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Dairy Milk and Plant-Based Alternative

Beverage Purchasing Factors:

Consumer Insights

Jeffrey Alan Rime

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Science

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ABSTRACT

Dairy Milk and Plant-Based Alternative Beverage Purchasing Factors: Consumer Insights

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Master of Science

From 2000 to 2019, total volume of fluid milk consumption in the USA has steadily fallen. Many factors have played a role in this trend, including competition with plant-based alternative beverages (PBABs). Comparably, sales of PBABs such as almond “milk” have increased over the same duration. Consumer research has identified key beverage characteristics as purchase drivers for both beverage types. This study sought to evaluate the relative importance of these characteristics, investigate the effect of label statements on ratings of their acceptability, and analyze the settings in which and occasions during which consumption of dairy milk and PBABs occurs.

This study consisted of two parts. First, a national survey was distributed to “dual consumers,” those who regularly consume both dairy milk and PBABs. The objectives were to quantify consumer perception of various beverage qualities, evaluate the impact of select label claims and statements on perception of the beverage qualities, and identify when and where dairy milk and PBABs are being consumed. Sensory analysis was also used to determine consumer perception of the various beverage qualities in a consumption experience. We investigated changes of perception during the consumption experience and compared sensory output to corresponding responses from the national survey.

Of the on-label messaging explored in this study, “Manufactured without the use of steroids” was the most impactful for increasing positive perceptions of dairy milk, while “Traditionally processed” and “Contains no bioengineered ingredients” negatively affected perceptions. There are many settings outside of the the home and times of the day other than breakfast in which occasional dairy milk and PBAB consumption takes place, indicating available opportunities to market dairy milk and PBABs.

Keywords: milk, dairy, plant based beverage, purchase, consumer, sensory

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INTRODUCTION

Dairy milk, defined by the Food and Drug Administration (**FDA**), is “the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy cows” (Food and Drug Administration, 1977). In this study, a plant-based alternative beverage (**PBAB**), for which there is no standard of identity, or FDA definition, is a beverage made using one or more of almond, soy, coconut, oat, rice, cashew, macadamia, hemp, quinoa, or other plant sources that contains no dairy ingredients. PBABs are commonly labeled as “milks,” e.g. “almond milk” and “soy milk,” even though usage in this context does not satisfy the standard of identity for milk. This illegal usage of the term “milk” suggests to consumers a false equivalence of the two beverage types (Singhal et al., 2017), and inappropriate substitution of dairy milk increases the risk of dietary deficiency (Mehta et al., 2013; Lee et al., 2014).

Over the five-year period of 2012 to 2017, sales of dairy milk and PBABs changed considerably. Sales of low-fat and skim milk, comprising the largest share of the fluid dairy milk market, decreased 28%, from \$11.9B to \$8.50B. Although sales of flavored milk, shelf-stable dairy milk, and whole milk rose 18%, 10%, and 8%, respectively, total sales in the dairy milk category fell 15%, from \$18.9B to \$16.1B (Mintel, 2017a). Comparatively, overall sales of PBABs grew 61% over the 2012-2017 period, from \$1.31B to \$2.11B. Sales of almond- and coconut-based alternative beverages increased 149%, and 78%, respectively, while sales of soy-based alternative beverages decreased 52%. As of 2017, almond-, soy-, and coconut-based alternative beverages comprised 64%, 13%, and 12% of the market share, respectively (Mintel, 2017b).

The perceptions consumers hold about dairy milk and PBABs have contributed to these sales trends. While they are not always consistent with truth (Bus and Worsley, 2003),

consumers' perceptions hold considerable leverage when it comes to purchasing decisions.

Consumers are subject to a diversity of on-label messaging at the point of sale, which can add to the misconceptions they may have about both beverage types. Conventional dairy milk packaging typically trails that of PBABs in regards to on-label messaging; while PBAB labeling often prominently displays its plant source alongside a spread of compositional and/or health claims, dairy milk labeling seldom consists of anything more than what is legally required, namely the ingredient declaration and nutrition facts panel. This gap in labeling practices does not aid in dispelling untrue perceptions about these beverages.

The nutritional composition of dairy milk differs from that of PBABs, and nutritional composition of PBABs varies from product to product. PBABs are perceived to be healthy, though the quality of plant-based protein is inferior to that contained in dairy milk, and most PBABs are too lacking in protein, vitamin, and mineral content to be considered adequate substitutes for dairy milk (Singhal et al., 2017). Because dairy milk has a standard of identity, variance in its nutritional composition between brands is minimal. On the other hand, the absence of a standard of identity gives PBABs plentiful flexibility in composition, which allows PBAB manufacturers to tailor beverage varieties to the demands and preferences of their consumers, taking advantage of consumers' perceptions. In a mall-intercept study of U.S. consumers, Roe et al. (1999) found that the presence of nutrient content claims led consumers to truncate their information search on food packaging; that is, consumers did not inspect the nutrition facts panel or sections other than the front panel of food packages containing nutrient content claims. As PBAB packaging often presents an abundance of claims on the front panel, PBAB manufacturers seemingly have taken note of this phenomenon and are playing into it at great benefit. Value-added dairy milk, a segment of dairy milk that has emerged recently, has

also adopted this practice. In contrast to traditional or conventional dairy milk, value-added dairy milk may be free of lactose, fortified with vitamin D, or have undergone additional processing to differ compositionally from traditional dairy milk. Fairlife® is a prominent brand in this segment of dairy milk, and features nutrition claims on the front panel. While sales in the dairy milk category overall have decreased, sales of value-added dairy milk have consistently risen (Mintel, 2019; Byington, 2020), likely at least partially due to labeling practices.

For exclusive consumers of PBABs, work by McCarthy et al. (2017) suggests the desire to consume fewer animal products, beliefs about animal mistreatment, and the perception that PBABs exhibit a lower environmental toll than dairy milk are significant motivators for purchase. The authors also suggested that exclusive dairy milk consumers perceive dairy milk as a staple food item, with perceived necessity as a purchase motivator. Dual consumers, a term used by McCarthy et al. in reference to consumers who regularly consume both dairy milk and PBABs, may be more persuaded by on-label messaging than either exclusive beverage consumer group, because the dual consumers surveyed in the study rated various beverage attributes as “attractive” whereas respondents in both exclusive groups rated them as “indifferent.” McCarthy et al. also reported that sugar level may be the most important product attribute considered by exclusive PBAB consumers and fat content, package size, and label claims, respectively, may be the most important product attributes considered by exclusive dairy milk consumers. They further propose that milk or milk-based beverages that are lactose-free or reduced in carbohydrate, but are still good sources of protein and calcium, may be impactful in bringing dual consumers back to consuming solely milk or milk-based beverages (McCarthy et al., 2017). While various traits of dairy milk and PBABs have been identified as important to consumers, the effect of on-label messaging on consumer perceptions of beverages is an area needing

exploration. A limitation of the study by McCarthy et al. (2017) was the predominance of qualitative data. It would be helpful to quantify consumer perceptions and acceptance of key beverage characteristics using a directional Likert scale, so that relative importance of the beverage characteristics can be obtained. Additionally, asking questions about the acceptability of key beverage characteristics in the products that consumers regularly purchase can show the areas in which these beverages could be improved.

Research on consumer eating patterns has shown the most frequent consumption of solid food for U.S. adults occurs in the home (Liu et al., 2015). Phan and Chambers (2018) explored the different motivators for daytime consumption and nighttime consumption of solid food and meals for U.S. adults. In a study of New Zealand consumption patterns, Mueller Loose and Jaeger (2012) identified specific usage nuances of dairy milk and other beverages, though PBABs were not explicitly included as their own category. A study of the time-of-day and location patterns of beverage consumption of U.S. adults that differentiates between dairy milk and PBABs is of vital importance to better understand the habits of U.S. dual consumers.

The objectives of our study were to (1) quantify the importance of relevant beverage characteristics for dual consumers in general and the acceptability of those characteristics in the dairy milk and PBABs that they regularly purchase, and to measure the effect of on-label messaging for both beverages; (2) investigate the influence of relevant on-label messaging, identified in (Objective 1), on acceptability ratings of the beverage characteristics. Determine the imagined eating experience and purchase likelihood of dairy milk and PBABs which display the on-label messaging relevant to dual consumers; (3) Assess whether the findings of (Objective 2) are substantiated by consumer sensory panels; and (4) Identify the consumption occasions (time

of day) and consumption settings (location) in which dual consumers drink each type of beverage.

MATERIALS AND METHODS

Overview

Two national surveys and one consumer sensory panel were conducted. The purpose of Survey 1 was to assess consumer perceptions of dairy milk and PBABs, the importance of various characteristics of those beverages, and when and how they are consumed. The purpose of Survey 2 was to determine the effect of on-label messaging on the acceptability of both beverage categories. The sensory panel was conducted to determine whether consumer perceptions of dairy milk in a consumption experience were consistent with data collected in Survey 2. The sensory panel used in this study differed from conventional sensory panels in that it assessed consumer insights in the presence of a sample, as opposed to quantifying panelists' ratings of sensorial properties. Subjects recruited for all parts of the study were selected based on their regularly consuming both dairy milk and PBABs, being a primary shopper, being at least 18 years of age, and being a U.S. resident.

All in-person studies were completed at the Brigham Young University (BYU) Sensory Lab (Provo, Utah) using subjects from its database. Participation in all studies was incentivized with a monetary reward and in compliance with guidelines of the university's Institutional Review Board (IRB); participants provided their informed consent.

National surveys were distributed via online format to U.S. residents, with equal representation from the 4 regions of the country as defined by the U.S. Census: West, Midwest, Northeast, and South. Subjects were recruited via convenience sampling by ESOMAR, a partner company to Qualtrics (Provo, Utah).

Development of Survey 1

Literature findings (McCarthy et al., 2017; Mintel, 2017a; Mintel, 2017b) and focus groups were used to generate a preliminary draft of Survey 1, followed by cognitive interviews to improve and finalize it.

Three 50-minute focus groups involving dual consumers of dairy milk and PBABs were conducted to understand why they purchase both beverage types, and to canvass their perceptions of both beverages. Efforts were also made to identify changes to in processing or composition that might influence perceptions and purchase intent. Subjects were asked what kinds of dairy milk and PBABs they purchase, why they purchase them, and how they use them. They were also asked open-ended questions about the following topics regarding both beverages: purchasing factors, memorable on-label messaging, the relevance of nutrition, safety, economic impact, value, and quality, and formulation. Each session followed the same script and was moderated by the same individual. Ten consumers participated in the first session, 9 in the second, and 8 in the third. The gender breakdown over all sessions was 16 women (59%) and 11 men (41%). Focus group results were used to further develop the Survey 1 questionnaire.

