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"Consumer Acceptance and Feasibility of Non-Dairy Probiotic Drinks in Hotels and Restaurants of Nagpur City"

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Abstract:

The study examines the acceptance of non-dairy probiotic drinks by customers and also the feasibility of incorporating them into the menus of hotels and restaurants in Nagpur City. We gave 116 people a structured questionnaire to find out about their demographics, knowledge of probiotic drinks, habits when it comes to non-alcoholic drinks, plans to buy them, flavour and packaging preferences, and what made them want to try non-dairy probiotic drinks.

The data shows that most people who filled out the survey are in their twenties and thirties, and that they are either students or working professionals. Although only about 38% have previously heard of specific probiotic drinks like kombucha or kefir, more than half are aware of the broader concept of prebiotic and probiotic functional beverages. Purchase intention for a non-dairy probiotic drink available in hotels and restaurants is generally positive, with a strong inclination towards tropical and citrus flavours, freshly prepared on-site service, and health-related benefits such as improved digestion, detoxification and immunity. Free tasting and communication of health benefits significantly influence the willingness to try and purchase.

According to the study's findings, the Nagpur foodservice industry offers a promising market for non-dairy probiotic drinks as long as the product positioning emphasizes taste, health benefits, and experiential marketing through sampling.

Keywords: *Acceptance, Non-Dairy Probiotic Drinks, Non-Alcoholic Drinks, Feasibility in Hotels and Restaurants.*

INTRODUCTION:

Customers have grown more health-conscious in recent years and are searching for drinks that provide both functional health benefits and refreshment. Prebiotic and probiotic beverages, which were

previously only found in dairy products, are now showing up in non-dairy forms like mocktails, sodas, and fermented fruit-based drinks because of people who are unable to eat or drink dairy due to lactose intolerance, vegetarianism, or other medical issues. Hotels and restaurants are important places where guests can discover non-dairy probiotic beverages.

Definition of Probiotics by the International Scientific Association for Probiotics and Prebiotics: "live microorganisms that, when administered in adequate amounts, confer a health benefit on the host." As stated by (Hill et al.,2014).

The word "probiotic," which literally means "for life," has its roots in Greek. To differentiate it from the word "antibiotic," Lilly and Stillwell first used it in 1965 to characterise "substances secreted by one microorganism which stimulate the growth of another." (Schrezenmeir & de Vrese, 2001)

The Indian probiotic industry is growing steadily, with opportunities for rapid expansion in the near future. In 2011, By 2016, the Indian probiotic industry was predicted to have grown from its 2012 valuation of $12 million, with an annual growth rate of 11%. The introduction of several pharmaceutical probiotic formulations has further enhanced the industry's revenue. Probiotic foods seem to have a promising future. More and more, modern consumers are concerned about their health and now expect the food they consume to not only be nutritious but also ‘preventive’ of diseases (Sharma et al., 2013).

Due to concerns about lactose intolerance, growing consumer interest in gut health, and the popularity of vegan and functional foods, non-dairy probiotic beverages are developing quickly. Probiotic drinks made from fruits, vegetables, cereals, and soy have a lot of market potential because of their high nutritional content, antioxidant qualities, and demonstrated advantages for immunity, digestion, and general well-being (Soni, 2025).

Taking the above into account, the present study was undertaken to develop a non-dairy probiotic beverage that would be acceptable to customers and to find out the feasibility of adding them in hotels and restaurants of Nagpur city.

1.1 Significance of the study:

While non-dairy probiotic drinks are gaining attention globally, their acceptance and feasibility in the local context of Nagpur City, especially within hotels and restaurants, are not well-documented. Understanding consumer awareness, preferences and purchase intent will help hospitality businesses decide whether to introduce such drinks on their menus and how to position them effectively.

1.2 Aim:

To study the Consumer Acceptance and Feasibility of Non-Dairy Probiotic Drinks in Hotels and Restaurants of Nagpur City.

1.3 Objectives:

1. To create awareness about non-dairy probiotic drinks among the guests of hotels & restaurants in Nagpur city.
2. To find out the advantages of non-dairy probiotic drinks with reference to health benefits
3. To assess the preference of probiotic drinks among different age groups and genders in Nagpur city.
4. To promote non-dairy probiotic drinks among the guests of hotels & restaurants in Nagpur city.

