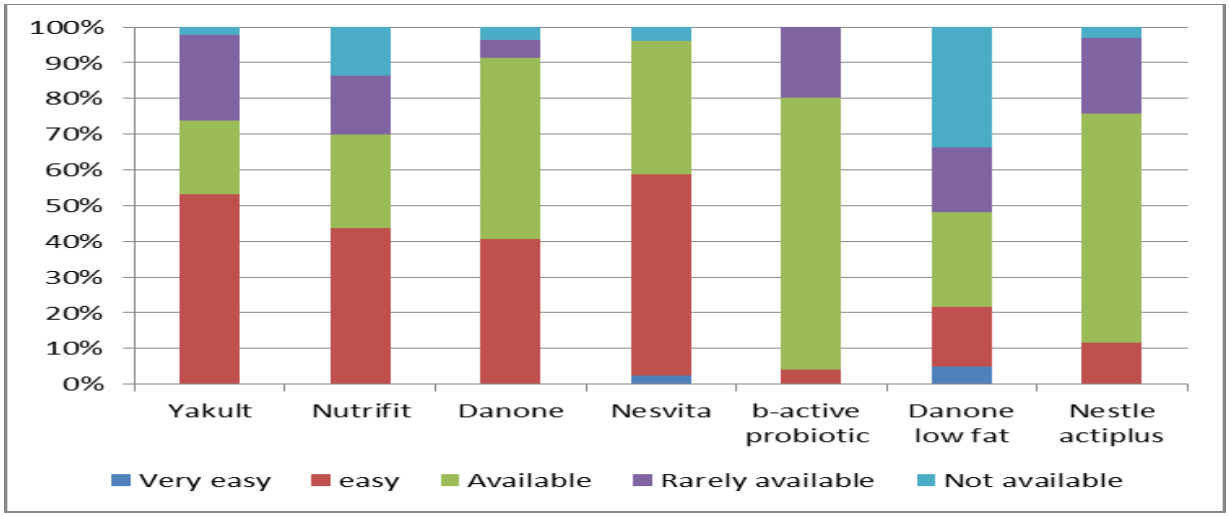


Fig. 4.15 Consumer preferences about availability of functional dairy foods

4.5.1.5 Consumer preferences for shelf life of probiotic drink and dahi

The examination of consumer preferences have showed that among the probiotic drinks, the Nutrifit had low perishability than that of Yakult, it means for better shelf life of Yakult cold chain has to maintain. Majority (59 per cent) of consumers said that Danone fortified dahi was less perishable. Among the probiotic dahi, the Nestle's Actiplus had low perishability than that of b-active probiotic dahi while, among low fat dahi, Danone low fat dahi was found to be highly perishable than Nesvita (Fig 4.16).

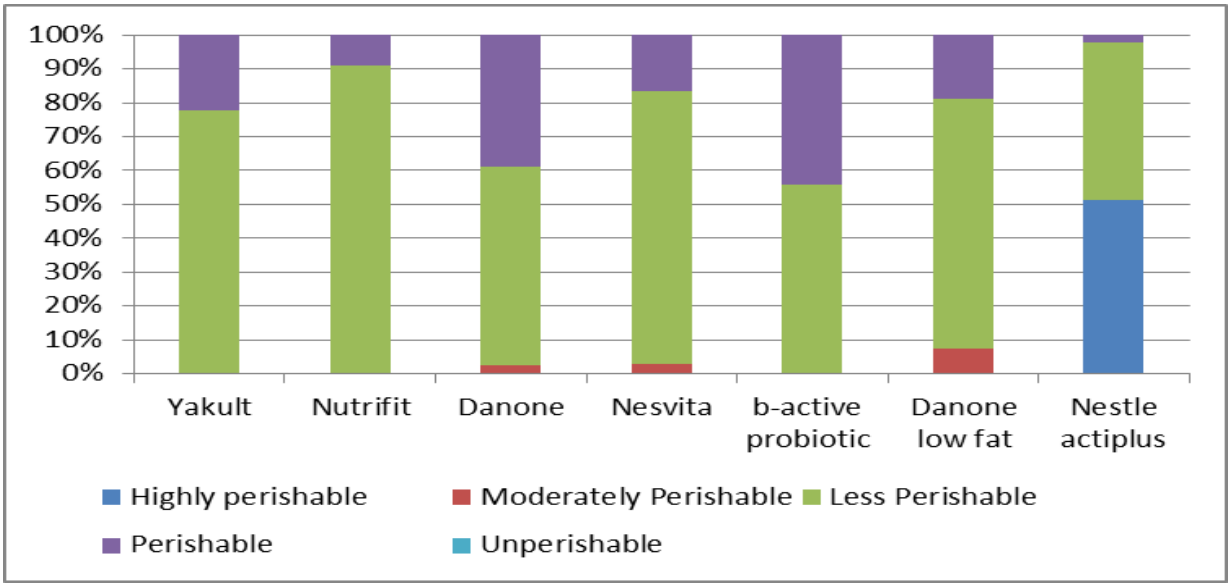


Fig. 4.16 Consumer preferences for shelf life of probiotic drink and dahi

4.5.1.6 Consumer preferences for packaging and labelling for probiotic drink and dahi:

The analysis of consumer preferences for packaging and labelling of functional dairy foods named probiotic drink, probiotic dahi was carried out and it was found that among probiotic drinks the Nutrifit had attractive packaging and labelling than that of Yakult. For Danone fortified dahi, mixed response of 50-50 percent was reported. Among the probiotic dahi, b-active probiotic dahi had attractive packaging and labelling than that of Nestle actiplus dahi. For low fat dahi, Nesvita was having attractive packaging than that of Danone low fat dahi (Fig 4.17).