Next, to gauge congruency between question intent and subjects' understanding, 10 participants completed a pilot questionnaire and wrote down anything they found confusing (such as wording and formatting) and suggested changes. Researchers were present to answer any questions during the process. Six additional participants tested the questionnaire on their personal smart phones and tablets to gauge the ease of use on these types of devices. Following this step, the final draft of Survey 1 was created.

Survey 1: Assessing Consumer Perceptions of Dairy Milk and PBABs

The final questionnaire was distributed to 1013 subjects. Of the total subjects' responses, 132 were excluded from analysis for indicating they either never consume dairy milk or never consume PBABs, resulting in a final number of 881 responses. Subjects first answered demographic questions relating to age, biological sex, marital status, education level, household income level, and perceived healthiness of dietary habits. Next, they were asked "Check All That Apply" (CATA) questions about the types of dairy milk and PBABs they purchase and consume. Type of beverage information obtained included brand, composition/nutrition, and for PBABs, source. Subjects were also asked CATA questions about the occasions and settings in which they consume each type of beverage. They were then asked to rate the importance of beverage characteristics in the context of 5 perception categories (nutrition, food safety, cost, environmental impact, and quality) for dairy milk and PBABs in general, using a discrete 5-point Likert scale where 5 = definitely important, 4 = somewhat important, 3 = neither important nor unimportant, 2 = somewhat unimportant, 1 = definitely unimportant.

Finally, subjects were asked to rate the acceptability of those beverage characteristics in the context of the same perception categories for the dairy milk and PBABs they regularly purchase, using a discrete 5-point Likert scale where 5 = definitely acceptable, 4 = somewhat acceptable, 3 = neither acceptable nor unacceptable, 2 = somewhat unacceptable, 1 = definitely unacceptable.

Survey 1: Assessing Consumer Usage Habits of Dairy Milk and PBABs

Subjects indicated how often (frequently, occasionally, never) they regularly consume different types of dairy milk and PBABs, how often they consume them in various consumption settings, and how often they consume them during various consumption occasions. Types of

dairy milk included whole/vitamin D, 2% fat, 1% fat, and fat-free/skim. Types of PBABs included almond, coconut, soy, cashew, oat, rice, hazelnut, banana, hemp, flax seed, quinoa, and other. Consumption settings consisted of home, work, sit-down restaurant, fast food restaurant, convenience store, grocery store or supermarket, mall or store, school, on the go, and other. These settings were chosen according to previous studies (Mueller Loose and Jaeger, 2012; Liu et al., 2015). Consumption occasions consisted of early morning snack, breakfast, mid morning snack, lunch, mid afternoon snack, dinner, after dinner snack, and late night snack.

Development of Survey 2

Potential label statements for Survey 2 were created based on rankings of the means of ratings of importance and acceptability of beverage characteristics gathered in Survey 1. The general beverage characteristics ranked as most important were compared with those having the lowest acceptability scores for dairy milk and PBAB products regularly purchased by subjects. Proposed label statements, reflecting the most relevant beverage characteristics, were: 1) “No steroids were used during production of this beverage” (dairy milk) / “No chemical fertilizer was used during production of this beverage” (PBAB); 2) “Contains no bioengineered ingredients;” 3) “Traditionally processed;” 4) “Sustainably produced;” and 5) “Manufactured without the use of antibiotics” (dairy milk) / “Manufactured without the use of herbicides” (PBAB).

Questions in Survey 2 included those where subjects were asked to rate overall characteristics (quality, safety, nutrition, environmental impact, and cost) of dairy milk and PBABs in the context of a label statement containing relevant messaging (amount of steroids/fertilizer, amount of bioengineered ingredients, amount of processing, sustainability, amount of antibiotics/herbicides). Due to the presence of overall quality, overall safety, overall

nutrition, and overall environmental impact on the list of relevant beverage characteristics, overall cost, being the only “overall” characteristic left out, was added.

Survey 2: The Effect of On-Label Messaging on Acceptability of Dairy Milk and PBABs

Survey 2 assessed the effect of the previously described label statements on perceived acceptability of the dairy milk and PBABs regularly purchased by dual consumers. Six questionnaire versions were implemented: five versions referencing 1 of the 5 label statements, identical except for the respective label statement, and a control version referencing no label statement. Subjects (n=1259) were randomly assigned one version of the survey each, with approximately 210 subjects receiving each version. Of the number of responses, 93 were excluded from analysis because of poor response quality, such as giving inconsistent responses. After answering demographics questions identical to those in Survey 1, subjects rated their expected acceptability and purchase willingness for the dairy milk and PBABs that they regularly purchase, in the context of the respective label statement. The control questionnaire asked subjects to rate the acceptability for the dairy milk and PBAB they regularly purchase, without the context of a label statement, much like in Survey 1.

Subjects who received questionnaires 1-5 also provided their expected ratings of overall nutrition, overall food safety, overall cost, overall environmental impact, overall quality, and overall drinking experience for the dairy milk and PBAB they regularly purchase, if “*Statement*” was printed on the label, using a discrete 5-point Likert scale where 5 = definitely acceptable, 4 = somewhat acceptable, 3 = neither acceptable nor unacceptable, 2 = somewhat unacceptable, 1 = definitely unacceptable. Subjects who received the control questionnaire rated these characteristics of the dairy milk and PBABs they regularly purchase, as the beverages are, using the same Likert scale. Additionally, subjects who received questionnaires 1-5 rated their

purchase willingness for the dairy milk and PBAB they regularly purchase, if “*Statement*” was printed on the label, using a discrete 5-point Likert scale where 5 = definitely more willing to purchase, 4 = somewhat more willing to purchase, 3 = neither more willing nor less willing to purchase, 2 = somewhat less willing to purchase, 1 = definitely less willing to purchase. Then, these subjects rated the comparative acceptability of overall nutrition, overall food safety, overall cost, overall environmental impact, and overall quality of the dairy milk and PBAB they regularly purchase, if “*Statement*” was printed on the label, using a discrete 5-point Likert scale where 5 = definitely more acceptable, 4 = somewhat more acceptable, 3 = neither more acceptable nor less acceptable, 2 = somewhat less acceptable, and 1 = definitely less acceptable. Because no label statements were tested on the control questionnaire, subjects who received the control were not asked to rate overall drinking experience, purchase willingness, or comparative acceptability.

Sensory Panels: The Effect of On-Label Messaging on Acceptability of Dairy Milk

Survey 2 gauged the effect of relevant label statements on the acceptability of beverage characteristics, imagined eating experience, and purchase likelihood of dairy milk and PBABs for dual consumers. The effect of label statements on acceptability perceptions of dairy milk in a consumption setting was evaluated through consumer sensory panels, in order to show whether attitudes and perceptions expressed in the survey would correlate with sensory panel results. In essence, the sensory panel explored consumer insights of dairy milk before and after trying a dairy milk sample. Panelists did not rate sensorial properties of the sample such as taste, aroma, or texture, as they would in a conventional sensory panel. The 5 label statements identified in Survey 1 and tested in Survey 2 were employed in these panels. Six consumer sensory panels with ≥ 88 panelists in each were conducted at the Brigham Young University Sensory Laboratory

(Provo, UT); five individual panels each tested a product identified by a different label statement. A control group tested a product identified only by the statement, “2% milk.” Milk with 2% fat was used in all panels because it was the type that respondents from Survey 1 indicated they consume most frequently. Market research also reported dairy milk with 2% milkfat to be the variety most frequently purchased by U.S. residents (Mintel, 2019). The gender ratio was 43% male to 57% female among age categories between 18 to 24 years and 55 years or older.

Milk was purchased from a local grocery store the day before the first panel and kept sealed in an industrial refrigerator. All of the milk came from the same lot and had the same “best by” date. Each 90 ml sample was served in a 150 ml translucent plastic cup. Milk was poured directly from the jug into the sample cups as needed. Only 1 jug was pulled from the refrigerator at a time. Jugs were replaced on the hour if they were not fully used during the immediately previous hour during each individual panel.

The panels were conducted in 6 sessions over 3 days with 1 session each morning and 1 each afternoon. In each 3-hour session, panelists received 1 sample with a single 3-digit blinding code unique to the session. Samples were received through pass-through compartments in isolated booths.

Questions were presented one-at-a-time on a computer screen and data were collected using Compusense® Cloud software (Compusense Inc., Guelph, Ontario, Canada). Panelists first answered demographic and screening questions to validate information gathered during recruitment. Then, panelists completed a 2-part questionnaire, rating the acceptability of the dairy milk they regularly purchase and rating the acceptability of a dairy milk sample provided in the panel.

In the first part of the questionnaire, panelists answered questions about the dairy milk they regularly purchase, in the context of a label statement (*“Statement”*) and rated their expected overall drinking experience for the dairy milk they regularly purchase, if *“Statement”* was printed on the label, using a discrete 5-point Likert scale where 5 = definitely acceptable, 3 = neither acceptable nor unacceptable, 1 = definitely unacceptable. Then, panelists indicated how much more or less acceptable they would expect to rate the overall nutrition, overall food safety, overall cost, overall environmental impact, and overall quality of the dairy milk the regularly purchase, if *“Statement”* was printed on the label, using a discrete 5-point Likert scale where 5 = definitely more acceptable, 3 = neither more acceptable nor less acceptable, 1 = definitely less acceptable. Panelists rated their purchase willingness for the dairy milk they regularly purchase, if *“Statement”* was printed on the label, using a discrete 5-point Likert scale where 5 = definitely more willing to purchase, 3 = neither more willing nor less willing to purchase, and 1 = definitely less willing to purchase.

Before proceeding to the second part of the questionnaire, each panelist was given a sample and instructed that it came from a container with *“Statement”* printed on the label. After tasting their sample, panelists answered the second part of the questionnaire. Panelists rated the overall drinking experience, overall nutrition, overall food safety, overall cost, overall environmental impact, overall quality, and purchase willingness of the sample using 5-point Likert scales in the same way as in the first part of the questionnaire; “given that ‘*Statement*’ was printed on the label” was emphasized in each question. Panelists also gave their actual ratings of the sample. Panelists were compensated monetarily for their time.

Statistical Analyses

For each part of the study, dependent variables were compared against each other using analysis of variance (ANOVA) with significance at the $\alpha = 0.05$ level. Explanatory variables were compared against other explanatory variables and against dependent variables using chi-square and Tukey adjustment for multiple comparisons with significance at the $\alpha = 0.005$ level. All statistical analyses were performed using Statistical Analysis Software (SAS), version 9.4.

