



# **Awareness of Plant-based Dairy Alternatives Among the College Students of Anand City, India**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

This study examines the level of awareness of plant-based dairy alternatives among college students in Anand City. With growing concerns over health, environmental sustainability, and animal welfare, plant-based alternatives to traditional dairy products have gained significant attention. Statistical analysis revealed varying degrees of awareness among respondents, influenced by factors such as dietary preferences, health consciousness, and environmental concerns. A primary survey was carried out with several questions covering general knowledge about " Plant-based Dairy Alternative " items. Available data was analyzed using descriptive statistics. Overall, the survey results showed that respondents understood what Plant-based Dairy Alternative were and the majority of them got aware of social media.

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**Keywords:** Dairy alternatives; vegan; non-dairy beverages; plant-based dairy substitutes; students; survey.

## 1. INTRODUCTION

Food technology improvements, environmental concerns, and changing consumer preferences are all contributing to a fundamental alteration of the global food scene. One noteworthy development that has attracted a lot of attention recently is the rise in popularity of plant-based dairy substitutes. Traditional animal-derived dairy products are being compellingly replaced by plant-based dairy alternatives as people look for better, more sustainable food options.

In India, a variety of vegan milk options are available. These days, people prefer vegan milk due to growing problems with cow milk, including allergies, lactose intolerance, calorie concerns, and the prevalence of hypercholesterolemia. In essence, vegan milk is plant-based juice that mimics the flavor, consistency, and attributes of traditional animal milk. Plant milk generally, tries to be as nutrient-dense as animal milk, however as vegan milks are made from processed plant extracts, its nutrient density is lower than that of dairy milk. (Sunidhi *et al.*2017)

Plant-based dairy substitutes can be categorized into five types: plant-based (from seeds like flax and hemp), vegetable-based (from potatoes), legume-based (from soy and peas), and nut-based (from almond, cashew, and coconut) [1]. They also contain plant-based water extract substitutes for dairy, yogurt, cheese, ice cream, butter, and cream. Plant-based foods have lower concentrations of several minerals (such calcium, phosphorus, magnesium, potassium, and sodium) and vitamins (like vitamin D and B12) than dairy products [2]. For this reason, plant-based dairy alternatives are often fortified to provide the maximum amount of nutrients [1]. Healthcare specialists generally assert that plant-based alternatives have lower nutritional value than dairy products, but they also concur that plant-based foods can be included in a balanced diet [3].

The conversation about diet decisions and sustainability has been very popular in the last several years, especially when it comes to dairy consumption. In light of worries about the effects on the environment, the welfare of animals, and individual health, more people are looking into dairy substitutes. A noteworthy change in eating habits is the growing acceptance of plant-based dairy substitutes [4-6].

For those looking for less expensive alternatives to regular milk for various reasons, it would be more beneficial to research plant-based, healthy, or blended milk analogues. Because of their functional and bioactive composition, the majority of the milk analogues on the market today, such as soya bean milk, oat milk, coconut milk, hemp milk, cocoa milk, and multigrain milk, are made by controlled fermentation [7]. These analogues are valued for their physiologically active constituents, which are frequently linked to their capacity to promote health and fend off disease. Analogues have several advantages over regular milk, one of which is that they need far less energy to manufacture each unit of milk than animal milk does, and their composition can constantly be changed to suit demand [8].

These days, customers choose cow milk substitutes because of lactose intolerance, allergies to cow milk, concerns about calories, the incidence of hypercholesterolemia, and a growing desire for vegan diets. An increasing number of people are turning to plant-based milk substitutes as an affordable option for those in developing nations with low incomes and in areas with a scarcity of cow's milk. While many creative plant-based food beverages are being used as alternatives to cow's milk, many of them have technological problems, whether they are connected to processing or preservation [9].