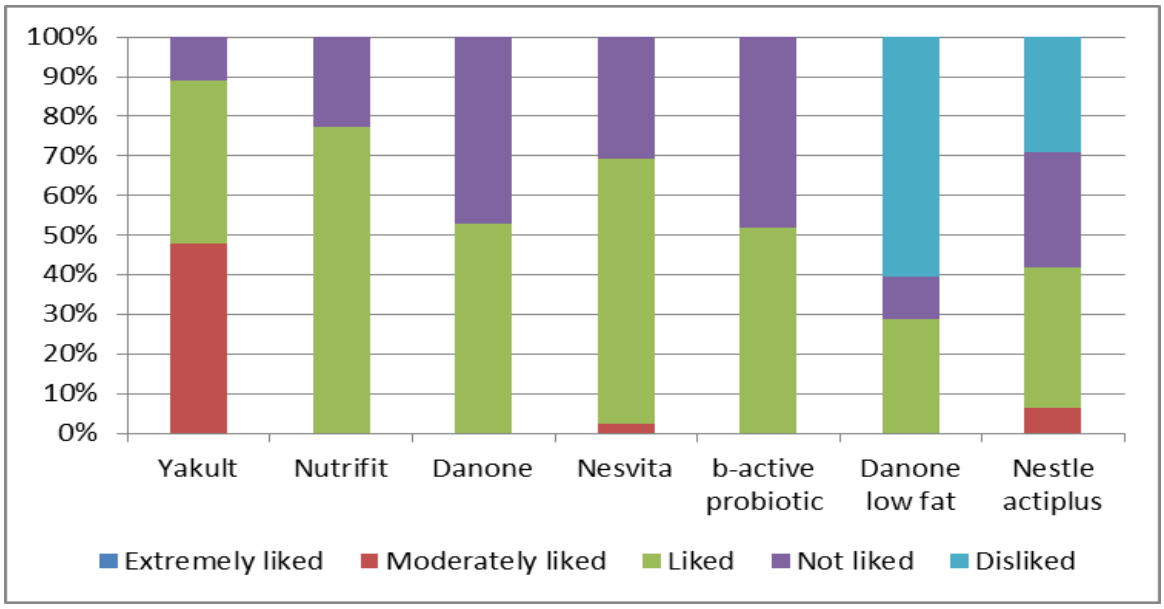


Fig. 4.17 Consumer preferences for packaging and labelling for probiotic drink and dahi

4.5.1.7 Consumer preferences for taste and preference for probiotic drink and dahi:

The analysis of consumer preferences for taste has shown that among the probiotic drinks, Nutrifit has more preferable taste than that of Yakult and for fortified dahi, Danone fortified dahi did not preferable in terms of taste. Among the probiotic dahi, the Nestle probiotic dahi had more preferable taste than that of b-active probiotic dahi. Among the low fat dahi, both of the dahi was having more over same response about taste. It was found that Nesvita taste was preferred by 57.77 per cent of consumers while Danone low fat dahi was preferred by 57.40 per cent which was highly nearer to value for Nesvita. (Figure 4.18)

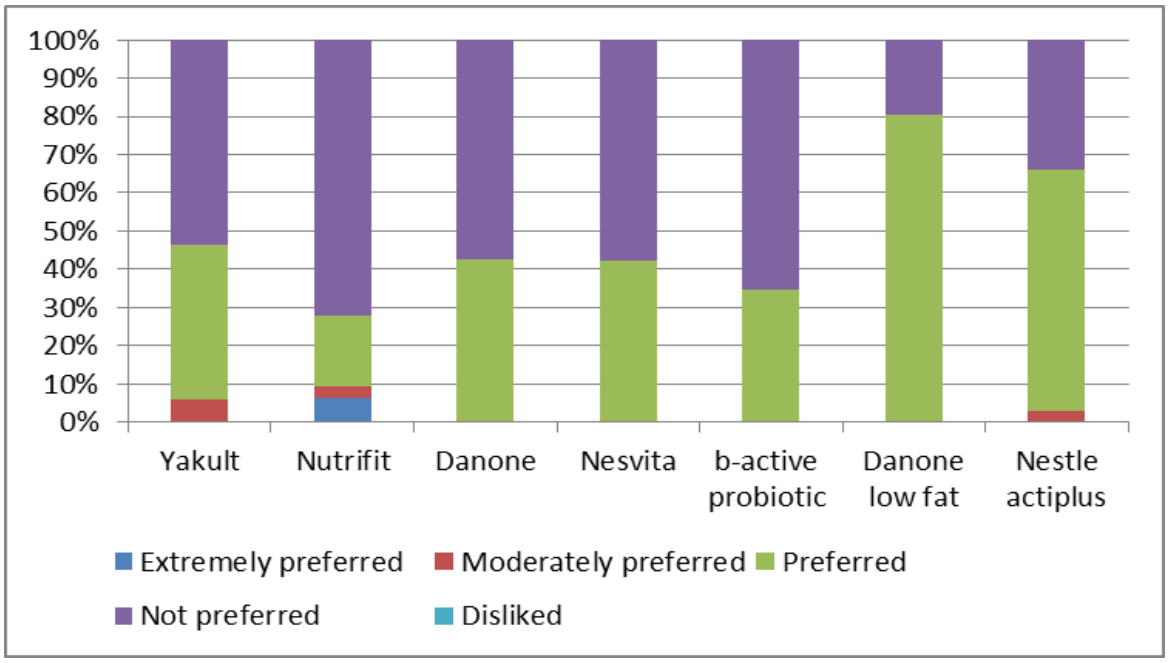


Fig. 4.18 Consumer preferences for taste and preferences of probiotic drink and dahi

4.5.2 Analysis of consumer preferences for different products attributes combinations

In this section, the consumer preferences were noted down for various combinations of products profile. The product profile for probiotic drink and dahi was prepared based on the attribute levels that were selected for preparation product profile preparation as shown in Table 4.12. The combinations of products profile were prepared by using orthogonal design in SPSS software. After selecting the levels through SPSS software, we followed the orthogonal design preparation technique in which we got 16 different combinations of products for probiotic drink while 64 combinations were obtained for dahi. Among above all combinations, appropriate 8 combinations for probiotic drink and 10 for dahi were selected and for each product combination the consumers rating was noted down. The lowest rating scale was 1 for strongly disagreed while highest rating scale was 5 for strongly agreed. The consumer's average rating for probiotic milk and dahi was analysed for all three income groups and presented in Table 4.13 and 4.14 respectively.

Table 4.12 Selection of attributes and their levels for probiotic drink and dahi

Attributes	Fermented milk	Dahi/Yoghurt
Brand	Yakult probiotic drink	Danone fortified dahi Danone low fat dahi Nesvita Nestle actiplus b-active probiotic dahi
	Nutrifit	
Price(Rs)& Quantity	10-65ml	27-400mg 50-400mg
	10-80ml	26-200mg 27-200mg
		38-400mg
Packaging & labeling	Single plastic bottle	
	Pack of 5 bottles	
Health & nutritional claims	No preservatives	Improves digestion Boosts immunity Low fat content
	Boosts immunity	
Purchase location	Supermarket Amul parlor Other retailer shops	Supermarket Amul parlor Other retailer shops

4.13 Consumer preferences for fermented milk attributes for different income groups:

Fermented milk attributes	**Income group I**	**Income group II**	**Income group III**	**Overall**
Nutrifi @Rs.10 in 80ml package in single plastic bottle, daily immune booster, available in other retail store	3.41	3.46	3.58	3.47
Yakult @Rs.10 in 65ml package in single plastic bottle, no preservatives and available in other retail stores	3.19	3.31	3.33	3.28
Nutrifit @Rs.10 in 80ml package in single plastic bottle, daily immune booster and available in supermarket	3.47	3.8	3.79	3.7
Yakult @Rs.10 in 65ml package in single plastic bottle, no preservatives and available in supermarket	3.25	3.7	3.66	3.55
Yakult @Rs.10 in 100ml package in packet of 5 bottles, no preservatives and available in supermarket	3.97	4.28	4.70	4.27
Yakult @Rs.10 in 65ml package in packet of 5 bottles, daily immune booster and available in other retail stores	3.02	3.26	3.29	3.2
Yakult @Rs.10 in 65ml package in packet of 5 bottles, daily immune booster and available in supermarket	3.19	3.48	3.58	3.41
Nutrifit @Rs.10 in 65ml package with packet of 5 bottles, daily immune booster and available in supermarket	3.19	3.48	3.58	3.41