RESULTS AND DISCUSSION

Preliminary Focus Group

Focus group participants indicated that “natural,” “organic,” and “local” were memorable messaging on dairy milk labels, while “healthy” and “lactose-free” were memorable messaging on PBABs. In contrast to the plain, semitranslucent jugs used for dairy milk, the vibrant packaging of certain PBABs is an enticing feature for some consumers and a purchase deterrent for others, who feel that the use of novel packaging has implications of high pricing. More sourcing information about the contents and cleaner labels are desired for PBABs. Motivators for purchase of PBABs include the desire to eat healthy, as well as dietary restrictions, compositional characteristics including their lower sugar level and lower caloric content than dairy milk, and the perception that PBABs are more healthy than dairy milk. Motivators for purchase of dairy milk include the desire for adequate children’s nutrition and cravings that aren’t satisfied by PBABs. Participants believed that dairy milk consumption promotes bone health and doubt that other foods provide that benefit. Cow hormones in dairy milk are a concern, while dairy milk’s lower price than that of PBABs is appealing. Table 11 shows the concepts participants associate with the terms nutrition, safety, economic impact, environmental impact, value, and quality for both beverages. Participants desire dairy milk that does not contain antibiotics and PBABs made from higher quality almonds than what is presently offered, and almond-based PBABs with higher protein content. Participants desire more information on dairy milk labels about why certain ingredients are added to or removed, where the cows have grazed, and whether the cows that provided the milk had been treated with antibiotics. Some participants question the practice of manufacturers labeling their products “milk” while others gain psychological comfort from its usage. Participants expressed a lack of trust in manufacturers of

both beverages, wondering whether PBAB manufacturers intentionally spread misinformation about dairy milk to sell their products, and how frequent negative narratives about dairy farms are portrayed through the media.

Importance and Acceptability Means from Survey 1

Building on the qualitative findings of the localized focus groups, the quantitative findings of Survey 1 are as follows. Table 1 shows the means of ratings of importance of the beverage characteristics in general for both beverages. Taste, overall quality, overall safety, overall nutrition, and amount of antibiotics/herbicides received the highest mean ratings of importance, in that order, for both beverage types, with mean ratings between 4.490 and 4.186 inclusive. Relative price received the lowest mean rating for both beverage types with mean ratings of 3.900 for dairy milk and 3.954 for PBABs, followed by overall environmental impact, amount of processing required, sustainability, and amount of calories. No characteristic received a mean rating lower than 3.900 or higher than 4.816.

In contrast to mean ratings of importance from Survey 1, Table 2 shows the means of ratings of acceptability of the beverage characteristics in the dairy milk and PBABs regularly purchased by subjects from Survey 1. While taste for dairy milk received the highest mean rating overall with 4.694, taste for PBABs scored 9th overall with a mean rating of 4.535. The highest scoring characteristic for PBABs was overall safety with 4.594, ranking 5th highest overall. For both beverages, amount of steroids/fertilizer received the lowest mean rating of acceptability, with mean ratings of 3.833 for dairy milk and 3.912 for PBABs. Additionally, amount of bioengineered ingredients, overall environmental impact, amount of processing, amount of antibiotics/herbicides, and availability of ingredient sourcing information on label were among the characteristics that received the lowest mean ratings, for both beverages, with mean ratings

between 3.875 and 4.131 inclusive. No characteristic received a mean rating lower than 3.833 or higher than 4.694. Results from Survey 1 (Tables 1 and 2) were used to generate label statements to be tested in Survey 2 and the sensory panels.

Generating Statements for Survey 2 and the Sensory Panels

Characteristics receiving the highest mean ratings of importance in general and lowest mean ratings of acceptability in products regularly purchased were deemed most relevant to dual consumers and thus, developed into label statements. Of the 22 characteristics tested in Survey 1, taste, overall quality, overall safety, overall nutrition, and amount of antibiotics/herbicides were the characteristics with the highest mean ratings of importance overall. Moreover, differences in mean ratings of these 5 characteristics were nearly at parity between beverage types; mean ratings of each of these characteristics for dairy milk differed from mean ratings of the same characteristic for PBABs by 0.05 or less points on the Likert scale. Comparatively, the lowest-ranking mean ratings for acceptability of dairy milk characteristics, in ascending order, were amount of steroids/fertilizer (3.833), amount of bioengineered ingredients (3.875), overall environmental impact (3.965), amount of processing (3.996), sustainability (4.001), and amount of antibiotics/herbicides (4.041). For PBABs, these were amount of steroids/fertilizer (3.912), relative price (3.956), amount of bioengineered ingredients (3.975), amount of processing (4.026), amount of antibiotics/herbicides (4.041). Thus, for both beverages, amount of steroids, amount of bioengineered ingredients, amount of processing, and amount of antibiotics/herbicides received the lowest mean ratings of acceptability, highlighting relevant concepts to address in the label statements. Additionally, among PBAB rating means, sustainability (4.160) and overall environmental impact (4.131) were not among the lowest mean ratings of acceptability, though they were within the lower half of the ratings, showing some consistency with their dairy milk

counterparts. While relative price of PBABs (3.956) was ranked among the lower half of mean ratings of acceptability, that of dairy milk (4.341) was rated among the upper half of mean ratings. Relative price was dismissed from consideration for label statements because its mean ranking was not consistent between both beverages; however, this inconsistency suggests that subjects find the relative price of dairy milk more acceptable than that of PBABs. Additionally, taste received the highest mean rating of acceptability overall for dairy milk (4.694) and was ranked 9th highest of the 22 characteristics for PBABs (4.535), indicating that overall, subjects already consider it an acceptable characteristic. Thus, taste was dismissed from consideration for label statements. The remainder of characteristics with highest ranked mean ratings of importance and lowest ranked mean ratings of acceptability (overall quality, overall safety, overall nutrition, amount of antibiotics/herbicides, amount of steroids/fertilizer, amount of bioengineered ingredients, overall environmental impact, amount of processing, sustainability) were considered most relevant to dual consumers, and were incorporated in the label statements for Survey 2 and the sensory panels.

Subject responses indicated that for most of the characteristics surveyed, there were differences in perception between how important the characteristic is in general and how acceptable the characteristic is in the products that subjects regularly purchase. Characteristics with the highest ratings of importance in general and lowest ratings of acceptability in products regularly purchased exemplify ways in which current offerings in dairy milk and PBABs have room to grow. The characteristic, amount of antibiotics/herbicides, meets both of those criteria, according to our Survey 1 results. Taste was an outlier among the characteristics surveyed because it received both high importance ratings and high acceptability ratings.

Table 1. Least-squares means of average ratings of importance¹ of characteristics of dairy milk and plant-based alternative beverages (n=881)

Characteristic	Beverage type ²	Estimate	Standard error	Degrees of freedom	Pr > t
Taste	PBAB	4.816	0.01557	1760	<.0001
Taste	DM	4.814	0.01557	1760	<.0001
Overall Quality	PBAB	4.791	0.01682	1760	<.0001
Overall Quality	DM	4.772	0.01682	1760	<.0001
Overall Safety	DM	4.722	0.02022	1760	<.0001
Overall Safety	PBAB	4.699	0.02022	1760	<.0001
Overall Nutrition	DM	4.589	0.02180	1760	<.0001
Overall Nutrition	PBAB	4.574	0.02180	1760	<.0001
Antibiotics/Herbicides	PBAB	4.545	0.02591	1760	<.0001
Antibiotics/Herbicides	DM	4.490	0.02591	1760	<.0001
Steroids/Fertilizer	DM	4.477	0.02948	1760	<.0001
Calcium	DM	4.443	0.02666	1760	<.0001
Sugar	PBAB	4.433	0.02909	1760	<.0001
Fat	DM	4.388	0.02809	1760	<.0001
Daily Needs	DM	4.360	0.02751	1760	<.0001
Vitamin D	DM	4.347	0.02808	1760	<.0001
Mouthfeel	PBAB	4.343	0.02698	1760	<.0001
Bioengineered Ingredients	DM	4.333	0.03200	1760	<.0001
Shelf Life	PBAB	4.330	0.02668	1760	<.0001
Source of Ingredients	PBAB	4.325	0.02884	1760	<.0001
Bioengineered Ingredients	PBAB	4.321	0.03200	1760	<.0001
Source of Ingredients	DM	4.311	0.02884	1760	<.0001
Calcium	PBAB	4.304	0.02666	1760	<.0001
Daily Needs	PBAB	4.300	0.02751	1760	<.0001
Protein	DM	4.300	0.02740	1760	<.0001
Fat	PBAB	4.293	0.02809	1760	<.0001
Overall Cost	PBAB	4.292	0.03005	1760	<.0001
Mouthfeel	DM	4.286	0.02698	1760	<.0001
Sugar	DM	4.286	0.02909	1760	<.0001

Protein	PBAB	4.285	0.02740	1760	<.0001
Steroids/Fertilizer	PBAB	4.261	0.02948	1760	<.0001
Shelf Life	DM	4.250	0.02668	1760	<.0001
Vitamin D	PBAB	4.250	0.02808	1760	<.0001
Overall Cost	DM	4.210	0.03005	1760	<.0001
Calories	PBAB	4.201	0.03116	1760	<.0001
Calories	DM	4.143	0.03116	1760	<.0001
Sustainability	PBAB	4.074	0.03209	1760	<.0001
Processing	PBAB	4.051	0.03285	1760	<.0001
Overall Environmental Impact	PBAB	4.043	0.03365	1760	<.0001
Sustainability	DM	4.017	0.03209	1760	<.0001
Processing	DM	4.006	0.03285	1760	<.0001
Relative Price	PBAB	3.954	0.03408	1760	<.0001
Overall Environmental Impact	DM	3.943	0.03365	1760	<.0001
Relative Price	DM	3.900	0.03408	1760	<.0001

¹Importance was rated on a 5-point scale, from “definitely unimportant” (1) to “definitely important” (5).