1.4 Hypothesis:

H1: Non-dairy probiotic drinks are perceived as healthier than other probiotic drinks by consumers in Hotels and Restaurants of Nagpur City.

LITERATURE REVIEW:

"Consumer Acceptance and Feasibility of Non-Dairy Probiotic Drinks in Hotels and Restaurants of Nagpur City" is the subject of the present research, and the following is a literature review that supports it.

2.1 History of Probiotics:

India has a long history of making traditional fermented drinks that serve as natural probiotic options. Indigenous communities have prepared these beverages for centuries using local ingredients and traditional methods. They can be grouped into dairy and non-dairy types and are usually made through spontaneous fermentation or by using natural probiotic cultures. The origins of fermented drinks in India go back to the Vedic period (2500–200 BCE), when beverages like soma were likely consumed in the Indus River region. Ancient texts such as the Ramayana also mention the common use of fermented drinks among tribal populations. Unlike the classical malting and wine fermentation methods found in other cultures, Indian traditional fermentation often uses mixed microbial starters. These starters, cultivated on cereals, pulses, fruits or vegetables, contain lactic acid bacteria, yeasts, and moulds. Traditional probiotic drinks made of millet like Kodo Koh Jaan remain vital for nutritional intakes, culture and food heritage across India (Mishra et al., 2021).

For thousands of years, traditional fermented and preserved foods have played an important role in the cultural heritage. Many people have relied on them as a basic food. People in ancient India, Egypt, Greece and Rome ate fermented dairy products as far back as 2000-3000 BC. Fermented dairy products include cheese, butter and milk. Archaeological evidence suggests that China manufactured drinks fermented with rice, honey or fruit as far back as 7000 B.C. Modern Study has shown that several of these ancient foods contain beneficial lactic acid bacteria with probiotic properties, despite the fact that they were formulated without a scientific understanding of microbial fermentation. Food scientists are working on new probiotic drinks and functional foods using this knowledge for the purpose of increasing consumer demand for health-oriented nutrition (Sharma et al., 2025).

2.2 Probiotics - Definition, Characteristics and Mechanisms of Action:

"Live microorganisms that, when administered in adequate amounts, confer a health benefit on the host." That's how the International Scientific Association for Probiotics and Prebiotics (ISAPP) defines probiotics. For any microbe to be viewed as a true probiotic, it must still be alive when ingested, not harmful to humans, identifiable to the strain level, and have a demonstrated functional benefit substantiated by research. It is important for them to survive in storage and reach the site where they can assist the host after passing through the digestive tract. Probiotics help digestive health and a healthy gut microbiota. But the strains of the bacteria have other useful characteristics too, which include boosting immunity and making bioactive metabolites (e.g. vitamins). Probiotics are useful as they have been demonstrated to positively contribute to health and well-being, not merely their presence in the body. (Hill et al., 2014).

The idea of probiotics has changed over many years. Initially, the focus was on the distinction between beneficial health-promoting microbes and harmful antibiotics. In the beginning, probiotics were merely substances that improved gut microbial balance. As the years progressed, the definition became more specific. Nowadays, probiotics are known as live microorganisms that, when taken in adequate amounts, can be beneficial to health. True probiotic microbes can survive in the gut after oral intake and also be present at high enough quantities (typically around 10^9 viable cells per day dosage) to affect the body measurably. (Vasudha & Mishra, 2013).

2.4 Shelf Life and Storage:

A probiotic drink was created using Lactobacillus acidophilus fermented honey by Aparna H Nath. They assessed its quality, viability, and shelf stability. The drink was quite attractive, kept probiotic levels above 9 log CFU/mL, and was stored refrigerated for a shelf life of up to 15 days. This means that this could be a healthy probiotic drink that one can consume (Mishra et al., 2021).

Scientific studies look at the impact of Moringa oleifera leaf extract in drinks. This fast-growing tree species is originally native to the Indian sub-continent. As per the research, this extract greatly enhanced the shelf life of the product. It did this by slowing down the growth of microorganisms and increasing antioxidant activity. (Hashemi et al., 2018).

