

# Market analysis for Rice Bran Milk: A study of consumer preference towards alternative dairy beverages in Sri Lanka

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**Abstract-** Consumption of alternative dairy beverages is on the rise in many parts of the world including a developing nation like Sri Lanka. During the last few decades there has been an increase of demand for healthy plant based dairy alternatives, particularly with low fat. Hence, producing alternative dairy beverages has a great opportunity for success in the current market as it is least likely to cause allergies and is great for people with lactose intolerance. "Rice Bran Milk" is one such alternative beverage which is aimed for the people who prefer products similar to dairy beverages. For success of any product, it is necessary to forecast the market demand prior to its commercial manufacturing. Therefore, a market analysis was carried out to examine the consumer preferences of dairy beverage amongst Sri Lankans as it is believed that people who consume dairy beverages are likely to consume an alternative like Rice Bran Milk. A questionnaire survey method was used to collect primary data and random sampling method was adopted to represent the population. Data was collected from respondents representing the whole country except Northern Province. Parametric tests (one population proportion) and Non parametric tests (chi square test) were used to determine preferred product characteristics and relationship between the products attributes respectively. Product price, nutritional value, appearance of packaging, environmental impact and health benefits of the alternative dairy beverage are determined as significant drivers affecting the demand for dairy beverages. This paper investigates consumer's preference towards dairy beverages and its implications towards dairy alternative beverages in Sri Lankan market.

**Keywords-** Market Analysis; Alternative Dairy Beverages; Rice Bran Milk; Parametric Tests; Non Parametric Tests

## 1. INTRODUCTION

Consumer behaviour has always been a great interest to marketers. The knowledge of consumer behaviour helps the marketer to understand how consumers think, feel and select from different products. Typically assessing consumer behaviour goes beyond marketing and advertising approaches to understand the consumer and identify their deepest desires, behavior and motivations[1]. A consumer's buying behaviour is influenced by different factors such as demographic, economic, cultural, social, geographical, and psychological factors. Most of them are beyond the hands of marketing people, but they should be considered while trying to understand the complex behavior of the consumers[1]. However, there are controllable factors like price, product, promotion and place which influence the consumer for buying decision. Studies related to consumer behavior are extremely significant in a number of aspects. The sense of consumer behavior encourages firms and businesses to predict consumer intentions to purchasing. Further, consumer buying behaviour can provide a clue related to which product to survive, which industry to perform and which company to succeed [2]. Complete understanding of consumer behavior assist businesses to identify major factors affecting consumer purchase decisions.

Many studies have outlined factors that influence consumers in their purchase decisions. However, Kotler (2003) explained four significant elements influencing buyer's behavior. Namely; cultural, social, personal and psychological factors [3]. Further, he demonstrates that three steps of the buying process as; Believe development, Attitude development and Purchasing decision. Babu et al. (2010) defined that decision-making process begins with need recognition, search and evaluate option, purchase and the post purchase decision [4]. Later, Wang et al. (2014) [12] illustrated a more comprehensive process of consumer buying behaviour including need recognition, information search, pre-purchase evaluation, purchase decision, product consumption, evaluation of product consumption and finally the divestment stage [2]. However, the execution of each step depends on the types of purchasing decision, whether consumers buy minor or major new purchase as well as minor or major re-purchase [4].

The consumer's decisions in brand choices and product are significantly influenced by core values, income level, stability, personality, life style and self-concept. The parameters of consumers' buying behavior, characteristics and preferences fluctuate over the consumers' life time [5]. Various studies have been executed in developing countries as well as in developed countries to the

purchasing behavior and consumption in general, in particular dairy consumption in Sri Lanka. However, this subject has not been empirically analyzed in the context of Sri Lanka to the best knowledge of the authors. Hence, this study focus on investigating the factors influencing Sri Lankan consumers' increasing demand for dairy beverages and determine the success of newly developed "Rice bran milk" in the current market.

## 2. REVIEW OF LITERATURE

Sri Lanka is mostly self-sufficient in animal products. Among them, dairy industry has occupied significant position and potential to contribute noticeably to Sri Lanka's economic growth. As consumers become more matured they tend to become more conscious about wellness issues and health regarding diets and food choices.

According to the dairy industry key statistics (2005-2014) of department of animal production and health, Sri Lanka, the annual milk production (cow milk) has increased twice by 2014. On the other hand, per-capita availability of milk and milk products (LME) showed a growth from 2005 (31.15Kg/Year) to 2014 (45.16Kg/Year) [6].