²DM: dairy milk; PBAB: plant-based alternative beverage

Table 2. Least-squares means of average ratings of acceptability¹ of characteristics of dairy milk and plant-based alternative beverages in products regularly purchased (n=881)

Characteristic	Beverage type ²	Estimate	Standard error	Degrees of freedom	Pr > t
Taste	DM	4.694	0.02197	1760	<.0001
Overall Quality	DM	4.641	0.02209	1760	<.0001
Overall Nutrition	DM	4.619	0.02116	1760	<.0001
Calcium	DM	4.595	0.02382	1760	<.0001
Overall Safety	PBAB	4.594	0.02342	1760	<.0001
Overall Quality	PBAB	4.572	0.02209	1760	<.0001
Vitamin D	DM	4.566	0.02457	1760	<.0001
Overall Nutrition	PBAB	4.547	0.02116	1760	<.0001
Taste	PBAB	4.535	0.02197	1760	<.0001
Overall Safety	DM	4.511	0.02342	1760	<.0001
Protein	DM	4.507	0.02416	1760	<.0001
Shelf Life	PBAB	4.454	0.02742	1760	<.0001

Daily Needs	DM	4.447	0.02561	1760	<.0001
Mouthfeel	DM	4.445	0.02597	1760	<.0001
Calories	PBAB	4.388	0.02624	1760	<.0001
Overall Cost	DM	4.383	0.02775	1760	<.0001
Protein	PBAB	4.377	0.02416	1760	<.0001
Calcium	PBAB	4.347	0.02382	1760	<.0001
Fat	DM	4.346	0.02786	1760	<.0001
Relative Price	DM	4.341	0.03149	1760	<.0001
Fat	PBAB	4.314	0.02786	1760	<.0001
Calories	DM	4.310	0.02624	1760	<.0001
Daily Needs	PBAB	4.307	0.02561	1760	<.0001
Vitamin D	PBAB	4.286	0.02457	1760	<.0001
Mouthfeel	PBAB	4.271	0.02597	1760	<.0001
Sugar	PBAB	4.224	0.03150	1760	<.0001
Sustainability	PBAB	4.160	0.03030	1760	<.0001
Shelf Life	DM	4.145	0.02742	1760	<.0001
Sugar	DM	4.142	0.03150	1760	<.0001
Overall Cost	PBAB	4.134	0.02775	1760	<.0001
Overall Environmental Impact	PBAB	4.131	0.03123	1760	<.0001
Source of Ingredients	PBAB	4.129	0.03098	1760	<.0001
Source of Ingredients	DM	4.081	0.03098	1760	<.0001
Antibiotics/Herbicides	DM	4.041	0.03308	1760	<.0001
Antibiotics/Herbicides	PBAB	4.041	0.03308	1760	<.0001
Processing	PBAB	4.026	0.03123	1760	<.0001
Sustainability	DM	4.001	0.03030	1760	<.0001
Processing	DM	3.996	0.03123	1760	<.0001
Bioengineered Ingredients	PBAB	3.975	0.03458	1760	<.0001
Overall Environmental Impact	DM	3.965	0.03123	1760	<.0001
Relative Price	PBAB	3.956	0.03149	1760	<.0001
Steroids/Fertilizer	PBAB	3.912	0.03477	1760	<.0001
Bioengineered Ingredients	DM	3.875	0.03458	1760	<.0001

Steroids/Fertilizer	DM	3.833	0.03477	1760	<.0001
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¹Acceptability was rated on a 5-point scale, from “definitely unacceptable” (1) to “definitely acceptable” (5).

²DM: dairy milk; PBAB: plant-based alternative beverage

Consumption Frequency: Consumption Settings

For both dairy milk and PBABs, “home” received the most “frequently” and “occasionally” responses of any consumption setting (Figures 1 and 2). These findings are supported by those of Mueller Loose and Jaeger (2012), who also found milk consumption more prominent in meals in the home for New Zealanders, and Liu et al. (2015), who found that all types of eating occasions occurred most frequently in the home for Americans. The setting “other” received the most “never” responses for both beverages. Dairy milk received more “occasionally” responses than PBABs in every other consumption setting. Similarly, dairy milk received more “occasionally” responses than PBABs in every other consumption setting except “work” and “convenience store,” where PBABs received marginally more responses than dairy milk. With the exception of “home,” the amount of “never” responses was the larger than that of “frequently” and “occasionally” for each consumption setting. The amount of “occasionally” responses was the next largest for each non-“home” consumption setting except “grocery store/supermarket” for dairy milk, where “frequently” and “occasionally” received almost equal amounts of responses. Outside of “home,” “grocery store” received the most “frequently” responses for both dairy milk and PBABs, while “restaurant” received the most “occasionally” responses for dairy milk and “on the go” for PBABs.

Consumption Frequency: Consumption Occasions

For both beverages, “breakfast” received the most “frequently” and “occasionally” responses of any consumption occasion (Figures 3 and 4). Similarly, Mueller Loose and Jaeger (2012) reported that breakfast was the most likely consumption occasion for milk for a New

Zealand sample. For every non-“breakfast” consumption occasion for both beverages, “never” was the most-selected response. With the exception of “breakfast” for dairy milk, the amount of “occasionally” responses was larger than the amount of “frequently” responses for all occasions, for both beverages. After “breakfast,” “early morning snack” received the largest amount of “frequently” responses for both beverages. “Dinner” received the third largest amount of “frequently” ratings for dairy milk, while “mid morning snack” received the third largest amount of “frequently” ratings for PBABs. For dairy milk, “lunch” received the largest amount of “occasionally” responses of any occasion, followed by “breakfast” and “mid morning snack.” For PBABs, “breakfast” received the largest number of “occasionally” responses of any occasion, followed by “lunch” and “mid morning snack.”

Consumption Frequency: Types of Dairy Milk and PBABs

Dairy milk with “2% fat” received the most “frequently” and “occasionally” ratings (Figure 5). This finding is consistent with that of Mintel (2019) which reports 2% milk as the most-purchased variety of dairy milk. “Fat-free/skim,” “1% fat,” and “whole/vitamin D” received nearly equal amounts of “frequently” ratings, while “other” received almost none. “1% fat,” “whole/vitamin D,” and “fat-free/skim” received intermediate amounts of “occasionally” ratings, while “other” received almost none. The amount of “occasionally” ratings exceeded the amount of “frequently” ratings in all non-“other” categories. After “other,” “fat-free/skim” received the most “never” ratings, followed by “whole/vitamin D,” “1% fat,” and “2% fat.”

Of the types of PBABs, “almond” received the most “frequently” and “occasionally” ratings (Figure 6). “Soy” received the next most “frequently” ratings, followed by “coconut” “cashew.” “Coconut,” received the second most “occasionally” ratings, followed by “soy” and “cashew.” Mintel (2019) also reports almond, coconut, and soy as the leading varieties of

PBABs in sales. Apart from “other,” “hemp” and “quinoa” both received the least “frequently” ratings and the least “occasionally” ratings. After “other,” “quinoa” received the largest amount of “never” ratings.

Comparing Survey 2 Means with Respect to Beverage Type

While Survey 1 asked subjects to rate the importance and acceptability of a wide variety of beverage characteristics, Survey 2 focused on acceptability of a qualified list of characteristics and purchase willingness, if a statement was printed on the label. Subjects rated the acceptability, using an absolute scale, and the comparative acceptability, using a relative scale to rate perceptions compared to whether the label statement was not present on the label.

The following differences in mean ratings of acceptability of beverage characteristics in Survey 2 between beverage types were significant (Table 3). For statement 4, “Sustainably produced,” the PBAB mean rating of acceptability was significantly higher than the dairy milk mean rating for overall environmental impact ($p=.0262$). For statement 5, “Manufactured without the use of antibiotics / Manufactured without the use of herbicides,” the PBAB mean ratings of acceptability were significantly higher than the dairy milk mean ratings for overall environmental impact ($p=.0341$) and overall quality ($p=.0196$). For the control, the PBAB mean rating of acceptability was significantly higher than the dairy milk mean rating for overall food safety ($p=.0196$), while the dairy milk mean rating of acceptability was significantly higher than the PBAB rating for overall cost ($p=.0007$) and overall environmental impact ($p<.0001$). No other differences in ratings of acceptability between beverage types in Survey 2 were found significant.

Similarly, Table 4 shows the differences in mean ratings of comparative acceptability of beverage characteristics in Survey 2 between beverage types. Two total differences in mean

ratings of comparative acceptability were significant. For statement 2, “Contains no bioengineered ingredients,” the PBAB mean rating of acceptability was significantly higher than the dairy milk mean rating for comparative overall environmental impact ($p=.0384$). For statement 5, “Manufactured without the use of antibiotics / Manufactured without the use of herbicides,” the PBAB mean rating of comparative acceptability was significantly higher than the dairy milk mean rating for overall environmental impact ($p=.0068$).

Table 3. Differences in mean ratings of acceptability¹ of overall characteristics and purchase willingness² of dairy milk and plant-based beverages in products regularly purchased from Survey 2

Characteristic	Statement ³	Estimate ⁴	Standard error	Degrees of freedom	P-value
Overall Cost	Steroids/Fert	0.0576	0.0883	380	0.5145
Overall Cost	Bio Ing	0.0933	0.0857	384	0.2773
Overall Cost	Trad Proc	0.0969	0.0925	393	0.2952
Overall Cost	Sustainability	-0.0226	0.0909	384	0.8041
Overall Cost	Antibio/Herbi	-0.0355	0.0869	392	0.6827
Overall Cost	Control	0.321	0.0944	383	0.0007
Overall Drinking Experience	Steroids/Fert	0.0367	0.0814	380	0.6527
Overall Drinking Experience	Bio Ing	-0.0518	0.0801	384	0.5181
Overall Drinking Experience	Trad Proc	0.0660	0.0856	392	0.4413
Overall Drinking Experience	Sustainability	-0.0155	0.0816	386	0.8498
Overall Drinking Experience	Antibio/Herbi	-0.0960	0.0823	394	0.2446
Overall Drinking Experience	Control	N/A	N/A	N/A	N/A
Overall Environmental Impact	Steroids/Fert	-0.105	0.0796	378	0.187
Overall Environmental Impact	Bio Ing	-0.0433	0.0878	383	0.6219
Overall Environmental Impact	Trad Proc	-0.167	0.106	394	0.1149
Overall Environmental Impact	Sustainability	-0.191	0.0854	386	0.0262
Overall Environmental Impact	Antibio/Herbi	-0.182	0.0855	394	0.0341
Overall Environmental Impact	Control	-0.508	0.0957	384	<.0001
Overall Food Safety	Steroids/Fert	0.0419	0.0735	380	0.569
Overall Food Safety	Bio Ing	0.0672	0.0796	382	0.3995

Overall Food Safety	Trad Proc	-0.0985	0.0831	392	0.2367
Overall Food Safety	Sustainability	-0.0567	0.0791	386	0.4739
Overall Food Safety	Antibio/Herbi	-0.0863	0.0865	392	0.319
Overall Food Safety	Control	-0.182	0.0778	382	0.0196
Overall Nutrition	Steroids/Fert	0.00799	0.0786	379	0.9191
Overall Nutrition	Bio Ing	0.0104	0.0750	384	0.8901
Overall Nutrition	Trad Proc	-0.0303	0.0944	394	0.7482
Overall Nutrition	Sustainability	-0.0337	0.0704	385	0.6326
Overall Nutrition	Antibio/Herbi	-0.136	0.0829	394	0.1006
Overall Nutrition	Control	-0.0777	0.0700	384	0.2674
Overall Quality	Steroids/Fert	0.0814	0.0775	379	0.2938
Overall Quality	Bio Ing	-0.0570	0.0720	384	0.4292
Overall Quality	Trad Proc	0.000974	0.0907	393	0.9914
Overall Quality	Sustainability	-0.0361	0.0749	386	0.6303
Overall Quality	Antibio/Herbi	-0.199	0.0851	393	0.0196
Overall Quality	Control	-0.140	0.0751	384	0.0632
Purchase Willingness	Steroids/Fert	-0.0471	0.0798	380	0.5551
Purchase Willingness	Bio Ing	-0.0363	0.0845	384	0.6679
Purchase Willingness	Trad Proc	-0.0152	0.0976	394	0.8768
Purchase Willingness	Sustainability	-0.150	0.0853	386	0.0805
Purchase Willingness	Antibio/Herbi	-0.157	0.0805	394	0.0524
Purchase Willingness	Control	N/A	N/A	N/A	N/A

¹Acceptability was rated on a 5-point scale, from “definitely unacceptable” (1) to “definitely acceptable” (5).