## 2. RESEARCH OBJECTIVES

1. To find out awareness of various plant-based dairy products
2. To find out the source of awareness of various plant-based dairy products
3. To find out the perception of plant-based dairy products

## 3. RESEARCH METHODOLOGY

The relevant data for the research study was collected by using a primary survey done by a questionnaire. The questionnaire was filled out by respondents using Google Forms. In the present study, there were around 100 number of respondents. Respondents were students and they were randomly selected from colleges in Anand City. The collected data was analysed using descriptive statistics.

## 4. RESULTS AND DISCUSSION

### 4.1 Demographic Profile of Respondents

The demographic characteristics of respondents from Colleges of Anand City were surveyed, covering various aspects such as gender, age, educational level, occupation of family, monthly family income and Area of residence. Table 1 Below is a detailed description of the data collected.

**Gender distribution:** The gender distribution of the respondents indicates a significantly higher number of females compared to males. Females constituted 68% of the total sample, while males accounted for 32%.

**Age distribution:** The age distribution shows a concentration in the younger age groups. The largest age group was 20-25 years, making up 78% of the total respondents. This was followed by those below 20 years (12%) and those aged 26-30 years (10%).

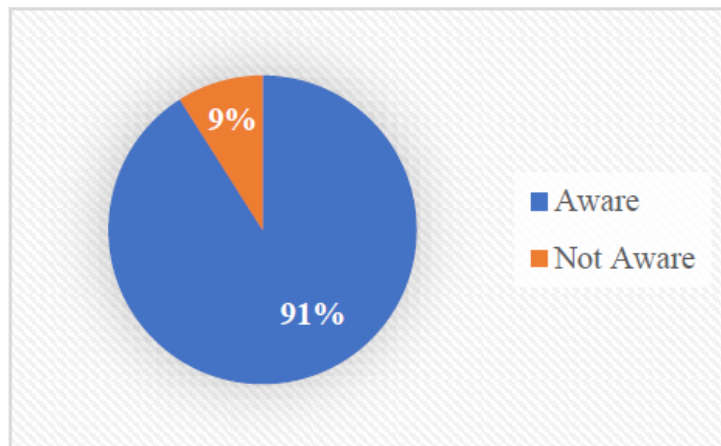
**Educational qualification:** Respondents' educational qualifications were divided into two categories. The majority of respondents were undergraduates, comprising 67% of the total, while postgraduates accounted for 33%.

**Occupation of family:** The occupational status of the respondents' families' reveals that 52% were engaged in agriculture. This was followed by 33% in jobs, while 15% were involved in business.

**Monthly family income:** Monthly family income was categorized into five brackets. The most common income bracket was more than 40000 INR, representing 46% of the respondents. The second most common income range was 30001 to 40000 INR, comprising 19% of respondents. The income ranges of 10000-20000 INR (14%), 20001-30000 INR (11%), and less than 10000 INR (10%) followed.

**Table 1. Demographic Profile of Respondents (n=100)**

Sr. No	Particular	No. of respondents	Percentage (%)
<b>Gender</b>			
1	Male	32	32
2	Female	68	68
	<b>Total</b>	<b>100</b>	<b>100</b>
<b>Age</b>			
1	Below 20	12	12
2	20-25	78	78
3	26-30	10	10
	<b>Total</b>	<b>100</b>	<b>100</b>
<b>Education Level</b>			
1	Undergraduate	67	67
2	Postgraduate	33	33
	<b>Total</b>	<b>100</b>	<b>100</b>
<b>Occupation of family</b>			
1	Agriculture	52	52
2	Job	33	33
3	Business	15	15
	<b>Total</b>	<b>100</b>	<b>100</b>
<b>Monthly Family Income</b>			
1	<10000	10	10
2	10000 - 20000	14	14
3	20001 - 30000	11	11
4	30001 - 40000	19	19
5	More than 40000	46	46
	<b>Total</b>	<b>100</b>	<b>100</b>
<b>Area of residence</b>			
1	Rural	68	68
2	Urban	32	32
	<b>Total</b>	<b>100</b>	<b>100</b>



**Fig. 1. Awareness of Plant-Based Dairy Alternative**

**Area of residence:** The survey also captured the type of residential area. Rural residents were more common, accounting for 68% of the total respondents, while urban residents represented 32% of the respondents.