Table no 4.14 Consumer preferences for dahi attributes for different income groups:

Dahi attributes	Income group I	Income group II	Income group III	Overall
Danone fortified dahi @Rs.39 in 400gm package, boosts immunity and available in supermarket	2.33	2.41	2.70	2.46
B-active dahi @Rs.26 in 200gm package, improves digestion and available in supermarket	2.80	3.13	3.12	3.07
Danone fortified dahi @Rs.20 in 400gm package, improves digestion and available in supermarket	3.36	3.86	4.16	3.9
Danone fortified dahi @Rs.50 in 200gm package, improves digestion and available in amul parlours	1.30	1.48	1.58	1.45
Nestle actiplus @Rs.27 in 400gm package, have low fat content and available in supermarket	3.19	3.58	3.70	3.58
Danone low fat dahi @Rs.50 in 200gm package, have low fat content and available in other retail stores	1.33	1.28	1.79	1.4
Danone low fat dahi @Rs.20 in 400gm package, have low fat content and available in Amul parlours	3.05	3.26	3.45	3.35
Nestle actiplus @Rs.26 in 200gm package, have low fat content and available in Amul parlours	2.55	3.03	2.91	2.95
Nesvita @Rs.26 in 200gm package, have low fat content and available in Amul parlours	2.69	3.13	3.87	3.02
Nesvita @Rs.27 in 400gm package, has low fat content and available in other retail stores	3.36	3.7	3.87	3.7

The consumer preferences for various product profiles of probiotic drink and dahi was analysed and results are presented in Table 4.13 and 4.14. The

results for probiotic drink attributes showed that among all attribute combinations, the attribute combination of (Yakult @Rs.10 in 100ml package with packet of 5 bottles which has no preservatives and available in super market) was the most preferred combination. It was found that among probiotic drinks, Yakult was more preferred if Yakult is available with increased quantity from supermarkets. The lowest preferred attribute of probiotic drink was (Yakult @Rs.10 in 65ml package with packet of 5 bottles which is daily immune booster and available in other retail stores). In consumer preferences, it was found that 90% of consumers had accepted the health claims for Yakult and retail stores were the least purchase location for functional dairy foods. The drink attributes combinations (Nutrifit @Rs.10 in 80ml package in single plastic bottle which is daily immune booster and available in other retail stores) and other milk attribute combination (Nutrifit @Rs.10 in 80ml package in single plastic bottle which is daily immune booster and available in supermarket), the attributes were same, the only difference was found in purchase location. It was found that rating for the attribute was higher for higher income groups of consumers means consumers of higher income were rating more for attributes only due to purchase location was supermarket. For dahi, the most preferred combination was (Danone fortified dahi @Rs.20 in 400gm package which improves digestion and available in supermarket).

CHAPTER – 5

SUMMARY AND CONCLUSION

5. Summary & Conclusions

The changing dietary pattern, increase in per capita availability of milk, rapidly growing middle class and increasing awareness among Indian consumers provide tremendous opportunities in Indian functional dairy foods market. The fermented dairy foods have played an important role in the human diet since time immemorial and are considered as natural functional foods because of wide array of novel therapeutic components contained by these and they have a long history of their well-established health benefits. Changing dietary pattern & increasing health consciousness among Indian consumers have changed view of consumers for conventional dairy products, in that increasing middle class population & urbanisation boosts up the favourable environment for expanding of functional foods sector in India as well as in Maharashtra.

Functional dairy foods provide a very good opportunity to expand nutraceutical market and research. As studies on consumption and consumer behavior for functional dairy foods are practically non-existent in India, therefore this study is being conducted to understand consumption pattern and consumer preferences for fermented functional dairy foods in metropolitan cities of Maharashtra with the following objectives:

1. **To analyse the consumption pattern and consumer behavior for fermented functional dairy foods**
2. **To identify the major determinants of consumption of fermented functional dairy foods**
3. **To determine consumer preferences for fermented functional dairy foods**

The study was based on data collected from 120 consumers of Mumbai and Pune cities of Maharashtra, the consumers were selected from supermarket, Amul parlours and retail dairy products shops. The major findings of the study are summarised below:

The consumers were classified into three income groups by using cumulative square root frequency method. The average stay of duration of

consumer households was found to be 19.5 years, having household income Rs. 61,158 per month with the average family size of 5. Being the metropolitan cities, majority of households were nuclear (91.66 per cent) families. The average size of households was found to be 5, consisting of 2.7 adults and 2.3 children.

The dietary pattern of member households varied with the age and sex of member households. On average, 54.16 per cent of adult males are non-vegetarian and 45.83 per cent of them are vegetarian while 74.16 per cent of adult females are vegetarian and 35.83 per cent of them were non-vegetarian. It was found that, irrespective of income groups, the vegetarian foods were more preferred by females.

The average age of head of household was found to be 45.46 years and majority (83.33 per cent) of head of households were males. Nearly 2.25 per cent of head of household had education of SSC (10^{th}), 18.33 per cent had HSC (12^{th}) and majority of head of households (about 79.16 per cent) was educated above graduation level. The 58.33 per cent of head of households was service class having jobs while 41.66 per cent was having business and other occupations.

It was found that on an average the consumption expenditure on food items was 39.45 per cent while consumption expenditure on non-food items was found to be 60.54 per cent. It was found that among the total consumers about 83.03 per cent of consumers knew about functional dairy foods while 16.93 per cent were not aware about the functional foods. The consumers were consuming the functional dairy foods due to health benefits provided by functional dairy foods. The major source of information (31 per cent) for functional foods was the television advertisements, followed by staff of supermarket (25 per cent). The other sources for information about functional foods were the friends contributing 25 per cent share while staff of company contributes 14 per cent. The Yakult Lady System started by Yakult-Danone Pvt Ltd. led a strong impact on providing information relating to Yakult probiotic drink. Banner advertisement and newspaper were contributing 4 per cent and 1 per cent respectively.

The analysis had shown that about 95.83 per cent of households use to consume the dairy foods regularly in their routine diet while only 4.17 per cent were not the regular consumer for dairy foods. For functional foods, it was found that among the total consumers, 87.6 per cent of households were consuming

the functional dairy foods. Among the total functional food consumers, it was found that about 76.88 per cent of consumers of functional dairy foods were consuming functional dairy foods for less than one year while 23.62 per cent of consumers were consuming functional dairy foods for more than one year. It was found that the share of expenditure on functional dairy foods increased with rise in the income level of consumers. It was found that on average each household spent about 11.59 per cent on functional dairy foods.