Moreover, across the districts, some 12% of the households buy liquid milk though the frequency is much higher in districts like Colombo (52%) and Badulla (41%). Over 50% of the purchased liquid milk is used for making tea/coffee, 43% is used for manufacturing milk products or used for home cooking and 5% is directly consumed by adults, leaving some 2% for the children below 7 years of age [7].

In the current market, dairy industry is headed by importers, mostly in the type of full cream milk powder (FCMP). Annually, about 72420 MT full cream milk powder is imported which provides a cheaper product than locally processed fresh milk. Having such a tremendous possibility to be self-sufficient with dairy products, yet the country produces only 20% of the requirement of the milk and milk based products. Rest is directly imported from other countries which is cost about Rs.36 billion per year with numerous problems [8].

Thus, there is an increasing demand for liquid milk and milk products among Sri Lankan people. In the present study, it is planned to market a value added milk product called "Rice Bran Milk", made with red rice bran. Most of people do not prefer eating red rice and it is discarded as wastage in many households. Rice Bran Milk can be introduced as a way of incorporating the nutritional value; particularly proteins, fats, minerals and micronutrients (vitamin B) of rice bran in to Sri Lankans diet. This is a convenient food and it matches current lifestyle of people as they are busy. As its flavor is similar to a malted dairy beverage, it gives more preferable and familiar flavor. Furthermore, since milk is added it could fulfill the country's protein requirement. This product is more cost efficient as it uses the wastage/ by product (rice bran) of the rice milling process. Paddy crops are

cultivated as a wetland crop in almost all districts in Sri Lanka making rice bran available in all areas as a by-product. Milk also available in every parts of the country. Therefore, the availability of raw materials for bran milk is high. So, it seems to be a feasible product, yet the success of the product is largely determined on how firms initiate an action in response to consumer's tastes and preferences [9]. In that case, marketing research is a precious tool to predict such decisions and guarantee success of a new product. On the other hand, new producers can actually sustain and achieve a competitive advantage through the market information generated by market researches. Previous studies shows that the critical components of good market research. Namely; Evaluation of the consumer; Compatibility of the product's nature and consumer requirements; target markets or the demographic location of consumer and effective promotion towards consumer who need it.

Even though, there are many factors that can affect consumer's buying process, the marketers are well served to understand the key influences. Thereby, marketers may be in a position to take advantage of these inspirations that will satisfy the customer and the marketer.

## 3. METHODOLOGY

### 3.1 Research Approach

A market survey was carried out in order to get an idea of the types of beverages with high preference and to determine whether the new product: Rice Bran Milk would be successful in the current market. The market survey was conducted through a primary market research which can help to gain a more detailed understanding about the consumer's opinions towards the Rice Bran Milk product.

### 3.2 Sampling and Data Collection

In the present study, random sampling method was adopted and a questionnaire was used for the data collection. The study covered eight provinces (out of nine provinces) in Sri Lanka which included, North Central, Sabaragamuwa, Uva, Southern, North Western, Eastern, Central and Western. The total number of consumers (respondents) participated in the survey was 191. Both male and female respondents were included in the survey and they were aged from 19 to 30.

### 3.3 Questionnaire and Measures

The Questionnaire was structured with a combination of demographic and conceptual factors. Both open ended and closed questions as well as qualitative and quantitative questions were used depending on the situation. Short questions were encouraged as they are usually more effective than longer ones. In the first part of the questionnaire was aimed at assessing the respondent's gender, age and residence to find demographic factors about the respondents. The questions included in the second section were aimed

at assessing the respondents' preference towards beverages in general, and types of beverages they would like to see in the market in the future. Finally a few questions were asked to get an idea about the way of marketing trends.

In order to measure the consumer's choice of beverage, respondents were asked to assign the level of importance of different categories such as price, nutritional value, appearance of packaging, environmental impact and health benefits obtained from the beverage generally. The response categories were; "very important (5)", "important (4)", "moderately important (3)", "little important (2)" and "unimportant (1)". In addition to that, questions about the preferred type, price, and flavour of beverage were included to get an idea of the consumer's preference on dairy beverages. Further, the occasions, places, time of consuming were also inquired. Finally, the improvements of the consumers' preference were asked in order to check whether they would like Rice Bran Milk when it is released to the market.