**4.2 Awareness of Plant-based Dairy Alternative Products**

The awareness of plant-based dairy alternative products is shown in the below chart.

The pie chart shows that 91% of respondents are aware of plant-based dairy alternative products. This is a high number, given the growing popularity of these products in recent years. Only 9% of people are not aware of plant-based dairy alternative products. This shows that of every 10 respondents 9 are aware of plant-based dairy alternative products.

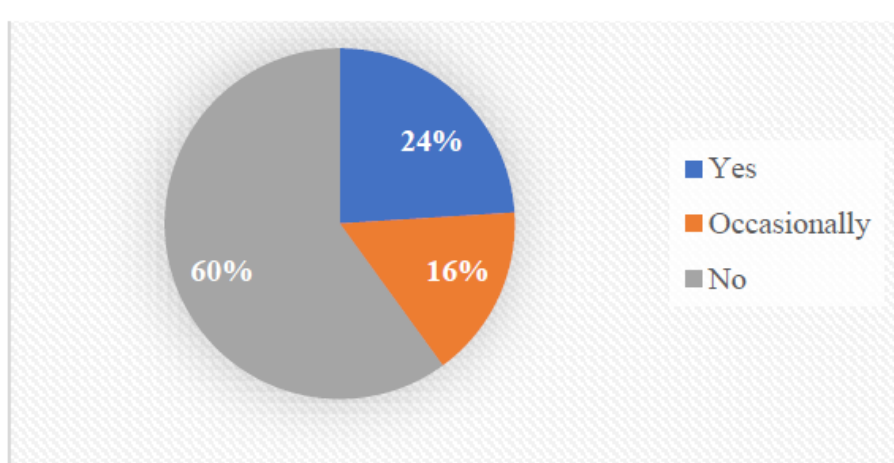
**4.3 Respondents Who Follow a Vegan Diet**

The no of respondents who follow vegan diet are shown in below chart.

The pie chart shows most respondents (60%) do not follow a vegan diet. A smaller proportion of respondents (24%) follow a vegan diet all the time, and a very small proportion of respondents (16%) follow a vegan diet occasionally.

**4.4 Analysis of Awareness and Vegan Diet with Respect to the Area of Residence of Respondents**

The awareness with respect to the area of residence about plant-based dairy alternative products is shown in the below Table 2.



**Fig. 2. Respondents following vegan diet**

**Table 2. Study of awareness & area of respondent (n=100)**

Sr No.	Area of Residence of respondents	Aware Respondents (%)	Not Aware Respondents (%)
1	Rural	92.65	7.35
2	Urban	87.50	12.50

**Table 3. Respondent Following Vegan Diet & Area of Respondent (n=100)**

Sr no.	Area of Residence of Respondents	Regularly Following (%)	Occasionally Following (%)	Not following (%)
1	Rural	20.59	13.24	66.18
2	Urban	28.13	25.00	46.88

Table 2 shows out of 68 respondents from rural areas 92.65% are aware of plant-based dairy alternative products, while out of 32 respondents from urban areas 87.50% are aware of plant-based dairy alternative products. There is a slightly higher awareness in rural areas compared to urban areas.

The no of respondents following a vegan diet with respect to area of residence about plant-based dairy alternative products is shown in the below table.

Table 3 shows 28.13% of respondents from urban areas said they regularly follow a vegan diet, compared to 20.59% of respondents from rural areas. 25.00% of respondents from urban areas said they occasionally follow a vegan diet, compared to 13.24% of respondents from rural areas and 46.88% of respondents from urban areas said they do not follow a vegan diet, compared to 66.18% of respondents from rural areas. Overall Urban area follows a vegan diet more than the rural area however total no of respondents not following a vegan diet is higher than the following.