Milk and milk products gain more importance in consumption with increase in income; the same was also evident through the study. The analysis shows that among the dairy products, milk was the product consumed in highest quantity than any other conventional dairy product. Highest quantity (31.75 kg/month) of milk was consumed in income group III while lowest quantity (23.44 kg/month) of milk was consumed in income group I. The income group II consumes about (27.26 kg/month) quantity of milk which nearly equal to average consumption of (27.01 kg/month).

The quantity of paneer consumed by household shows that, it was consumed in highest quantity (0.34 kg/month) in income group III while consumed in lowest quantity (0.27 kg/month) in income group II. Ice-cream consumption was highest (0.82 kg/month) among households of income group III, the reason may be due to more number of children in the household.

On an average, the highest (43 per cent) expenditure among functional foods was on probiotic drinks, followed by desserts (17 per cent). Per cent consumption expenditure on probiotic yoghurt was found to be 12 per cent and for probiotic lassi, it was 2 per cent which is lowest consumption expenditure among all functional dairy foods. The per cent expenditure on both type of dahi low fat and fortified fat was 9 per cent each.

In all income groups, probiotic drink was the highest food expenditure items contributing 39 per cent, 45 per cent and 41 per cent respectively. Followed by probiotic drink, the desserts are the second major expenditure foods item among all functional dairy foods.

Among the probiotic drink, the Yakult was the most preferred brand irrespective of the income of households. The average consumption of Yakult

was far more than Nutifit which was another probiotic drink. With increase in income of households, the consumption of Yakult increased. In case of fortified dahi consumption, total three brands were found to be consumed. The average consumption of Danone and Nestle's fortified dahi was found to be 0.36 kg/month for both of the brands. Among all the brands, Danone fortified dahi was consumed in highest quantity of 0.38 kg/month while Nestle's fortified dahi was consumed in lowest quantity of 0.2 kg/month.

For the low fat dahi, total five brands were analysed and it was found that average quantity of low fat dahi consumption was highest (0.32 kg/month) for Amul brand and lowest quantity was consumed of brand Danone low fat dahi. The reason behind it may be that among all probiotic low fat dahi, the Danone low fat dahi was having highest price. The average quantity of Danone and Nestle low fat dahi was consumed about 0.3 Kg/month. Britannia low fat dahi was consumed with the average quantity of 0.24 kg/month while Mother Dairy's b-active probiotic dahi was consumed with an average of 0.30 kg/month.

About 58.49 per cent of consumers were consuming conventional dairy foods due to health consideration while 41.51 per cent of consumers were consuming conventional dairy foods as their regular foods habit. For the functional dairy foods consumption, the reason behind consumption was the health benefits provided by them.

The conventional dairy foods were highly (51 per cent) purchased by the consumers on daily basis while functional dairy foods were purchase highly (61 per cent) on monthly basis. For conventional dairy foods, following to daily as major contributor, once a week (36 per cent), twice a week (12 per cent) and alternative days (1 per cent) were the respective purchase frequencies. It means for conventional dairy foods almost 51 per cent respondents would like to purchase them on daily basis.

For functional dairy foods, the monthly basis (61 per cent) as major, twice a week (35 per cent), alternative days (3 per cent) and daily (1 per cent) are the respective purchase frequencies. The purchase locations analysis for conventional foods shows that the supermarket was the first preferred (40 per cent) purchase location, followed by dairy products shop as second most preferred purchase location. About 28 per cent of consumers were preferring milk

venders as their choice of purchase while only 4 per cent of consumers preferred retail stores as their purchase location. In case of functional dairy foods, again supermarket was the first (57 per cent) preferred choice of purchase, followed by Amul parlours (28 per cent), and retail stores contributes (9 per cent). Dairy product shops were preferred by 6 per cent consumers.

The analysis of multiple regression indicates that the income of household has significant effect on consumption of functional dairy foods. A unit increase in household monthly income resulted in increase of household expenditure on functional dairy foods by 0.0023 units.

For Yakult, about 82 per cent of respondents had opined that the price for Yakult was reasonable while for Nutrifit, about 87 per cent of respondents have said that the Nutrifit was having reasonable price. About 72 per cent of respondents reported that Yakult gives high quantity of probiotic drink.

Health claims declared by Yakult was almost accepted by all of the consumers. For Nutrifit also, the 78 per cent of consumers have accepted health claims declared by Nutrifit. It means among probiotic drinks, Yakult health claims were more preferred than that of Nutrifit. For Danone fortified dahi, 51 per cent of consumers did not accept the health claims declared for Danone foritified dahi. Among the probiotic dahi of Mother dairy and Nestles probiotic dahi named Nestle actiplus, the health claims declared by mother dairy were easily accepted.

Majority (59 per cent) of consumers has said that Danone fortified dahi were less perishable. Among the probiotic dahi, the Nestles actiplus has low perishability than that of b-active probiotic dahi. Among low fat dahi, Danone low fat dahi was found to be highly perishable than Nesvita.

The analysis of consumer preferences for packaging and labelling of functional dairy foods like probiotic drink, probiotic dahi was carried out and it was found that among probiotic drinks the Nutrifit has attractive packaging and labelling than that of Yakult. For Danone fortified dahi, mixed response of 50-50 percent was found. Among the probiotic dahi, b-active probiotic dahi has attractive packaging and labelling than that of Nestle actiplus dahi. For low fat dahi, Nesvita was having attractive packaging than that of Danone low fat dahi. The analysis of consumer preferences for taste has shown that among the

probiotic drinks, taste of Nutrift was more preferred than that of Yakult. Danone fortified dahi has less preferable taste. Among the probiotic dahi, the Nestle probiotic dahi was more preferred in taste than that of b-active probiotic dahi.

The analysis of consumer preference noted for different product profile of dahi and probiotic drink was found that purchase locations play an important role in consumer preferences. Among all possible combinations of probiotic drink the combination Yakult-Rs.10-100ml-pack of five bottles-no preservatives-supermarket was the most preferred combination because in same price consumer was getting more quantity of Yakult along with most preferred purchase location that is super market.

Currently, the consumers are spending about 11.59 per cent of total expenditure on dairy products, there exists lot of scope to increase the consumption of functional dairy foods since the income is increasing overtime. With changing lifestyles and increasing health awareness, the demand for functional dairy foods is expected to go up further. The manufacturers may focus on right kind of marketing strategies including product, price, distribution and promotion, the specific dimensions have been reflected in second and third sections of Results & Discussion Chapter. In order to expand the market of functional dairy foods in India, the producers may focus more on promotion through advertisement in televisions since television was most important source of information to consumers of functional dairy foods. The brands providing offers and discounts are purchased by consumers of all income groups, the specific strategies may be planned accordingly. The direct marketing strategy adopted by Yakult will be helpful to increase awareness about functional dairy foods among Indian consumers.