²Purchase willingness was rated on a 5-point scale, from “definitely less willing to purchase” (1) to “definitely more willing to purchase” (5).

³1: “No steroids were used during production of this beverage” / “No chemical fertilizer was used during production of this beverage;” 2: “Contains no bioengineered ingredients;” 3: “Traditionally processed;” 4: “Sustainably produced;” 5: “Manufactured without the use of antibiotics” / “Manufactured without the use of herbicides;” Control - No statement

⁴The estimate is the difference between means of dairy milk and plant-based alternative beverage ratings. A positive value indicates the dairy milk mean is greater than the plant-based alternative beverage mean. A negative value indicates the plant-based alternative beverage mean is greater than the dairy milk mean.

Table 4. Differences in mean ratings of comparative acceptability¹ of overall characteristics of dairy milk and plant-based alternative beverages in products regularly purchased from Survey 2

Characteristic	Statement ²	Estimate ³	Standard error	Degrees of freedom	P-value
Overall Cost	Steroids/Fert	0.0524	0.0874	380	0.5495
Overall Cost	Bio Ing	0.00518	0.0903	384	0.9543
Overall Cost	Trad Proc	0.000	0.102	394	1
Overall Cost	Sustainability	-0.0619	0.100	386	0.5383
Overall Cost	Antibio/Herbi	-0.0707	0.0913	394	0.4391
Overall Cost	Control	N/A	N/A	N/A	N/A
Overall Environmental Impact	Steroids/Fert	-0.120	0.0802	380	0.1341
Overall Environmental Impact	Bio Ing	-0.176	0.0848	384	0.0384
Overall Environmental Impact	Trad Proc	-0.177	0.109	394	0.107
Overall Environmental Impact	Sustainability	-0.103	0.0872	386	0.2378
Overall Environmental Impact	Antibio/Herbi	-0.217	0.0798	394	0.0068
Overall Environmental Impact	Control	N/A	N/A	N/A	N/A
Overall Food Safety	Steroids/Fert	-0.0419	0.0737	380	0.5702
Overall Food Safety	Bio Ing	-0.0570	0.0814	384	0.4842
Overall Food Safety	Trad Proc	-0.0859	0.0958	394	0.3706
Overall Food Safety	Sustainability	-0.113	0.0828	386	0.1714
Overall Food Safety	Antibio/Herbi	-0.111	0.0847	394	0.1904
Overall Food Safety	Control	N/A	N/A	N/A	N/A
Overall Nutrition	Steroids/Fert	0.0419	0.0763	380	0.5834
Overall Nutrition	Bio Ing	-0.0881	0.0773	384	0.2555
Overall Nutrition	Trad Proc	0.0303	0.101	394	0.7635
Overall Nutrition	Sustainability	-0.0670	0.0772	386	0.3861
Overall Nutrition	Antibio/Herbi	-0.111	0.0804	394	0.1675
Overall Nutrition	Control	N/A	N/A	N/A	N/A
Overall Quality	Steroids/Fert	-0.0419	0.0773	380	0.588
Overall Quality	Bio Ing	0.0259	0.0770	384	0.7367
Overall Quality	Trad Proc	-0.0808	0.0996	394	0.4178
Overall Quality	Sustainability	-0.0928	0.0798	386	0.2459

Overall Quality	Antibio/Herbi	-0.0657	0.0843	394	0.4368
Overall Quality	Control	N/A	N/A	N/A	N/A

¹Comparative acceptability was rated on a 5-point scale, from “definitely less acceptable” (1) to “definitely more acceptable” (5).

²1: “No chemical fertilizer was used during production of this beverage;” 2: “Contains no bioengineered ingredients;” 3: “Traditionally processed;” 4: “Sustainably produced;” 5: “Manufactured without the use of herbicides;” Control - No statement

³The estimate is the difference between means of dairy milk and plant-based alternative beverage ratings. A positive value indicates the dairy milk mean is greater than the plant-based alternative beverage mean. A negative value indicates the plant-based alternative beverage mean is greater than the dairy milk mean.

In most instances of significance, statements more positively impacted PBAB mean ratings than dairy milk mean ratings. Statement 1, “No steroids were used during production of this beverage” (dairy milk) / “No chemical fertilizer was used during production of this beverage” (PBAB) and Statement 3, “Traditionally processed,” seemed to be equally impactful for both beverages, as their presence resulted in no significant differences in mean ratings between the beverage types.

Comparisons of Survey 2 Means and Survey 1 Means

Comparing the means of acceptability ratings between Survey 2 and Survey 1 showed different trends for the statements than comparing Survey 2 results to each other. Table 5 shows these comparisons for dairy milk; significant differences are as follows. For statement 1, “No steroids were used during production of this beverage,” the mean rating of overall environmental impact from Survey 2 was significantly higher than from Survey 1 ($p < .0001$). For statement 2, “Contains no bioengineered ingredients,” the mean rating of overall environmental impact from Survey 2 was significantly higher than from Survey 1 ($p < .0001$), while the mean rating of overall quality from Survey 1 was significantly higher than from Survey 2 ($p = 0.0392$). For statement 3, “Traditionally processed,” the mean ratings of overall nutrition, overall quality, and overall food safety from Survey 1 were significantly higher than from Survey 2 ($p < .0001$, $p < .0001$, and $p = .0002$). For statement 4, “Sustainably produced,” the mean rating of overall environmental

impact from Survey 2 was significantly higher than from Survey 1 ($p=.0007$), while those of overall quality and overall cost from Survey 1 were significantly higher than from Survey 2 ($p=.0005$, $p=.0149$). For statement 5, “Manufactured without the use of antibiotics,” the mean rating of overall environmental impact from Survey 2 was significantly higher than from Survey 1 ($p=.0015$), while that of overall quality from Survey 1 was significantly higher than from Survey 2 ($p<.0001$). For the control, which did not reference any label statement, the mean ratings of overall quality, overall nutrition, and overall food safety from Survey 2 were significantly higher than from Survey 1 ($p<.0001$, $p=.0142$, and $p=.0350$, respectively). Of the 5 characteristics subjects rated, the mean rating of overall quality was the most affected by the label statements, while the mean rating of overall cost was the least affected. This suggests that subjects’ perceptions of quality were the most moldable to label statements and those of cost were most robust to label statements.

Table 5. Differences in mean ratings of acceptability¹ of overall characteristics of dairy milk in products regularly purchased between Survey 1 and Survey 2

Characteristic	Statement ²	Estimate ³	Standard error	Degrees of freedom	P-value
Overall Cost	Steroids	0.07362	0.06554	2039	0.9211
Overall Cost	Bio Ing	0.03537	0.06526	2039	0.9982
Overall Cost	Trad Proc	0.1896	0.06472	2039	0.0531
Overall Cost	Sustainability	0.2176	0.06512	2039	0.0149
Overall Cost	Antibiotics	0.1084	0.06472	2039	0.6329
Overall Cost	Control	0.06646	0.06526	2039	0.9499
Overall Environmental Impact	Steroids	-0.4562	0.07649	2040	<.0001
Overall Environmental Impact	Bio Ing	-0.3512	0.07600	2040	<.0001
Overall Environmental Impact	Trad Proc	0.02037	0.07521	2040	1.0000
Overall Environmental Impact	Sustainability	-0.3135	0.07584	2040	0.0007
Overall Environmental Impact	Antibiotics	-0.2978	0.07521	2040	0.0015
Overall Environmental Impact	Control	0.09435	0.07600	2040	0.8779

Overall Food Safety	Steroids	-0.07037	0.06127	2035	0.9129
Overall Food Safety	Bio Ing	0.02911	0.06127	2035	0.9991
Overall Food Safety	Trad Proc	0.2659	0.06063	2035	0.0002
Overall Food Safety	Sustainability	0.1190	0.06088	2035	0.4440
Overall Food Safety	Antibiotics	0.1656	0.06050	2035	0.0897
Overall Food Safety	Control	0.1879	0.06114	2035	0.0350
Overall Nutrition	Steroids	0.09230	0.05813	2039	0.6902
Overall Nutrition	Bio Ing	0.09012	0.05775	2039	0.7078
Overall Nutrition	Trad Proc	0.4166	0.05715	2039	<.0001
Overall Nutrition	Sustainability	0.1523	0.05775	2039	0.1156
Overall Nutrition	Antibiotics	0.2449	0.05715	2039	0.0004
Overall Nutrition	Control	0.1937	0.05775	2039	0.0142
Overall Quality	Steroids	0.08869	0.05803	2039	0.7278
Overall Quality	Bio Ing	0.1750	0.05766	2039	0.0392
Overall Quality	Trad Proc	0.4484	0.05718	2039	<.0001
Overall Quality	Sustainability	0.2444	0.05754	2039	0.0005
Overall Quality	Antibiotics	0.3837	0.05706	2039	<.0001
Overall Quality	Control	0.2786	0.05766	2039	<.0001

¹Acceptability was rated on a 5-point scale, from “definitely unacceptable” (1) to “definitely acceptable” (5).

²The statements used in Survey 2. 1: “No steroids were used during production of this beverage;” 2: “Contains no bioengineered ingredients;” 3: “Traditionally processed;” 4: “Sustainably produced;” 5: “Manufactured without the use of antibiotics;” Control - No statement

³The estimate is the difference between means of dairy milk ratings between Survey 1 and Survey 2. A positive value indicates the Survey 1 mean is greater than the Survey 2 mean. A negative value indicates the Survey 2 mean is greater than the Survey 1 mean.