#### 4.5 Awareness of Different Plant-based Dairy Alternative Products

The Table 4 shows the specific product awareness of different plant-based dairy alternative products among 91 respondents (who were aware of plant-based dairy products).

From Table 4, Soy milk and almond milk were the most well-known plant-based milk alternatives, with over 86% of respondents being aware of them. Oat milk had moderate awareness, with around two-thirds of respondents knowing about it. Coconut milk had slightly lower awareness than oat milk. Cashew milk was the least well-known option, with only about half of respondents being aware of it.

#### 4.6 Awareness of Different Brands of Plant-based Dairy Alternative Products

The Table 5 shows the brand awareness of different plant-based dairy alternative products among 91 respondents (who were aware of plant-based dairy products).

Epigamia was the most recognizable brand, with over 60% of respondents aware of it.

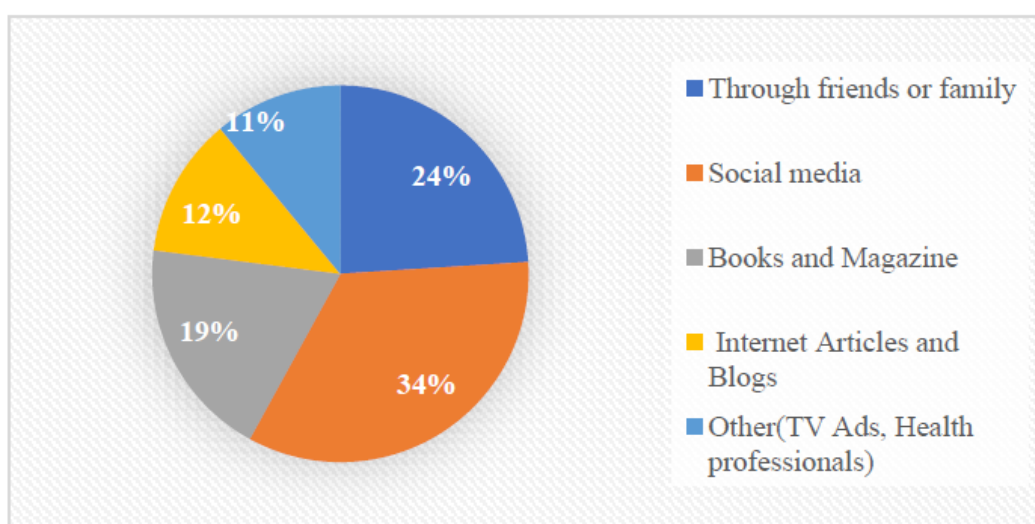
Goodmylk, Urban Platter and VDC Vegan Drink Company have moderate brand awareness, ranging from 35% to 50% of respondents being aware. Alt Company, Happy Jars, Nourish You and Dancing Cow have lower brand awareness, with less than 33% of respondents familiar with them. This is the data taken from a survey it doesn't represent the market share of the brand.

**Table 4. Respondents Awareness About Specific Plant-Based Dairy Alternative Product (n=100)**

Sr. No.	Product	No of respondent	Percentage
1	Almond milk	79	86.81
2	Soy Milk	80	87.91
3	Oat Milk	62	68.13
4	Coconut Milk	69	75.82
5	Cashew Milk	51	56.04

**Table 5. Respondents awareness about specific brand of plant-based dairy alternatives (n=100)**

Sr. No.	Brand	No of respondent	Percentage
1	Goodmylk	44	48.35
2	Epigamia	56	61.54
3	Urban Platter	36	39.56
4	Happy Jars	27	29.67
5	Alt Company	30	32.97
6	VDC Vegan Drink Company	32	35.16
7	Dancing Cow	24	26.37
8	Nourish You	26	28.57



**Fig. 3. Source of awareness**

#### 4.7 Source of Awareness of Plant-based Dairy Alternative Products

Various Sources of awareness about plant-based dairy alternative products are shown in the below chart.