BIBLIOGRAPHY

BIBLIOGRAPHY

Alzamora, S. M., Salvatori, D., Tapia, S. M., Lo´ pez-Malo, A., Welti-Chanes, J., & Fito, P. (2005). Novel functional foods from vegetable matrices impregnated with biologically active compounds. *Journal of Food Engineering,* **67**: 205–214.

Ares, G., Gimenes, A. and Deliza R. (2010). Influence of three non-sensory factors on consumer choice of functional yoghurt over regular ones. *Food and Quality Preference, 21***(4):** 361-367.

Arnoult, M. H., Lobb, A. E., Chambers, S. A., Traill W. B. and Tiffin R. (2007). Consumers' willingness to pay for functional agricultural foods. The University of Reading, Project Document No. 09, Work Package No. 2, Report No. 5.

Batra, S. (1990). Operation Flood: Impact on the Delhi market. Resources, institutions and Strategies, Operation Flood and Indian Dairying. 356-383.

Bech-Larson, T. and Grunert K.G. (2003). The perceived healthiness of functional foods: A conjoint study of Danish, Finnish and American consumer's perception of functional food. *Appetite*, **(40):** 9-14.

Bidwe, K. U., Chavan, S.D. and Wankhade S. A. (2007). Consumer's preference for different milks. *J. Dairying, Foods & H.S.,* **28**(1): 67-69.

Birthal, P. S. (1996). Nutrient consumption pattern in rural areas of Western Uttar Pradesh. *Agril.Econ. Res.Rev*., **9** (2): 175-188.

Carlos, P. B., Anette, C., Schulze, B. and Spiller A. (2005). Assessing determinants of organic food consumption using data from the German National Nutrition Survey II. *Food Quality and Preference*, (**28)**: 60-70.

Carola, G., Yue, C., Bruhn, M. and Jenson H. H. (2004). Milk marketing: Impact of perceived quality on consumption patterns. Paper prepared for presentation

at the 105th EAAE seminar *"International marketing and international trade of quality food products", Bologna, Italy,* March 8-10, 2007.

Cooner, M. T. and Booth D. A. (1988). Preferred sweetness of a like drink and preference for sweet over non sweet foods related to sex and reported age and body weight. *Appetite,* **10**(1): 25-35.

Das, G. and Verma, N. K. (2008). Consumption pattern of milk and milk products in North Tripura District (Tripura), *J. Dairying, foods and H.S,* **30** (4):230-238.

D, Ashok and Srivastava A. P. (2010). Product innovation and its influence on consumer purchasing pattern – A study on packaged dairy products in Bettiah (West Champaran, Bihar). *IOSR Journal of Business and Management,* **1**(1): 22-28.

Directorate of Economics and Statistics, Planning Department, *Maharashtra state Economic Survey*, GOM, 2012.

Gandhi, D. N. and Rao, S. M. (1989). Dahi and acidophilus milk. *Indian Dairyman*, **41**(10): 521-525.

Ganguly, A. (1960). Consumption pattern of different occupational groups. Studies on consumer behaviour, *Indian Statistical Series No. 6*, Asia Publishing House, Bombay and Statistical Publishing Society, Calcutta: 1-8.

Gupta, S.B.L. (1963). Pattern of food consumption among agricultural population in Budaun (U.P.). *Ind. J. Agri. Econ*. **18**(1): 81-88.

Hailu, G., Boecker A., Henson S., and Cranfield J. (2009). Consumer valuation of functional foods and nutraceuticals in Canada: A conjoint study using probiotics. *Appetite,* **(52):** 257-265.

Hanna, S., Matthias S., Meike, J. and Ulrich, H. (2007). Preferences and determinants for organic, conventional and conventional plus products-The case of occasional organic consumers. *Food Quality and Preference,* **(22):** 772-779.

Henson, S., Cranfield, J. and Herath D. (2010). Understanding of consumer receptivity towards foods and non-prescription pills. *International Journal of Consumer studies,* **34**(1): 28-37.

Herath, D., Cranfield, J. and Henson S. (2008). Who consumes functional foods and nutraceuticals in Canada? Results of cluster analysis of the 2006 survey of Canadian demand for food supporting health and wellness. *Appetite,* **51**:256-265.

Jain, D.K. (1998). Demand analysis of milk and milk products in India. A research study under DES&M Division, NDRI, Karnal (Haryana) – India.

Jain, D.K. and Patel, R.K. (1984). Consumption pattern of milk and milk products in different income groups in Haryana*. Indian Dairyman*, **36**(7): 64.

Jain, D. K. and Patel R. K. (1996). Consumption pattern of food and non-food items in Haryana state. *Indian Journal of Dairy Science*, **45**(4): 171-177.

Jain, L. R. and Tendulkar, S. D. (1973). Analysis of occupational differences in consumer expenditure pattern in India. *Sankhya Series* B, 35, Part2: 239-267.

Kaur, H. and Gupta, J. N. (1996). Consumption expenditure on milk and milk products on food and non-food items in Chandigarh, *Journal of Dairying, foods and H. S* **15**(1): 45-52.

Kumar, K., Ambarish, Jordan, B. B. and Barker, T. A. (1987). Made in India, what is means to Indian consumers? *Indian Journal of Marketing,* **17**(9): 26-34.

Mark-Herbert, C. (2004). Innovation of a new product category - Functional foods. *Technovation*, **24**: 713–719.

Ministry of Statistics and Programme Implementation, NSSO. *Indian consumer survey*, 2010.

Ministry of Home affairs, GOI. *Indian Census,* 2011.

Ministry of Animal Husbandry, Dairy Development, Fisheries Department, *Dairy Development Department,* GOM.

Mehta, B. C. and Gupta, P. R. (1976). Changing consumption pattern in Rajasthan. *The Economic Times,* August 26, 1976.

MRCI. (1973). A report on the market for milk and milk products in Madras city for the Tamil Nadu Dairy Development Cooperation of India Ltd., New Delhi.

Nair, K. R. and Vaidyanathan, A. (1978). Inter-state differences in milk consumption in India-A preliminary analysis, Working Paper No. 62, Centre of Development Studies, Trivandrum, Feb. 78.

Niva, M. (2007). 'All foods affect health': Understandings of functional foods and healthy eating among health-oriented Finns. *Appetite,* **48**: 384–393.

Parry, S. P. and Childress, R. A. (1966). Attitudinal changes towards milk by students at different grade levels. *Milk Dir.,***56**: 34-36.

Patel, R.K., Kumar, P. and Khera, J.K. (1974). A study of consumption pattern of milk and milk products. XIX International Dairy Congress, New Delhi, India, 852-853.

Pathak, M. and Goswami, P. C. (1989). A study on food consumption pattern in rural areas of Assam. *Indian Journal of Nutrition and Dietetics*, **26**(11): 315-320.

Prabhaharan, R. (1978). Consumption pattern, consumer awareness and preferences of milk and milk products in Madras city, unpublished M.Sc. thesis, Kurukshetra University, Kurukshetra.