In comparing the means of acceptability ratings between Survey 2 and Survey 1 for PBABs, the following differences were significant (Table 6). For statement 2, “Contains no bioengineered ingredients,” the mean rating of overall food safety from Survey 1 was significantly higher than from Survey 2 ($p=.0342$). For statement 3, “Traditionally processed,” the mean ratings of overall food safety, overall nutrition, and overall quality from Survey 1 were significantly higher than from Survey 2 ($p=.0003$, $p<.0001$, and $p<.0001$). Thus, in each significant difference in mean ratings between Survey 2 and Survey 1, the presence of an

imagined label statement resulted in decreased acceptability ratings compared to the absence of such statement. This finding contrasts work by Rebouças et al. (2017), who found that information on composition, nutritional characteristics, and functional claims positively affected consumers' perception of healthiness and nutritious value of PBABs in a sensory setting. Perhaps allowing subjects to taste PBABs would yield different results for our study, as subjects did not taste PBABs before or during their rating of the acceptability of the characteristics. Three of the 4 significant differences in PBAB mean ratings between Survey 1 and Survey 2 involved the statement, "Traditionally processed." Consumers may be unfamiliar with the processes utilized in PBAB manufacture, but suspect that "traditional" is not a congruent description of them.

Table 6. Differences in mean ratings of acceptability¹ of overall characteristics of plant-based alternative beverages in products regularly purchased between Survey 1 and Survey 2

Characteristic	Statement ²	Estimate ³	Standard error	Degrees of freedom	P-value
Overall Cost	Fertilizer	-0.1174	0.07145	2037	0.6544
Overall Cost	Bio Ing	-0.1199	0.07114	2037	0.6256
Overall Cost	Trad Proc	0.03798	0.07040	2037	0.9982
Overall Cost	Sustainability	-0.05356	0.07129	2037	0.9892
Overall Cost	Herbicides	-0.1757	0.07055	2037	0.1631
Overall Cost	Control	0.1391	0.07129	2037	0.4462
Overall Environmental Impact	Fertilizer	-0.1174	0.07145	2037	0.6544
Overall Environmental Impact	Bio Ing	-0.1199	0.07114	2037	0.6256
Overall Environmental Impact	Trad Proc	0.03798	0.0704	2037	0.9982
Overall Environmental Impact	Sustainability	-0.05356	0.07129	2037	0.9892
Overall Environmental Impact	Herbicides	-0.1757	0.07055	2037	0.1631
Overall Environmental Impact	Control	0.1391	0.07129	2037	0.4462
Overall Food Safety	Fertilizer	0.05438	0.05840	2039	0.9676
Overall Food Safety	Bio Ing	0.1791	0.05816	2039	0.0342
Overall Food Safety	Trad Proc	0.2502	0.05755	2039	0.0003
Overall Food Safety	Sustainability	0.1452	0.05803	2039	0.1590

Overall Food Safety	Herbicides	0.1622	0.05767	2039	0.0736
Overall Food Safety	Control	0.08844	0.05828	2039	0.7344
Overall Nutrition	Fertilizer	0.02878	0.05669	2041	0.9988
Overall Nutrition	Bio Ing	0.02897	0.05645	2041	0.9987
Overall Nutrition	Trad Proc	0.3148	0.05586	2041	<.0001
Overall Nutrition	Sustainability	0.04711	0.05633	2041	0.9812
Overall Nutrition	Herbicides	0.03700	0.05586	2041	0.9945
Overall Nutrition	Control	0.04451	0.05645	2041	0.9861
Overall Quality	Fertilizer	0.1009	0.05890	2040	0.6076
Overall Quality	Bio Ing	0.04876	0.05865	2040	0.9817
Overall Quality	Trad Proc	0.3802	0.05804	2040	<.0001
Overall Quality	Sustainability	0.1391	0.05852	2040	0.2090
Overall Quality	Herbicides	0.1152	0.05816	2040	0.4269
Overall Quality	Control	0.06949	0.05865	2040	0.9000

¹Acceptability was rated on a 5-point scale, from “definitely unacceptable” (1) to “definitely acceptable” (5).

²The statements used in Survey 2. 1: “No chemical fertilizer was used during production of this beverage;” 2: “Contains no bioengineered ingredients;” 3: “Traditionally processed;” 4: “Sustainably produced;” 5: “Manufactured without the use of herbicides;” Control - No statement

³The estimate is the difference between means of plant-based alternative beverage ratings between Survey 1 and Survey 2. A positive value indicates the Survey 1 mean is greater than the Survey 2 mean. A negative value indicates the Survey 2 mean is greater than the Survey 1 mean.

These findings indicate that statement 1 and the control had outright positive influence on perceptions of acceptability of dairy milk, while statements 2, 4, and 5 had mixed influence, and statement 3 had outright negative influence. For PBABs, statements 2 and 3 had outright negative influence on perceptions of acceptability. These mixed results corroborate work by Lyly et al. (2007) and (Sabbe et al., 2009), who found that health claims may only provide marginal, if any, added value to products that consumers already consider healthy. Many consumers believe that PBABs are more healthy than dairy milk because of their plant source, which supports this idea. Findings of Sabbe et al. (2009) also suggest that consumers maintain a belief in an assumed tradeoff between taste and health, which is supported by our subjects’ rating the taste of PBABs as less acceptable than dairy milk (Table 2).

Sensory Panels: The Effect of On-Label Messaging on Acceptability of Dairy Milk

The mean ratings of acceptability from the sensory panels for dairy milk regularly purchased and the sample given in the sensory panels are shown in Tables 7 and 8. For statement 2, “Contains no bioengineered ingredients,” the sample received a significantly higher mean rating of acceptability than dairy milk for expected overall drinking experience (Table 9). With the exception of this difference, no significant differences were observed between ratings of acceptability of beverage characteristics in the sensory panels between beverage types. After tasting the sample, subjects rated its taste more acceptable than their imagined taste of the dairy milk they regularly purchase. For the single significant difference in means, the presence of the dairy milk positively impacted consumer perception. In a study by Palacios et al. (2009), subjects preferred the taste of dairy milk samples with varying fat and lactose content over all PBAB beverage samples. Thus, dairy milk packaging aspects that visually evoke the taste of dairy milk and remind consumers of the superiority of dairy milk’s taste over PBABs’ could be successful in increasing sales of dairy milk.

Table 7. Least-squares means of average ratings of acceptability^{1,2} of overall characteristics and purchase willingness³ of dairy milk in products regularly purchased from sensory panels

Characteristic	Statement ⁴	Estimate	Standard error	Degrees of freedom	Pr > t
Overall Cost	Steroids	3.405	0.110	176	<.0001
Overall Cost	Bio Ing	3.364	0.120	174	<.0001
Overall Cost	Trad Proc	3.341	0.100	174	<.0001
Overall Cost	Sustainability	3.446	0.109	182	<.0001
Overall Cost	Antibiotics	3.479	0.103	186	<.0001
Overall Cost	Control	3.856	0.103	178	<.0001
Overall Drinking Experience	Steroids	4.517	0.0728	176	<.0001
Overall Drinking Experience	Bio Ing	4.114	0.0952	174	<.0001
Overall Drinking Experience	Trad Proc	3.830	0.1088	174	<.0001
Overall Drinking Experience	Sustainability	4.207	0.0889	182	<.0001

Overall Drinking Experience	Antibiotics	4.277	0.100	186	<.0001
Overall Drinking Experience	Control	4.644	0.0816	178	<.0001
Overall Environmental Impact	Steroids	4.101	0.0889	176	<.0001
Overall Environmental Impact	Bio Ing	3.955	0.105	174	<.0001
Overall Environmental Impact	Trad Proc	3.375	0.114	174	<.0001
Overall Environmental Impact	Sustainability	4.348	0.0762	182	<.0001
Overall Environmental Impact	Antibiotics	3.968	0.105	186	<.0001
Overall Environmental Impact	Control	3.622	0.106	178	<.0001
Overall Food Safety	Steroids	4.258	0.0921	176	<.0001
Overall Food Safety	Bio Ing	4.034	0.101	174	<.0001
Overall Food Safety	Trad Proc	3.239	0.120	174	<.0001
Overall Food Safety	Sustainability	3.826	0.0920	182	<.0001
Overall Food Safety	Antibiotics	3.809	0.118	186	<.0001
Overall Food Safety	Control	3.933	0.0984	178	<.0001
Overall Nutrition	Steroids	4.225	0.0877	176	<.0001
Overall Nutrition	Bio Ing	4.011	0.0985	174	<.0001
Overall Nutrition	Trad Proc	3.477	0.110	174	<.0001
Overall Nutrition	Sustainability	3.728	0.0918	182	<.0001
Overall Nutrition	Antibiotics	4.064	0.104	186	<.0001
Overall Nutrition	Control	4.067	0.103	178	<.0001
Overall Quality	Steroids	4.258	0.0906	176	<.0001
Overall Quality	Bio Ing	3.966	0.101	174	<.0001
Overall Quality	Trad Proc	3.511	0.117	174	<.0001
Overall Quality	Sustainability	3.848	0.0908	182	<.0001
Overall Quality	Antibiotics	3.883	0.109	186	<.0001
Overall Quality	Control	4.156	0.0947	178	<.0001
Purchase Willingness	Steroids	4.023	0.0937	176	<.0001
Purchase Willingness	Bio Ing	3.830	0.100	174	<.0001
Purchase Willingness	Trad Proc	3.352	0.119	174	<.0001
Purchase Willingness	Sustainability	3.707	0.0954	182	<.0001
Purchase Willingness	Antibiotics	3.819	0.114	186	<.0001

Purchase Willingness	Control	4.200	0.104	178	<.0001
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¹Acceptability of overall cost, overall environmental impact, overall food safety, overall nutrition, and overall quality was rated on a 5-point scale, from “definitely less acceptable” (1) to “definitely more acceptable” (5).

²Acceptability of overall drinking experience was rated on a 5-point scale, from “definitely unacceptable” (1) to “definitely acceptable” (5).

³Purchase willingness was rated on a 5-point scale, from “definitely less willing to purchase” (1) to “definitely more willing to purchase” (5).