The pie chart shows 34% of respondents cited social media as a source of awareness about plant-based dairy alternatives. 24% of respondents learned about plant-based dairy alternatives through friends or family. 19% of respondents found information through online articles and blogs. 11% of respondents cited books and magazines as a source of awareness. 12% of respondents learned about plant-based dairy alternatives through other sources, including TV advertisements and health

professionals. Social media and friends and family are leading sources of awareness.

#### 4.8 Respondents' Preference towards the Cost of Plant-based Dairy Alternative Products

The Table 6 shows the Respondents' preference towards the cost of plant-based dairy alternative products.

Table 6 shows that Almost half (43%) of the respondents find plant-based dairy alternatives to be too expensive. A significant portion (28%) are unsure about the cost, suggesting they might need more information or be open to persuasion. Only 29% find the current cost reasonable, indicating a potential challenge for wider adoption of these products.

**Table 6. Respondents' Preference Towards Cost of Plant-Based Dairy Alternative Products (n=100)**

Sr No.	Preference towards cost	No of respondents	Percentage
1	Yes, it's reasonable	29	29.00
2	Not sure	28	28.00
3	No, it's too expensive	43	43.00
<b>Total</b>		<b>100</b>	<b>100.00</b>

**Table 7. Respondents' Preference Towards Trying New Plant-Based Dairy Alternative Products (n=100)**

Sr No.	Preference to try new products	No of respondents	Percentage
1	Yes	46	46.00
2	Maybe	30	30.00
3	No	24	24.00
<b>Total</b>		<b>100</b>	<b>100.00</b>

**Table 8. Respondents' Preference to Recommend Probiotic Dairy Products to Friends and Family (n=100)**

Sr No.	Preference towards recommendation	No of respondents	Percentage
1	Yes	37	37.00
2	Not sure	32	32.00
3	No	31	31.00
<b>Total</b>		<b>100</b>	<b>100.00</b>

#### 4.9 Respondents' Preference towards Trying New Plant-based Dairy Alternatives

The Respondents' preference towards trying new plant-based dairy alternatives is shown in the below table.

Table 7 shows that 46% of respondents said they would try new plant-based dairy products, 30% of respondents said they might try new plant-based dairy products and 24% of respondents said they would not try new plant-based dairy products.

#### 4.10 Detail about Respondents' Preference to Recommend Plant-based Dairy Alternative Products to Friends and Family

The Detail about respondents' preference to recommend plant-based dairy alternative products to friends and family are shown in the below table.

Table 8 shows that 37% of respondents said they would recommend probiotic dairy products to friends and family. 32% of respondents said they were not sure, and 31% of respondents said they

would not recommend probiotic dairy products to friends and family [10,11].

### 5. CONCLUSION

The majority of respondents in the study were male (68%), belonged to the 20-25 years age group, were studying in undergraduate course (67%), their family background belonged to agriculture (52%) and their family's monthly income was around ₹ 40000(46%). Further, the Majority of respondents belonged to rural areas and they were found to be aware of probiotic dairy products.

The main source of awareness about probiotic dairy products was found to be books, social media, and friends and family. The finding also suggests that the majority of the respondents were aware of almond milk, soy milk and coconut milk. Further, Epigamia and Goodmylk both brands were more popular among respondents.

Only around 46% of respondents were willing to try new plant-based dairy alternatives. About 29% of the respondents believed that plant-based dairy alternative dairy products are more expensive than normal dairy products. Aware

respondents (37%) were happy and willing to recommend probiotic dairy products to their family and friends.

### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

### CONSENT

As per international standards or university standards, respondents' written consent has been collected and preserved by the author(s).

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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