A study that was undertaken on a probiotic drink containing 25% honey, 10% aloe vera, 25% sweet lime juice, and 40% water, in addition to 1% Lactobacillus acidophilus, was found to produce a product of good quality. A drink's shelf life is up to 15 days and 72 hours at 4 ± 1° C and 30 ± 1° C, respectively (Editor IJAPSA, 2019).

2.5 Probiotics in Functional Foods and Beverages:

The growing popularity of functional beverages globally is due to rising consumer knowledge of nutrition and support from world health organizations like the WHO. Functional beverages are one of the fastest-growing sectors in the food industry. Their products are packed with bioactive substances

such as probiotics, vitamins, minerals, phenolics, peptides, and EFAs.

These drinks come from a plant, animal and microbial source. People are looking for all kinds of drinks these days: prebiotic and probiotic drinks, energy and sports drinks, immunity boosters, cognitive enhancers, wellness shots, and much more! The purpose of this study is to improve the stability and functionality of bioactive components by using technologies like encapsulation or high-pressure homogenization. The industry has grown to become a multi-billion-dollar industry, but there is a long way to go in terms of bioavailability, consumer safety, sensory appeal, and green manufacturing. A lot of potential exists in the market if functional beverages are developed that emphasise health benefits along with a good taste, appearance, and shelf life (Gupta et al., 2023).

Prebiotics may also be incorporated into functional drinks. Studies have shown that the chances of microbial survival increase when you combine prebiotics and probiotics. Probiotic beverages are able to provide solutions for the ever-increasing demand for functional foods within the developing world. This is a place where probiotic function and stability are dependent on cheap and easily available materials. Non-dairy probiotic options are witnessing increased attention globally as a functional food. Further, they avail a significant breakthrough that has a solution for different food needs (Soni, 2025).

2.6 Benefits of Probiotics:

Research is increasingly substantiating the beneficial effects of probiotics on human health. They may reduce blood cholesterol levels and support gut health, but they may also prevent cancer. But these benefits might be strain-specific and are not caused by the same mechanism in each organism. There are some health benefits that are well-established already, including the treatment of acute diarrhoea, prevention of antibiotic-associated diarrhoea and better digestion of lactose. Other claimed benefits still need more clinical testing. Health-promoting organisms (probiotics) have promising potential as health-promoting agents, but more investigation is warranted to confirm their efficacy in a wider array of clinical conditions (Kechagia et al., 2013).

Probiotic drinks can help with many health conditions. Some of these conditions include high blood pressure, inflammatory bowel disease, mental health conditions, dental issues, and non-alcoholic fatty liver disease. Beneficial microbes are good for our health.

2.7 Function of Probiotics:

Probiotics are helpful microorganisms that naturally belong to our body. They act as a defence mechanism, preventing infections. When taken in food or drinks, they help maintain a healthy balance of micro-organisms in the bowel or gut microbiota. Those substances protect against harmful pathogens by producing antimicrobial substances like bacteriocins, siderophores, lysozymes, proteases, and hydrogen peroxide. Proteins obtained from different probiotic strains, such as amylase, protease and cellulase, play the role of digestive enzymes. Probiotics aid in digestion and overall well-

being while strengthening the intestine and boosting immunity. (El-Saadony et al., 2021).

Probiotics or beneficial microbes are incorporated into the gut microbiota from the very conception. They are crucial to keeping the digestive system healthy. You will find them in foods that are fermented, processed, or free of dairy. The anticancer potential of probiotics is helpful for weight control and stress-relief. They also prevent diseases. Probiotics can balance the gut microorganisms.

2.8.1 Probiotic Beverages from Fruits and Vegetables:

People are replacing dairy-based probiotic drinks with ones made from fruits and vegetables due to their health benefits. These foods contain a lot of minerals, vitamins, antioxidants, and fibre. These ingredients allow probiotics to survive and improve the nutritional and taste quality of the end product. Scientists in India have looked at various fruits and vegetables like citrus, pomegranate, beetroot, and cabbage for fermentation using Lactobacillus and Bifidobacterium. These drinks are beneficial for vegans and lactose-intolerant individuals. These provide improved digestion, boost immunity, and offer antioxidant effects. The rising popularity of plant-based health drinks is stimulating innovation and business growth in this field (Mishra et al., 2021).