Peng, Y., West G. E. and Wang C. (2006). Consumer attitude and acceptance of CLA-enriched dairy products. *Canadian Journal of Agril. Econ.,* **54**: 663-684.

Qingbin, W. and Junjie, S. (2002). Consumer preference and demand for organic food: Evidence from a Vermont survey. Paper prepared for presentation at the *American Agricultural Economics Association Annual Meeting, Montreal, Canada,* July 27-30, 2003.

Raja, B. and Arunachalum, K. (2011). Market potential for probiotic nutritional supplements in India. *African Journal of British Management*, **5**(14): 5418-5423.

Rani Daisy, Selvam, S., Saifullah, A.M. and Prabhakaran, R. (2000). Consumption pattern and consumer preferences for milk and milk products in Madras city, *Ind. J. Agril. Market.,* **31**(1): 36-39.

Rao, V.M. (1982). Role of income and occupational factors in monthly consumption patterns in India. Arthavijnana, 12: 523-562.

Ratnam, N.V. and Spielman, H. (1972). Consumer attitude and their impact on fluid milk demand Hawai: A component – Regression analysis approach. *American J. Agril. Econ.,* **54**: 671-678.

Roberfroid, M. B. (2002). Global view on functional foods: European perspectives. *British Journal of Nutrition,* **88**: S133–S138.

Roy et.al. (2002).Consumption pattern of milk and milk products among different income levels in some selected areas of Bangladesh. *Pakistan Journal of Nutrition* **1**(6): 282-287.

Rupkumar, V. N. Anthr and Mahalle (1995). Family consumption pattern in rural sector – A case study of rural sector. *The Bihar Journal of Agril. Market.,* **3**(2): 205-213.

Sarkar, A.K. (1992). Consumption pattern and consumer preferences for milk products in Nadia districts of West Bengal. Unpublished M.Sc.thesis, NDRI, Karnal.

Sarkar, B.K. (1981). Consumption pattern and demand for milk and milk products in Agra Town(U.P.). Unpublished Ph.D. thesis, Punjab University, Chandigarh.

Sekar, C. and Senthilnath, S. (1994). Fish consumption pattern in Coimbatore city- A functional analysis. *The Bihar J. Agril. Market.,* **36**(4): 27-20.

Singh, A. J., Jain, K.K. and Vats, B.K. (1980). Regional disparities in levels of living. *Eastern Economicst,* II Jan. 80: 64-71.

Singh, B. (1979). Consumption behaviour for milk and milk products in Muzaffarnagar (U.P.) – an economic study. Unpublished Ph.D. thesis, Punjab University, Chandigarh.

Singh, R. (1989). Consumer's perception of the organized sector dairy products. *Indian Dairyman,* **41**(2): 89-95.

Singh, S. (1979). Consumption inequality and technology – a regional study. *Indian J. Regional Sci.,* **11**(2): 86-100.

Singh, S., Bhatnagar, D. and Hardeep K. (2007). Consumer behaviour regarding branded milk vis-à-vis unbranded milk. *Indian Management Studies Journal,* **(11)**: 105-125.

Srivastava, D. and Dongra, P. (1991). Consumption of fruits and vegetables in rural Himachal Pradesh. *Acta Hort*, **270**: 223-230.

Sound, K. K. and Lal, A. (1969). Production and consumption pattern of milk in a small country. *Agril.Situ, India,* **24**: 729-734.

Swarnalata (1981). Consumption pattern of milk and milk products in Karnal. Unpublished M.Sc. thesis, Kurukshetra University, Kurukshetra.

Tendulkar, S.D. (1969). Econometric study of monthly consumption expenditure in rural U.P. *American Jour. Of Agri. Econ*., **51**: 119-136.

Thraen, C.S.,Hahn, D.E. and Su, M.M. (1990). Consumer preferences and attitudes towards characteristrics of dairy products: a related analysis of the attitude, usage and trends survey. World Agril. Econ. and Rural Sociology Abstr., **33**: 321.

Tourilla, H. (1987). Selection of milk with varying fat contents and related overall liking, attitudes, norms and intention. *Dairy sci. Abstr.*, **49**: 3698.

Verbeke, W. (2005). Consumer acceptance of functional foods: Socio-demographic, cognitive, and attitudinal determinants*. Food quality and preferences,* **16**: 45-57.

Vijayalakshmi, S. and sampat, S.R. (1976). Consumption pattern of bovine milk in Banglore city. *Curr. Res.,* **5**: 181-183.

West, G.E., C. Gendron, B.Larue and L. Remy (2002). Consumer's valuation of functional properties of foods: Results from a Canada-wide survey. *Canadian Journal of Agricultural Economics,* **50**: 541-558.

West, G. E. and Larue B. (2004). Profiling consumer trend –setters in the Canadian Healthy- foods market. *Current Agril., food and resource Issues*, **5**: 65-82.

Zuzanna, P., Aertsens, J. and Verbeke, W. (2007). Subjective and objective knowledge as determinants of organic vegetables consumption. *Food Quality and Preference,* (21): 581-588.

1. Introduction

Now a days, foods are not intended to only satisfy hunger and to provide necessary nutrients for humans but also to prevent nutrition related diseases and improve physical and mental wellbeing of consumers *(Indian Consumer Survey, 2010*). Changing dietary pattern, increase in per capita availability of milk, rapidly growing middle class and increasing awareness among Indian consumers show tremendous opportunities in Indian functional dairy foods market. Fermented dairy foods have played an important role in the human diet since time immemorial. The fermented foods are considered as natural functional foods because of wide array of novel therapeutic components contained by these and they have a long history of their well-established health benefits. The traditional fermented foods have also attracted the attention of the consumers, researchers and processors for delivering the disease alternatives or disease preventing components in diet. The consumers' increasing demand for dairy products with functional properties is a key factor driving sales growth. Thus, the markets for fermented dairy foods across the globe especially probiotics and those with special added ingredients are booming.

1.1. HISTORY OF FUNCTIONAL DAIRY FOODS

Initially, the concept of functional food was first promoted in 1984 by Japanese scientists who studied the relationships between nutrition, sensory, satisfaction, fortification and modulation of physiological systems. In 1991, the Ministry of Health of Japan introduced rules for approval of a specific health-related food category called FOSHU (Food for Specified Health Uses), which included the establishment of specific health claims for this type of food. The number of FOSHU items has progressively increased and 590 FOSHU products were available in Japanese market as on August, 2006.

India has a rich history of having a variety of traditional and ethnic foods with functional attributes. Health properties of various spices, herbs, whole foods, seasonal fruits and vegetables have been documented in the literature and even in ancient scriptures of India. There is no doubt that dairy products are functional foods, these are one of the best sources of calcium, an essential nutrient which

can prevent osteoporosis and possibly colon cancer. In view of the former, the National Academy of Sciences recently increased recommendations for this nutrient for most age groups. In addition to calcium, however, recent research has focused specifically on other components in dairy products, particularly fermented dairy products known as probiotics.