⁴1: “No steroids were used during production of this beverage;” 2: “Contains no bioengineered ingredients;” 3: “Traditionally processed;” 4: “Sustainably produced;” 5: “Manufactured without the use of antibiotics;” C: “2% milk” (Control)

Table 8. Least-squares means of average ratings of acceptability^{1,2} of overall characteristics and purchase willingness³ of a dairy milk sample from sensory panels

Characteristic	Statement ⁴	Estimate	Standard error	Degrees of freedom	Pr > t
Overall Cost	Steroids	3.584	0.110	176	<.0001
Overall Cost	Bio Ing	3.625	0.120	174	<.0001
Overall Cost	Trad Proc	3.477	0.100	174	<.0001
Overall Cost	Sustainability	3.533	0.109	182	<.0001
Overall Cost	Antibiotics	3.606	0.103	186	<.0001
Overall Cost	Control	3.900	0.103	178	<.0001
Overall Drinking Experience	Steroids	4.629	0.0728	176	<.0001
Overall Drinking Experience	Bio Ing	4.466	0.0952	174	<.0001
Overall Drinking Experience	Trad Proc	4.114	0.1088	174	<.0001
Overall Drinking Experience	Sustainability	4.359	0.0889	182	<.0001
Overall Drinking Experience	Antibiotics	4.351	0.100	186	<.0001
Overall Drinking Experience	Control	4.567	0.0816	178	<.0001
Overall Environmental Impact	Steroids	4.124	0.0889	176	<.0001
Overall Environmental Impact	Bio Ing	4.102	0.105	174	<.0001
Overall Environmental Impact	Trad Proc	3.443	0.114	174	<.0001
Overall Environmental Impact	Sustainability	4.326	0.0762	182	<.0001
Overall Environmental Impact	Antibiotics	3.894	0.105	186	<.0001
Overall Environmental Impact	Control	3.711	0.106	178	<.0001
Overall Food Safety	Steroids	4.337	0.0921	176	<.0001
Overall Food Safety	Bio Ing	4.136	0.101	174	<.0001
Overall Food Safety	Trad Proc	3.523	0.120	174	<.0001
Overall Food Safety	Sustainability	3.804	0.0920	182	<.0001

Overall Food Safety	Antibiotics	3.851	0.118	186	<.0001
Overall Food Safety	Control	3.933	0.0984	178	<.0001
Overall Nutrition	Steroids	4.214	0.0877	176	<.0001
Overall Nutrition	Bio Ing	4.125	0.0985	174	<.0001
Overall Nutrition	Trad Proc	3.648	0.110	174	<.0001
Overall Nutrition	Sustainability	3.761	0.0918	182	<.0001
Overall Nutrition	Antibiotics	4.032	0.104	186	<.0001
Overall Nutrition	Control	4.067	0.103	178	<.0001
Overall Quality	Steroids	4.326	0.0906	176	<.0001
Overall Quality	Bio Ing	4.159	0.101	174	<.0001
Overall Quality	Trad Proc	3.750	0.117	174	<.0001
Overall Quality	Sustainability	3.902	0.0908	182	<.0001
Overall Quality	Antibiotics	3.979	0.109	186	<.0001
Overall Quality	Control	4.156	0.0947	178	<.0001
Purchase Willingness	Steroids	4.124	0.0937	176	<.0001
Purchase Willingness	Bio Ing	4.023	0.100	174	<.0001
Purchase Willingness	Trad Proc	3.636	0.119	174	<.0001
Purchase Willingness	Sustainability	3.826	0.0954	182	<.0001
Purchase Willingness	Antibiotics	3.862	0.114	186	<.0001
Purchase Willingness	Control	4.267	0.104	178	<.0001

¹Acceptability of overall cost, overall environmental impact, overall food safety, overall nutrition, and overall quality was rated on a 5-point scale, from “definitely less acceptable” (1) to “definitely more acceptable” (5).

²Acceptability of overall drinking experience was rated on a 5-point scale, from “definitely unacceptable” (1) to “definitely acceptable” (5).

³Purchase willingness was rated on a 5-point scale, from “definitely less willing to purchase” (1) to “definitely more willing to purchase” (5).

⁴1: “No steroids were used during production of this beverage;” 2: “Contains no bioengineered ingredients;” 3: “Traditionally processed;” 4: “Sustainably produced;” 5: “Manufactured without the use of antibiotics;” C: “2% milk” (Control)

Table 9. Differences in mean ratings of acceptability^{1,2} of overall characteristics and purchase willingness³ of dairy milk in products regularly purchased and dairy milk sample from sensory panels

Characteristic	Statement ⁴	Estimate ⁵	Standard error	Degrees of freedom	P-value
Overall Cost	Steroids	-0.180	0.155	176	0.2488
Overall Cost	Bio Ing	-0.261	0.169	174	0.1241

Overall Cost	Trad Proc	-0.136	0.142	174	0.3372
Overall Cost	Sustainability	-0.0870	0.154	182	0.5721
Overall Cost	Antibiotics	-0.128	0.146	186	0.3825
Overall Cost	Control	-0.0444	0.146	178	0.7615
Overall Drinking Experience	Steroids	-0.112	0.103	176	0.2765
Overall Drinking Experience	Bio Ing	-0.352	0.135	174	0.0097
Overall Drinking Experience	Trad Proc	-0.284	0.154	174	0.0666
Overall Drinking Experience	Sustainability	-0.152	0.126	182	0.2275
Overall Drinking Experience	Antibiotics	-0.0745	0.142	186	0.6006
Overall Drinking Experience	Control	0.0778	0.115	178	0.5013
Overall Environmental Impact	Steroids	-0.0225	0.126	176	0.8583
Overall Environmental Impact	Bio Ing	-0.148	0.149	174	0.3227
Overall Environmental Impact	Trad Proc	-0.0682	0.161	174	0.6724
Overall Environmental Impact	Sustainability	0.0217	0.108	182	0.8402
Overall Environmental Impact	Antibiotics	0.0745	0.149	186	0.6176
Overall Environmental Impact	Control	-0.0889	0.150	178	0.5536
Overall Food Safety	Steroids	-0.0787	0.130	176	0.5468
Overall Food Safety	Bio Ing	-0.102	0.142	174	0.4736
Overall Food Safety	Trad Proc	-0.284	0.170	174	0.0955
Overall Food Safety	Sustainability	0.0217	0.130	182	0.8675
Overall Food Safety	Antibiotics	-0.0426	0.167	186	0.7986
Overall Food Safety	Control	0	0.139	178	1
Overall Nutrition	Steroids	0.0112	0.124	176	0.9279
Overall Nutrition	Bio Ing	-0.114	0.139	174	0.4158
Overall Nutrition	Trad Proc	-0.171	0.156	174	0.2757
Overall Nutrition	Sustainability	-0.0326	0.130	182	0.8019
Overall Nutrition	Antibiotics	0.0320	0.147	186	0.8282
Overall Nutrition	Control	0	0.146	178	1
Overall Quality	Steroids	-0.0674	0.128	176	0.5995
Overall Quality	Bio Ing	-0.193	0.143	174	0.1786
Overall Quality	Trad Proc	-0.239	0.166	174	0.1519

Overall Quality	Sustainability	-0.0544	0.128	182	0.6726
Overall Quality	Antibiotics	-0.0957	0.154	186	0.5352
Overall Quality	Control	0.000	0.134	178	1
Purchase Willingness	Steroids	-0.101	0.133	176	0.4465
Purchase Willingness	Bio Ing	-0.193	0.142	174	0.1755
Purchase Willingness	Trad Proc	-0.284	0.169	174	0.0944
Purchase Willingness	Sustainability	-0.120	0.135	182	0.3765
Purchase Willingness	Antibiotics	-0.0426	0.161	186	0.7921
Purchase Willingness	Control	-0.0667	0.147	178	0.6516

¹Acceptability of overall cost, overall environmental impact, overall food safety, overall nutrition, and overall quality was rated on a 5-point scale, from “definitely less acceptable” (1) to “definitely more acceptable” (5).

²Acceptability of overall drinking experience was rated on a 5-point scale, from “definitely unacceptable” (1) to “definitely acceptable” (5).

³Purchase willingness was rated on a 5-point scale, from “definitely less willing to purchase” (1) to “definitely more willing to purchase” (5).

⁴1: “No steroids were used during production of this beverage;” 2: “Contains no bioengineered ingredients;” 3: “Traditionally processed;” 4: “Sustainably produced;” 5: “Manufactured without the use of antibiotics;” C: “2% milk” (Control)

⁵The estimate is the difference between means of dairy milk and sample ratings. A positive value indicates the dairy milk mean is greater than the sample mean. A negative value indicates the sample mean is greater than the dairy milk mean.

Comparing Survey 2 Means to Sensory Panels Means

In comparing the means of comparative acceptability ratings between Survey 2 and the sensory panels for dairy milk, each of the 5 statements resulted in significant differences (Table 10). For statement 1, “No steroids were used during production of this beverage” the mean ratings of overall cost, overall environmental impact, overall nutrition, and purchase willingness from Survey 2 were significantly higher than from the sensory panels. For statement 2, “Contains no bioengineered ingredients,” the mean ratings of overall cost, overall drinking experience, overall environmental impact, overall food safety, overall nutrition, overall quality, and purchase willingness (all characteristics) from Survey 2 were significantly higher than from the sensory panels. For statement 3, “Traditionally processed,” the mean ratings of overall cost, overall drinking experience, overall environmental impact, overall food safety, overall nutrition, overall

quality, and purchase willingness (all characteristics) from Survey 2 were significantly higher than from the sensory panels. For statement 4, “Sustainably produced”, the mean ratings of overall cost, overall food safety, overall nutrition, overall quality, and purchase willingness from Survey 2 were significantly higher than from the sensory panels. For statement 5, “Manufactured without the use of antibiotics,” the mean ratings of overall cost, overall environmental impact, overall food safety, overall nutrition, overall quality, and purchase willingness from Survey 2 were significantly higher than from the sensory panels.