2.10 Safety of Probiotics:

Experimental evidence indicates that strains such as Lactobacillus and Bifidobacterium are largely safe, even in people with weakened immune systems, even though probiotics might pose risks like systemic infections, harmful metabolic activities, excessive immune activation and gene transfer. Lactic acid bacteria, such as L. The use of dairy fermentation has made acidophilus and other probiotics safe for human consumption for a long time. While bacteremia has occurred sparingly, monitoring data and clinical studies indicate that commercial probiotics are typically safe. In order to protect consumers, FAO/WHO international guidelines recommend evaluation of the properties of each strain, its intestinal behaviour and contacts with the host to support health and safety claims (Soccol et al., 2010).

RESEARCH METHODOLOGY:

Research methodology is the methodical, theoretical examination of the techniques used in a field of study or research project. Because it is the foundation of the entire study project, it serves as the backbone. Put otherwise, it is a method of looking for or resolving the research issue. An outline of the research techniques is provided in this section.

3.1 Design of Research:

The current study, "Consumer Acceptance and Feasibility of Non-Dairy Probiotic Drinks in Hotels and Restaurants of Nagpur City," employs a quantitative research methodology. To determine consumer awareness, acceptability level, preferences, and viability of launching non-dairy probiotic drinks in Nagpur city's hospitality sector, a descriptive research approach has been used. The research

design aids in accomplishing the study's objectives.

3.2 Area Selection:

Study Universe: All customers who visit Nagpur city's hotels and eateries make up the study's universe.

3.3 Sample Selection:

Convenience random sampling was employed to gather data because a full census survey was not practical. Customers who eat at or visit different hotels and restaurants in Nagpur city made up the respondents.

A sample size of 116 participants was used for the research. The data gathered from these participants was subsequently analysed to draw meaningful conclusions on the feasibility and consumer acceptability of probiotic drinks that do not include dairy.

Target Market: People who go to Nagpur city's hotels and dining establishments.

3.4 Data Collection:

The researcher gathered information from two sources to achieve the goals of the study:

A. Primary Data: A structured questionnaire consisting of predetermined questions was used to collect primary data. Throughout the survey, non-dairy probiotic drinks' knowledge, attitudes, price willingness and demand were the main focus questions.

B. Secondary Data: The secondary data were collected from books, journals, research papers, websites, articles, and various studies already published on probiotics and functional beverages.

3.5 Data Analysis:

The gathered information was put together and then analysed statistically. Different techniques were used, like frequency distribution and percentage analysis, to accurately depict the data. The project used tables to present the results clearly and systematically. This made it easier to compare and better understand what consumers thought. This systematic analytical technique helps interpret results on acceptance, preferences and viability of non-dairy probiotic beverages in hotels and restaurants of Nagpur City.

RESULTS AND DISCUSSION:

Table 4.6 Preference of Non – Alcoholic Beverages at Hotels & Restaurants

Beverage Type	Frequency	Percentage
Mineral water	78	67
Coffee	72	62
Soft drinks	53	46
Tea	56	48
Milkshakes/Smoothies	43	37
Fruit & Vegetable Juices	37	32

Buttermilk	35	30
Lassi	32	28
Mocktails	39	34
Total	116	100

(Source: Primary data)

The most popular non-alcoholic drinks at hotels and restaurants are mineral water (67%), coffee (62%), and tea (48%). Fruit and vegetable juices (32.90%) and buttermilk (30%), two health-conscious drinks, are likewise becoming more and more popular. This suggests that consumers are favourably inclined toward refreshing and healthier beverage options, which presents a chance for non-dairy probiotic drinks to join the market as a desirable substitute. In the above table 4.6, the percentage of each category has been rounded to whole numbers. Due to this, a rounding error occurs and because the above question was a multiple choice to answer to which, 116 respondents gave multiple answers, so it won't match the total frequency and percentage.