### 3.4 Data Analysis

The data collected from the research were analyzed using Minitab 14 software. One sample proportion method was used in order to estimate the proportions that would consume the newly developed beverage. Chi square test was used to determine whether there is a significant relationship between the variables considered. A few hypotheses were developed in order to estimate whether Rice Bran Milk product would survive in the market. During hypothesis testing 95% was taken as the confidence interval.

- Descriptive statistics: pie charts and bar charts
- Parametric tests: one population proportion
- Non parametric tests: chi square test

#### 3.4.1 Tested Hypothesis using parametric tests (One population proportion test)

H<sub>0</sub>: most of the consumers prefer dairy beverages

H<sub>1</sub>: most of the consumers do not prefer dairy beverages

H<sub>0</sub>: most of the consumers prefer RTD's

H<sub>1</sub>: most of the consumers do not prefer RTD's

H<sub>0</sub>: price is important to most of the consumers

H<sub>1</sub>: price is not important to most of the consumers

H<sub>0</sub>: nutritional value is important to most of the consumers

H<sub>1</sub>: nutritional value is not important to most of the consumers

H<sub>0</sub>: most of the consumers prefer chocolate flavour

H<sub>1</sub>: most of the consumers do not prefer chocolate flavor

H<sub>0</sub>: most of the consumers prefer tetra-pack

H<sub>1</sub>: most of the consumers do not prefer tetra-pack

#### 3.4.2 Tested Hypothesis using non-parametric tests (Chi-Square)

H<sub>0</sub>: there is not a relationship between gender and most preferred beverage

H<sub>1</sub>: there is a relationship between gender and most preferred beverage

H<sub>0</sub>: there is not a relationship between gender and most preferred type of beverage product

H<sub>1</sub>: there is a relationship between gender and most preferred type of beverage product

H<sub>0</sub>: there is not a relationship between most preferred type of beverage product and purchase places

H<sub>1</sub>: there is a relationship between most preferred type of beverage product and purchase places

H<sub>0</sub>: there is not a relationship between Nutritional value and the Price of the beverage products

H<sub>1</sub>: there is a relationship between Nutritional value and the Price of the beverage products

H<sub>0</sub>: there is not a relationship between Manufacturer and importance of health benefits

H<sub>1</sub>: there is a relationship between Manufacturer and importance of health benefits

## 4. RESULTS AND DISCUSSION

A consumer's buying behaviour is influenced by certain controllable and uncontrollable factors. Which includes, individual's social and physical environment, their perception of the brand, product, service or company[1]. Therefore, studying these parameters with respect to Rice Bran Milk is very important and it will help to maximize benefits from implementation.

### 4.1 Descriptive Analysis

Previously, Saheeka et al., 2013 reported that demographic factors and socio economic factors such as age, gender, income level, and ethnicity was seen to have a significant impact on the consumption frequencies of dairy products in Sri Lanka [8]. According to the descriptive analysis of the sample covered in the market survey, majority of the respondents were females (106-55.5%) out of 191 respondents. Age groups covered by the sample were 19-24 years and 25-30 years and the majority included 19 -24 age (80.1%). Nearly 19.9% of the respondents were included in 25 -30 age group. According to the findings of Saheeka et al., 2013, older consumers are more likely to have an increased consumption of dairy products rather than younger consumers [8]. Present result considered the geographical distribution, majority of the respondents (87.43%) were situated at Western province while a few of respondents were situated at other provinces.

### 4.2. Parametric tests

During the questionnaire survey, respondents were asked to select a beverage they prefer which they purchase regularly. The results presented in Table 01 indicates that the majority (44%) of the respondents selected dairy beverages as their most preferred beverage, which is a positive outcome as it implies that the new product will be successful in the market. Further, there were around 128 (67%) of respondents who selected Ready-To-Serve-Drink (RTDs) as the preferred type of dairy beverage. According to the parametric test (One population proportion test); it is 95% confident that the most of the consumers prefer dairy beverages ( $p = 0.884$ ) over other



types and most of the consumers prefer RTD's ( $p=0.981$ ). As consumer demands for 'natural' and 'less processed' food drinks are becoming popular worldwide with the prevalence of non-communicable diseases, people are looking for natural formulations with recognizable ingredients. In that case, this product has a high probability to satisfy the consumer's expectations.