1.1.1 Definition of functional foods

Typically, a food marketed as functional contains added, technologically developed ingredients with a specific health benefit (Niva, 2007). Although the term ‘‘functional food’’ has already been defined several times (Roberfroid, 2002), so far there is no unitary accepted definition for this group of food (Alzamora et al., 2005). In most of countries there is no legislative definition of the term and drawing a border line between conventional and functional foods is challenging even for nutrition and food experts (Mark-Herbert, 2004; Niva, 2007). To date, a number of national authorities, academic bodies and the industry have proposed definitions for functional foods. These range from the very simple to the more complex; ‘‘Foods that may provide health benefits beyond basic nutrition’’ and ‘‘Foods similar in appearance to conventional food that are intended to be consumed as part of a normal diet, but has been modified to sub serve physiological roles beyond the provision of simple nutrient requirements’’ are good examples for the two approaches (Bech-Larsen & Grunert, 2003).

In India, there were multiple laws and regulations covering the foods, but there is no single law that could have significantly regulate the functional foods. In 2006, the Indian government passed Foods Safety and Standard Act (FSSA) to integrate and streamline the many regulations covering nutraceuticals, foods and dietary supplements. Once established, the FSSA will be charged with drafting rules and regulations for companies in the food sector to be licensed by local authorities, and a system of checks and balances, including product recall procedures enforcements and penalties.

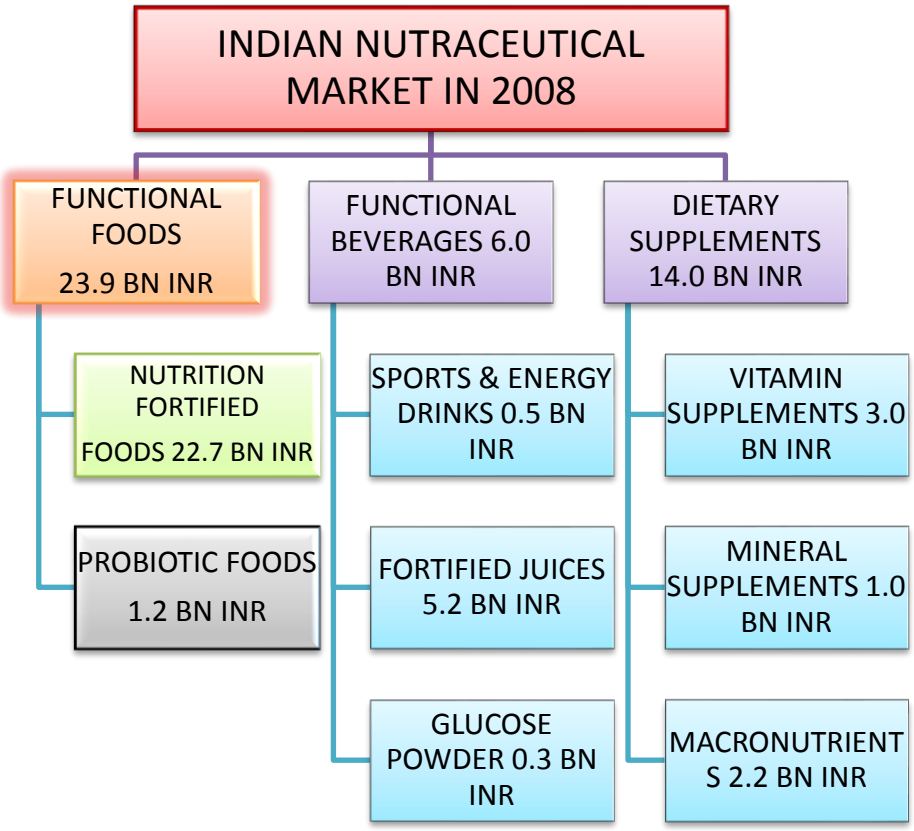
1.2 FUCTIONAL DAIRY FOODS IN INDIA

The rising disposable incomes of Indian consumers have led to the diversification of the dairy industry as consumers are looking beyond pouched milk and the occasional butter and cheese spreads. This has given rise to value

additions such as flavoured milk, vitamin enriched yoghurt, flavoured yoghurts, etc. Categories like probiotic-enriched milk and yoghurt are the rising new stars of the dairy industry. As the Indian consumers tastes evolve, so does the need for more flavours and variety and hence the need for wider range of choices. Also, with the advent of strong brands in the Indian marketplace, with companies launching new products followed by in-store promotions and advertisements, there is greater communication with the end-consumer. So, increased awareness has resulted in an increase in the basket of products that the consumer now buys. For example, cheese slices are now more commonly bought as compared to ten years ago when it was a rarely purchased food item. Even traditional products like dahi have got a new avatar in the packaged variety. Value additions have definitely had a positive impact on the dairy category. People started buying more cheese spreads because of relevant range and variations. In certain cases, a family's share of dairy spends went up because it found probiotic drinks useful for the children.

1.3 INDIAN NUTRACEUTICAL MARKET

Nutraceuticals, an emerging concept can be, broadly categorised as products which are extracted from natural sources or manufactured synthetically, which supplements the diet to provide nutrition over and above regular food and help prevent nutrition related disorders. The Indian nutraceutical market is broadly categorised as fallows - Functional foods (54 per cent), Dietary supplements (32 per cent) and Functional beverages (14 per cent). India has less than 1 per cent share of global nutraceutical market, but growing with CAGR (Compound Annual Growth Rate) of 18 per cent which is much greater than global nutraceutical CAGR of 7 per cent (Ghosh, 2009). The information regarding Indian nutraceuticals market is given in Fig 1.1.



Source: Ghosh (2009)

Fig 1.1. Indian nutraceuticals market at a glance

Most active area within the functional dairy foods market is probiotic dairy products. Indian probiotic market is valued at $2 million as per 2010 estimates and is poised to quadruple by 2015 (Raja and Arunachalam, 2011). The existing probiotic market in India majorly comprises of three segments, urban chain, young adults and people with special needs such as pregnancy, lactation, immunodeficiency, geriatric etc. India at present accounts less than 1 per cent of the total world market turnover in the probiotic industry. Probiotics in Indian market generally comes in two forms, milk and fermented milk products with the former occupying 62 per cent of the market share and later having 38 per cent market share. Currently Indian probiotic products are Dahi (Indian yoghurt), flavoured milk and butter milk.

1.4 MAJOR PROBIOTIC MARKET PLAYERS IN INDIA

Indian probiotic dairy food market is governed by major four market players, they are as fallows-

1. Yakult Danone India pvt Ltd: Yakult Danone India Pvt Ltd (YDIPL) is a 50:50 joint venture between Japan's Yakult Honsha and the French- DANONE Group. Yakult is a probiotic drink made from fermented milk, *lactobacillus* and some sugar. Yakult is a world leader in probiotic drinks and has a rich heritage. Yakult was launched in India in the late 2007. The brand was initially available only in Delhi. Now Yakult is being launched nationally in a phased manner in other parts of the country. Yakult is fermented milk that contains healthy bacteria *Lactobacillus casei* strain *Shirota*. According to the brand site, a 65-ml Yakult bottle of price Rs 10 contains 6.5 bn probiotic bacteria.