Table 4.7 Reasons for Choosing Non-Alcoholic Beverages

Reason	Frequency	Percentage
To refresh & stay hydrated	75	65
To enjoy the taste without alcohol effects	61	53
Health & wellness	39	34
Fitness & diet reasons	19	16
Total	116	100

(Source: Primary data)

The majority of respondents (65%) select non-alcoholic beverages mainly for hydration and refreshment, with flavour without alcohol effects coming in second (53%). A sizable number (34%) actively choose drinks that build wellness and good health, indicating a desire for wholesome and functional drinks. Consumers are highly receptive to products their non-dairy probiotic drinks targeting gut health and wellness. In the above table 4.7, the percentage of each category has been rounded to whole numbers. Due to this, a rounding error occurs and because the above question was a multiple choice to answer to which, 116 respondents gave multiple answers, so it won't match the total frequency and percentage.

Table 4.10 Healthy Drinks consumed to support Fitness and Wellness

Beverage Type	Frequency	Percentage
Buttermilk / Chaas	73	63
Fresh fruit/vegetable juices	73	63
Lassi	46	40

Hydration drinks	37	32
Protein/Nutrition Drinks	33	28
Herbal/Ayurvedic Drinks	20	17
Detox/Weight-management	23	20
Low-calorie Drinks	21	18
Total	116	100

(Source: Primary data)

A majority of respondents prefer traditional, natural, and healthy beverages like fresh fruit and vegetable juices and buttermilk/chaas (63% for each). People choose beverages that they know and are health-oriented. Meanwhile, fresh healthy drinks such as protein drinks (28%) and detox drinks (20%) have lesser, but rising, consumer interest, suggesting the potential of novel functional drinks such as non-dairy probiotic drinks. In the above table 4.10, the percentage of each category has been rounded up to whole numbers; due to this, a rounding error occurs, and because the above question was a multiple-choice question to which 116 respondents gave multiple answers, it does not match the total frequency and percentage.

Table 4.11 Purchase Influencing Factors

Factor	Frequency	Percentage
Health Benefits	99	85
Taste	83	72
Price	53	46
Brand	40	34
Packaging	23	20
Total	116	100

(Source: Primary data)

A very high percentage of customers (85%) prefer health benefits when buying drinks. Whereas (72%) prefer flavour. Branding and packaging don't impact much on decision making, but pricing is still an essential element, though secondary (46%). The results suggest that flavour and functionality are the best factors influencing consumers' acceptance of innovative health-oriented beverages. In the above table 4.11, the percentage of each category has been rounded up to whole numbers; due to this, a rounding error occurs, and because the above question was a multiple-choice question to which 116 respondents gave multiple answers, it does not match the total frequency and percentage.

Table 4.16 Reasons to buy Non-Dairy Probiotic Drinks

Benefit	Frequency	Percentage
Gut Health/ Digestion Support	64	55
Sugar-free / Low sugar	59	51

Detoxification	57	49
Live Probiotics Claim	53	46
Immunity Boost	53	46
Acidity / Gas Reduction	44	38
Vegan / Non-dairy	24	21
Total	116	100

(Source: Primary data)

A majority of respondents (55%) consider gut health improvement as the primary reason to choose non-dairy probiotic drinks. Nearly half the consumers also look for low-sugar options, detox benefits, and proven live cultures. The vegan / non-dairy claim is the least influential (21%). In the above table 4.16, the percentage of each category has been rounded up to whole numbers; due to this, a rounding error occurs, and because the above question was a multiple-choice question to which 116 respondents gave multiple answers, it does not match the total frequency and percentage.

4.20 Hypothesis Result and Testing based on research findings:

4.20.1 Hypothesis 1: Non-dairy probiotic drinks are perceived as healthier than other probiotic drinks by consumers in Hotels and Restaurants of Nagpur City.

Null Hypothesis (H01): Non-dairy probiotic drinks are not perceived as healthier than other probiotic drinks by consumers in Hotels and Restaurants of Nagpur City.

Alternative Hypothesis (H1): Non-dairy probiotic drinks are perceived as healthier than other probiotic drinks by consumers in Hotels and Restaurants of Nagpur City.

Result: - Null Hypothesis H01 is rejected, and Alternative Hypothesis H1 is accepted.