Table 1. Preference of beverage

Type of Beverage	Preferred Percentage
Dairy beverages	84 (44%)
Fruit juices	65 (34%)
Carbonated soft drinks	24 (12.6%)
Malted beverages	12 (6.3%)
Other	6 (3.1%)

Studies related to consumer behavior shows that consumer will come to expect the availability of the product at the time and place where he wants and not when and where the supplier wants to deliver [1]. When considering the distribution of selling places, majority of the respondents (20.4%) selected Canteens, Restaurants and Super Markets as preferred places for purchasing of dairy beverages. These results are in accordance with the results of Saheeka et al., 2013 [8]. As expected, supermarkets and grocery stores were found to be the most preferred places of purchasing dairy products. Thus introducing Rice Bran Milk product to canteens, restaurants, super markets and retail shops will be an effective marketing strategy for the success of the product in the market.

Table 2. Preference of purchase places of dairy beverages

Type of Place/ Places	Preferred Percentage
Canteen, Restaurants, Super Markets	39(20.4%)
Super Markets	35(18.35%)
Canteens	34(17.8%)
Super Markets, Retail Shops	22(11.5%)
Canteen, Super Markets	20(10.5%)
Retail Shops	18(9.4%)
Retail Shops, Super Markets, Restaurants	13(6.8%)
Restaurants	8(4.2%)
Other	2(1%)

When respondents were asked to mention the package sizes they like for any dairy beverage. Results presented in Table 03 indicated that the majority (39.3%) preferred 180ml packet size for dairy beverages.

Table 3. Preference of size of packages of dairy beverages

Size of Package	Preferred Percentage
Packet 180ml	75 (39.3%)
Milk Powder 400g,900g	50 (26.2%)
Bottle 250ml	40 (20.9%)
Plastic Drinking Cup	15(7.9%)
All	9(4.71%)

In general, food choices are connected to flavour preferences and the dietary habits. The consumption patterns and taste in food are often shaped by family

life cycle and the number, age, and gender of people in the household, and occupation [10].

The research of "consumption behavior and factors influencing the purchase instant noodles" revealed that flavor and TV advertisements were the most crucial factors in making buying decisions of instant noodles [11]. Also, flavour or taste is influencing the consumer for selecting a brand. Therefore, selecting an agreeable flavour for the rice bran milk will make it attractive among other dairy beverages.

In the present study, majority of the respondents (58.6%) selected Chocolate as their preferred flavor for dairy beverages and since it is hoped to introduce a Chocolate flavor to the newly developed Rice Bran Milk, consumers will accept this product. Parametric test results for "Preference of flavor" presented that the most of the consumers prefer chocolate flavor ( $p=0.993$ ) at 95% confidence.

Table 4. Preference of flavor for dairy beverages

Flavour	Preferred Percentage
Chocolate	112 (58.6%)
Vanilla	59 (30.9%)
Strawberry	14 (7.3%)
Mixed fruits	5 (2.6%)
Other	1 (0.5%)

Today, consumers are being presented with an ever increasing number of food and drink alternatives, which compete with each other to attract the attention of the consumer. In this case, packages are found to attract consumers at the first sight. Underwood et al., 2001 reported that pictures on packages are emphasized to attract attention, particularly when consumers are not very familiar with the brands [12]. Milk beverages have been categorized into different groups and they require a different processing methods and packages depending on the preservation technique and the expected shelf life. In order to meet the specific dairy requirements, several solutions exist such as Glass Bottles, Tetra Pak Carton, Polythene and Metal cans.

In Sri Lankan context, present results expressed that majority of the respondents (37.8%) selected Glass Bottles as the preferred Packaging material for dairy beverages of total respondent (191). But nearly similar amount of respondents preferred Tetra pack carton (35.6%). The Rice Bran Milk product is decided to fill in to a tetra pack carton as it is easy to use as well easy to transport when compared with glass bottles.

Table 5. Preference of Packaging material for dairy beverages

Packaging Material	Preferred Percentage
Glass Bottles	71 (37.8%)
Tetra Pak Carton	68 (35.6%)
Polythene	17 (8.9%)
Glass Bottles or Tetra Pak	12 (6.28%)
Metal cans	7 (3.67%)
Glass Bottles or Polythene	6 (3.14%)
Tetra Pak or Metal Cans	1 (0.52%)

All	2 (1.05%)
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In today's market, consumers are bombarded with different types of brands with varying prices and perceived quality levels, therefore consumers has to make their choice after considering the relative importance of both (price and quality) attributes. Product quality is an important factor that motivate a consumer to make a purchase. Usually, consumer decide the degree of quality based on its price, nutritional value, appearance, health benefits and brand image.