In Maharashtra, Yakult is available in all metropolitan cities within 114 supermalls along with many retail dairy stores. Pune is considered as test market by Yakult and ready to expand its market in it. The brand is currently available in Delhi, Mumbai, Chandigarh and Jaipur. The entry of Yakult is expected to increase the visibility and growth of probiotic category in India and Maharashtra. The brand is also making enough noise in the media. The brand predominately targets the health conscious ladies as the primary consumer. The brand has taken the positioning of a "health enhancer" and adopted the tagline "Daily Piyo, Healthy Jiyo" ("Drink daily, Win health"). But a product like a probiotic drink may not be easily adopted by the consumer since they may have lot of doubts about the product. It is in this context, the brand adopted its strategy of direct marketing where the consumers can order the product through home delivery. This generally ensures that the product is being regularly used by the consumers. The main challenge for this product is to make the consumers believe that the product is delivering benefit to them. The brand will be initially operating in a niche category and its strategy will be to expand the niche category into a main stream one.

2. Amul: Amul is a leader in Indian probiotic market sharing 70 per cent of market in 2011, was the first to venture into the category with its probiotic ice creams prolife in February 2007. Amul, on the other hand, has tasted success in the probiotics category with its ice cream in earlier 2011 year, is already in the process of test-marketing pouched lassi (sweetened curd) in Gujarat and some parts of Maharashtra, with plans of introducing it in the other parts of the country soon. Probiotic products contribute to 10 per cent to its ice-cream sales and 25

per cent of its Dahi (Indian yoghurt) sales. Amul is leader in Indian probiotic market shared 70% of market in 2011 while Nestle India Pvt Ltd and Mother Dairy were at 2nd and 3rd place. Amul recently launched the sugerfree ice cream for diabetic patients. In Maharashtra, total 63 Amul Parlour are available as market outlets of functional dairy foods.

3. Nestle India Pvt Ltd: Nestle, having recently declared dairy as its key area of growth, is all set to introduce probiotics in its other dairy products as well. The total packaged curd market in India is estimated at 40,000-60,000 tonnes per annum, of which Nestle has a 30 per cent market share. Internationally, the average contribution of probiotic products to total dairy products was estimated between 10 and 20 per cent depending on the country and business. Nestle also has introduced flavoured milk varieties of probiotic nature. Nestle India Pvt Ltd has 30 per cent of market share in dahi business in six metros. Nestle recently launched Fruit yoghurt and low fat dahi in the Indian probiotic market.

4. Mother Dairy: Mother Dairy in Delhi was set up in 1974 under the Operation Flood Programme on a wholly owned subsidy of the National Dairy Development Board (NDDB). Currently, it is one of the largest milk plants in Asia selling more than 25 lakh liters of milk per day, having a market share of 66 per cent of the branded milk sales in New Delhi, capital of India. Other important markets include Mumbai, Saurashtra and Hyderabad. b- Active Probiotic Dahi, b-Active Probiotic Lassi, b-Active Curd and Nutrifit (Strawberry and Mango) are the company's probiotic products. Probiotic products are contributing to 15 per cent of the turnover of their fresh dairy products. Over the next 3-4 years, the contribution is expected to go up to 25 per cent and the urban acceptance is making the company to increase their focus on probiotic products. Out of total dahi business of Mother Dairy probiotic dahi contributes about 7-8 per cent.

Table1.1 Major market players and brands of fermented functional dairy foods available in India

Market supplier	Name of product	Brand name	Other information
Yakult-Danone India pvt.ltd	Probiotic drink	Yakult probiotic drink	65 ml in Rs.10

Danone	Fortified dahi	Danone fortified dahi	400g in Rs.27
	Low fat dahi	Danone low fat dahi	400g in Rs.50
Mother Dairy	Probiotic dahi	b-active probiotic dahi	Available in 200g, 400g
	Probiotic lassi	b-active probiotic lassi	Available in 90g tubs
	Probiotic drink	Nutrifit	80 ml in Rs. 10
Nestle India pvt.ltd	Low fat dahi	Nesvita	98% fat free, 200g in Rs.20
		Nestle actiplus	200g in Rs.27
Amul	Fruit yoghurt	Flaavyo	100g in Rs. 15
	Probiotic dahi	Prolife probiotic dahi	Available in 200g & 400g tubs
	Probiotic ice-cream	Prolife ice-cream	Recently launched
	Suger free desserts	Amul sugar free dessert	For diabetic patient
KDIL (Kwality Dairy India Ltd)	Low cholesterol dahi	Dairy best fresh dahi	Available in 200g & 400g tubs
	Low cholesterol ghee	Livlite	Developed in NDRI
	Pasteurized butter	White salted butter	Available in 200g & 400g
KMF (Karnataka Milk Federation)	Probiotic ice-cream	Sugerfree probiotic ice-cream	Available in 1kg packet
Lifeway foods	Probiotic drink	Probugs	Reduced sugar level
Britannia	Probiotic yoghurt	Daily fresh probiotic yoghurt	Available in 200g in Rs. 20

1.5 STATEMENT OF PROBLEM

The changing dietary pattern, increase in per capita availability of milk, rapidly growing middle class and increasing awareness among Indian consumers provide tremendous opportunities in Indian functional dairy foods market. The fermented dairy foods have played an important role in the human diet since time immemorial and are considered as natural functional foods because of wide array of novel therapeutic components contained by them. Changing dietary pattern & increasing health consciousness among Indian consumers have changed view of consumers for conventional dairy products, in that increasing middle class population & urbanization boosts up the fevorable environment for expanding of functional foods sector in India as well as in Maharashtra.

Functional dairy foods provide a very good opportunity to expand nutraceutical market and research. As studies on consumption and consumer behavior for functional dairy foods are practically non-existent in India and particularly progressive state like Maharashtra, therefore this study was conducted to understand consumption pattern and consumer preferences for fermented functional dairy foods in metropolitans of Maharashtra.

1.5.1 OBJECTIVES OF RESEARCH WORK

1. To analyse the consumption pattern and consumer behavior for fermented functional dairy foods
2. To identify the major determinants of consumption of fermented functional dairy foods
3. To determine consumer preferences for fermented functional dairy foods

1.5.2 Limitations of study: Great care has been taken to maintain the objectivity of the study, a few limitations could not be avoided such as:

1. Reliability of data totally depends upon the recall method i.e. memory of the respondents. However, every effort was made to get the accurate information.
2. Due to time and resource constraints on the part of research scholar, the study was confined only to Mumbai and Pune city of Maharashtra with sample size of 120.