Interpretation:

From the above tables 4.11 and 4.16, we can see that for (85%) of the respondents, health benefits play an important role in purchasing decisions. (55%) of respondents will prefer to buy for improved digestion and gut health, (51%) for low sugar / sugar-free options and (46%) for live probiotics and immunity improvement claims. The respondents have shown interest in plant - based, vegan and non-dairy products, which is easily acceptable for lactose-intolerant and health-conscious people.

SUMMARY AND CONCLUSION:

The current study, “Consumer Acceptance and Feasibility of Non-Dairy Probiotic Drinks in Hotels and Restaurants of Nagpur City, was done to understand consumer awareness, acceptance, preference and possibility of introducing non-dairy probiotic drinks in hotels and restaurants of Nagpur city. The primary focus was on demographics, non-alcoholic beverage consumption patterns, awareness of probiotic and prebiotic drinks, purchase intentions, and factors influencing acceptability. This was done by gathering from 116 respondents using a structured questionnaire.

The result tells us that the majority of the respondents who are health - conscious and like to experiment or try new things, who were represented by students and working professionals, belonged to the younger category of the age range of (18-25) years. A larger group of respondents understood the basic idea of prebiotic and probiotic drinks, although the awareness of probiotic drinks like kefir and kombucha was found to be average. This shows us that consumers have a basic idea of the health benefits of functional beverages, regardless of the fact that product -level knowledge is still evolving. The main factors influencing purchasing decisions were claims of health benefits like gut health, digestion, detoxification, and immune boosting, followed by cost and flavour.

This study tells us that people are likely to try a sample of non-dairy probiotic drinks at hotels and restaurants when they are given options like citrus and tropical flavours, which are freshly prepared on the spot. By giving a free sample to taste, there is a higher chance for the consumer who likes to experiment and buy the product, which helps us to highlight experimental marketing. Many consumers preferred a price range of the product between ₹100 and ₹200, provided that it has good taste and health benefits. Overall, the study tells us that non-dairy probiotic drinks have a very good potential in the Nagpur hospitality industry if its focus on marketing for its position on health benefits, rejuvenation and experiential beverages.

In conclusion, the study shows us that non-dairy probiotic drinks are feasible and are very well-accepted by the consumers who visit hotels and restaurants in Nagpur City. As there is an increase in preference for health-oriented, non-alcoholic, and plant-based beverages, factors like these help to support the introduction of such drinks in foodservice menus. However, in order to achieve success in the market, it will depend on factors like providing information to the consumer about the product, communication regarding health benefits, maintaining consistency of the product quality and providing free samples to the consumers to encourage them to try the product. The findings in this study will provide valuable information for the study in the future studies for hospitality professionals, beverage developers, and marketers. It also opens a path for future study with a larger sample and comparative studies across different cities.

SUGGESTION AND RECOMMENDATION:

6.1.1 Developing Menus and Launching Products:

- Non-dairy probiotic drinks must be regularly available in hotel and restaurant menus, especially at hotels, cafés, fast-food restaurants, casual dining establishments, and health-conscious eateries.
- There is a very strong preference for freshly prepared beverages, so that the outlets should focus on on-site preparation for better improvement for freshness, flavour and health benefits.

6.1.3 Flavour and Sensory Development:

- The development of the product should be focused on flavours like mango, pineapple, lemon,

and orange, as these were the most preferred categories by the respondents.

- We need to make sure that to maintain the health claims of our product, the taste should not be compromised, as taste was identified as one of the most influencing reason for the purchase.

6.1.4 Health Awareness and Communication:

- The menu, displays, posters and digital platforms should be kept as simple as possible, especially non-technical explanations for non-dairy probiotic beverages and their health benefits.
- Proper training should be provided to staff so that they can explain the concept of probiotics beverage to the customers with confidence, which will improve the trust and conversion between them.

6.1.7 Development of Product and Quality Control:

- Hospitality professionals, beverage developers, and marketers should focus on:
  - ❖ Non-dairy and vegan formulas
  - ❖ Sugar-free or low-sugar options
  - ❖ Maintain sufficient amounts of viable probiotic counts in the beverage.

6.2 Recommendations for Future Research:

- To improve generalizability, multiple cities and a larger sample can be included in future studies.
- Qualitative studies like focus groups or interviews can provide a deeper understanding of consumer views and obstacles.

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