In the questionnaire survey, respondents were asked to mention the importance of selling price, Nutritional value, Appearance and Health Benefits of beverage products when they are going to purchase from market. As evident from the results presented in Table 06, the most important factors affecting preference towards Rice bran milk were health benefits (90.6%) and nutrition value (88%). It indicates that consumers also pay considerable attention on the nutritional qualities as well as sensory factors during purchase. The next factor influencing their preference was price (82.2%). The least importance was taken by product appearance among other three factors which takes 63.4%.

Table 6 Importance of Price, Nutritional value, Appearance and Health Benefits of beverage products for respondents

Factor	Important	Unimportant
Price	157 (82.2%)	29 (15.2%)
Nutritional value	168 (88%)	16 (7.4%)
Appearance	121 (63.4%)	62 (32.5%)
Health Benefits	173 (90.6%)	12 (6.3%)

Marketing promotion and advertising offer to consumers to know about new products available in the current market. So, marketers need to understand the buying behaviour of consumers while designing their advertisements for the desired impact. When consumer weigh benefits, they become emotionally involved with advertising and promotion. Finally, repeated advertising messages affect consumer behavior. Therefore, marketers should be careful when select suitable advertising media in order to attract consumers.

The survey conducted by Adeolu B. Ayanwale, Taiwo Alimi & Mathew A. Ayanbimipe (2005) for Bournvita (a brand of malted and chocolate malt drink) presented that TV advertising (71.43%) was the most preferred by the respondents among all the media used in advertising Bournvita. These results were in conformity with present findings as the majority (49.2%) of respondents were known about new products which are being advertised in TV. Also 28.8% respondents knew about Rice Bran Milk product through both TV and Newspapers. Thus it will be success to present TV advertisements and newspaper advertisements in the process of advertise product and making it commercially successful.

### 4.3. Non Parametric Test - Comparisons across Respondent Groups

Using chi-square statistic, it was examined variations across various respondent groups with regard to different aspects discussed above. This was done to look for any significant relationships between variables about market survey for Rice Bran Milk product. The Table 07 provides results of this analysis.

Table 7 Chi-Square values for comparison of two variables in questionnaire.

Tested Hypothesis	Pearson Chi-Square	P-Value
Gender Vs Mostly Drunk Type	11.541	0.021
Gender Vs Most Preferred Type	13.894	0.000
Most Preferred Type Vs Place	9.501	0.219
Price Vs. Nutrition	0.203	0.652
Importance Manufacturing Place Vs. Importance Of Health Benefits	6.618	0.010

According to the results of non-parametric test, there is a relationship between gender and most preferred beverage (*chi-square=11.541, p=0.021*) and the beverage type; RTDs and Milk Powder; (*chi-square=13.894, p=0.000*). Previously, Saheeka et al., 2013 reported that the probability of buying one more unit of dairy product is decreased by 0.6% when the buyer is a male of the household. This may be due to the fact that females are generally assumed to be more health conscious than men and they are significantly more likely to purchase and consume natural and fresh food [8].

Although consumers behaviors mostly rely on price and nutritional value of dairy beverage, there is no relationship between these two factors as evident to non-parametric test (*chi-square=0.203, p=0.652*). However, there is a relationship between importance of manufacturer and health benefits of dairy beverage (*chi-square=6.618, p=0.010*).

### 5. CONCLUSION

Understanding consumer buying behavior is not an easy task for businesses as consumer buying patterns is highly unpredictable. This study discuss some of the vital factors related to consumer buying behavior, particularly dairy beverage market in Sri Lankan context. Better understanding of the consumer behavior is important for food marketers as well as producers to analyze the quality of their products so as to respond effectively to the consumer demands in similar perspective.

In the above study, factors that influence current and future buyers' behaviors are identified and categorized. Understanding peoples' desires and preference is relatively important to create consumer satisfaction and loyalty as it will lead to retention in buying the new product.

The Rice Bran milk will be highly successful in the market as a high number of consumers prefer chocolate flavored dairy beverages in tetra pack with a high nutritional and health value for an affordable price. It is better to distribute the new product through Supermarkets, Canteens, Restaurants and Retail shops and also using the promotional methods such as TV and Newspaper advertisements would be more successful over other generic media. Therefore there is a high probability for Rice Bran Milk to be successful in the Sri Lankan market. Finally, it is assumed that information gathered for the Rice Bran Milk could be utilized for the analysis of the current market for any dairy beverages and also to know the probability of survival of this product in market after launching.

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