Table 10. Differences in mean ratings of comparative acceptability¹ of overall characteristics and purchase willingness² of dairy milk in products regularly purchased between Survey 2 and sensory panels

Characteristic	Statement ³	Estimate ⁴	Standard error	Degrees of freedom	P-value
Overall Cost	Steroids	0.7526	0.1174	278	<.0001
Overall Cost	Bio Ing	0.7918	0.1265	279	<.0001
Overall Cost	Trad Proc	0.553	0.125	284	<.0001
Overall Cost	Sustainability	0.5183	0.1309	284	<.0001
Overall Cost	Antibiotics	0.6475	0.1238	290	<.0001
Overall Cost	Control				
Overall Drinking Experience	Steroids	-0.08753	0.09948	278	0.3797
Overall Drinking Experience	Bio Ing	0.2801	0.1129	279	0.0137
Overall Drinking Experience	Trad Proc	0.3887	0.1156	283	0.0009
Overall Drinking Experience	Sustainability	0.1440	0.1022	284	0.1601
Overall Drinking Experience	Antibiotics	0.03654	0.1147	290	0.7504
Overall Drinking Experience	Control				
Overall Environmental Impact	Steroids	0.2549	0.1055	278	0.0163
Overall Environmental Impact	Bio Ing	0.2734	0.1217	279	0.0254
Overall Environmental Impact	Trad Proc	0.3422	0.1468	284	0.0204
Overall Environmental Impact	Sustainability	-0.05401	0.1076	284	0.616
Overall Environmental Impact	Antibiotics	0.2491	0.1112	290	0.0258
Overall Environmental Impact	Control				
Overall Food Safety	Steroids	0.1971	0.1005	278	0.0509

Overall Food Safety	Bio Ing	0.3545	0.1144	279	0.0021
Overall Food Safety	Trad Proc	0.7513	0.133	284	<.0001
Overall Food Safety	Sustainability	0.4626	0.1117	284	<.0001
Overall Food Safety	Antibiotics	0.5147	0.1217	290	<.0001
Overall Food Safety	Control				
Overall Nutrition	Steroids	0.2936	0.09651	278	0.0026
Overall Nutrition	Bio Ing	0.4291	0.1085	279	<.0001
Overall Nutrition	Trad Proc	0.5833	0.1328	284	<.0001
Overall Nutrition	Sustainability	0.6223	0.1047	284	<.0001
Overall Nutrition	Antibiotics	0.3099	0.112	290	0.006
Overall Nutrition	Control				
Overall Quality	Steroids	0.1761	0.1061	278	0.098
Overall Quality	Bio Ing	0.5004	0.1064	279	<.0001
Overall Quality	Trad Proc	0.4735	0.1301	284	0.0003
Overall Quality	Sustainability	0.4666	0.1035	284	<.0001
Overall Quality	Antibiotics	0.4706	0.1161	290	<.0001
Overall Quality	Control				
Purchase Willingness	Steroids	0.3754	0.1038	278	0.0004
Purchase Willingness	Bio Ing	0.4762	0.1104	279	<.0001
Purchase Willingness	Trad Proc	0.5265	0.1302	284	<.0001
Purchase Willingness	Sustainability	0.4894	0.1148	284	<.0001
Purchase Willingness	Antibiotics	0.4435	0.1196	290	0.0002
Purchase Willingness	Control				

¹Comparative acceptability was rated on a 5-point scale, from “definitely less acceptable” (1) to “definitely more acceptable” (5).

²Purchase willingness was rated on a 5-point scale, from “definitely less willing to purchase” (1) to “definitely more willing to purchase” (5).

³1: “No steroids were used during production of this beverage;” 2: “Contains no bioengineered ingredients;” 3: “Traditionally processed;” 4: “Sustainably produced;” 5: “Manufactured without the use of antibiotics;” Control – No statement (Survey 2), “2% milk” (sensory panels)

⁴The estimate is the difference between means of dairy milk ratings between Survey 2 and sensory panels. A positive value indicates the Survey 2 mean is greater than the sensory panels mean. A negative value indicates the sensory panels mean is greater than the Survey 2 mean.

In each instance of a significant difference in ratings of comparative acceptability between Survey 2 and the sensory panels, the rating from Survey 2 was larger than the rating from the sensory panels. This suggests that the location in which the survey was administered affected consumer perceptions. It seems that when subjects were physically seated in a booth with the expectation of tasting dairy milk, the presence of label statements resulted in decreased expected perceptions of acceptability. Subjects in the sensory lab completed the questionnaire in a controlled environment, with minimal distractions. In contrast, those participating in Survey 2 were given more flexibility in the setting in which they completed it. Environmental factors such as noise and other sensory stimulus were not controlled in Survey 2 as they were in the sensory lab, better representation a “real-life” situation. Thus, subjects in Survey 2 were more prone to distraction while answering the questionnaire than those in the sensory panels. Also, the sample size of Survey 2 was considerably larger than that of the sensory panels. Statements 2 and 3 resulted in significant differences in mean ratings for all 7 characteristics, statement 5 resulted in significant differences in mean ratings for 6 differences, statement 4 for 5 differences, and statement 1 for 4 differences. Therefore, statements 2 and 3 were most impactful in this section while statements 4 and 5 were moderately impactful, although each significant difference showed lower mean ratings in the sensory panels than in Survey 2.

CONCLUSIONS

The main purpose of this research was to identify potentially meaningful messages that, if printed on the label of dairy milk and PBABs, could positively impact perceptions and purchase willingness of each beverage. The statement, “No steroids were used during production of this beverage” may be the most effective in conveying a positive message about dairy milk to dual consumers, when printed on the label. “Traditionally processed” may result in adverse effects on perception of both beverages, and “Contains no bioengineered ingredients” may adversely affect perceptions of PBABs when presented on the label. For both beverage types, breakfast was reported the most frequent time of day for consumption. However, each other consumption occasion received considerable amounts of “other” responses, indicating an opportunity to broaden the scope of marketed consumption occasions. Similarly, consumption of both beverages was reported to occasionally take place in the consumption settings on-the-go and restaurant, indicating opportunities to market for these locations. Subjects in this study were chosen via convenience sampling and self-reported their compatibility with the subject criteria, which may have resulted in findings not applicable to dual consumers as a whole.

Figure 1. Survey 1: Dairy milk consumption frequency by setting (n=881)

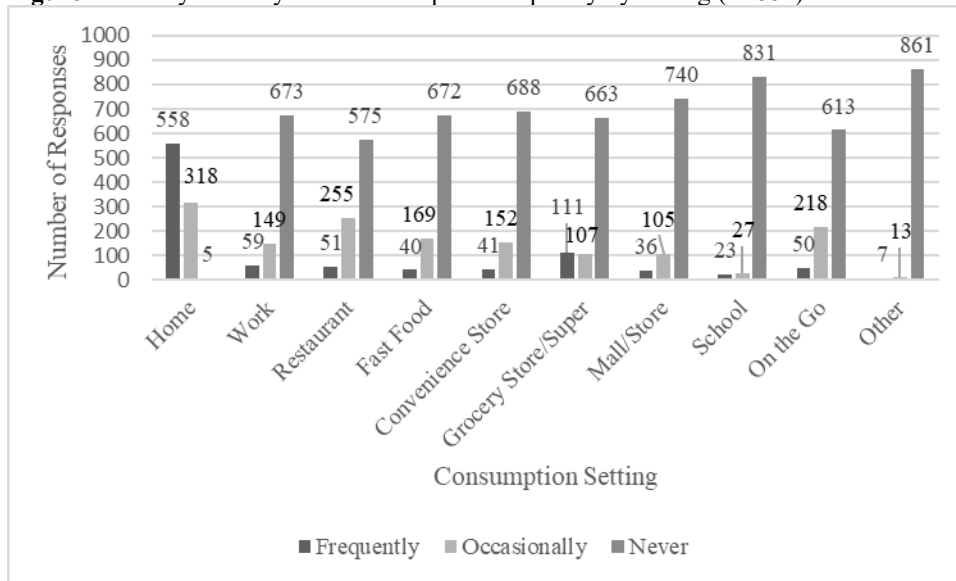


Figure 1: 881 subjects rated how often they regularly consume dairy milk in various consumption settings

Figure 2. Survey 1: PBAB consumption frequency by setting (n=881)

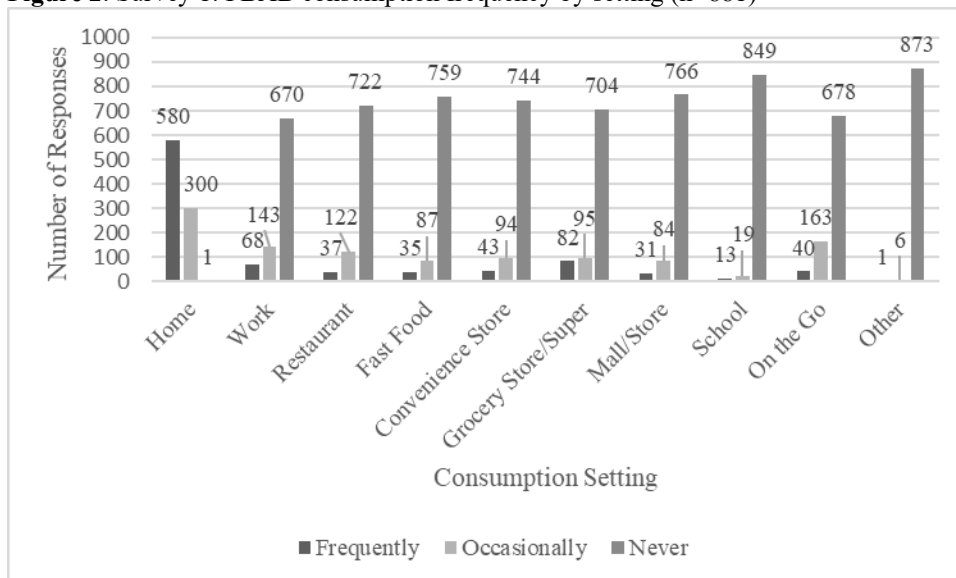


Figure 2: 881 subjects rated how often they regularly consume plant-based alternative beverages in various consumption settings

Figure 3. Dairy milk consumption frequency by occasion (n=881)

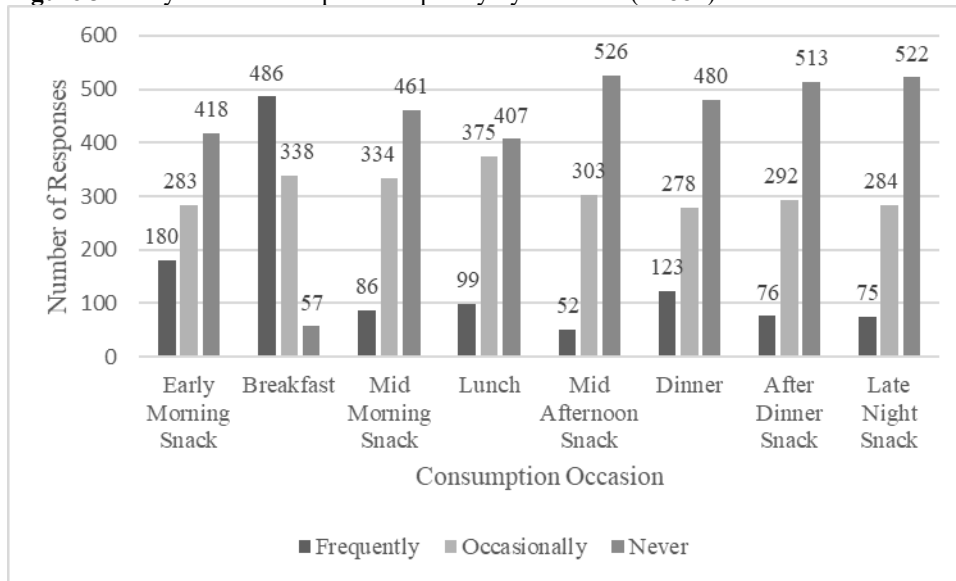


Figure 3: 881 subjects rated how often they regularly consume dairy milk during various consumption occasions

Figure 4. PBAB consumption frequency by setting (n=881)

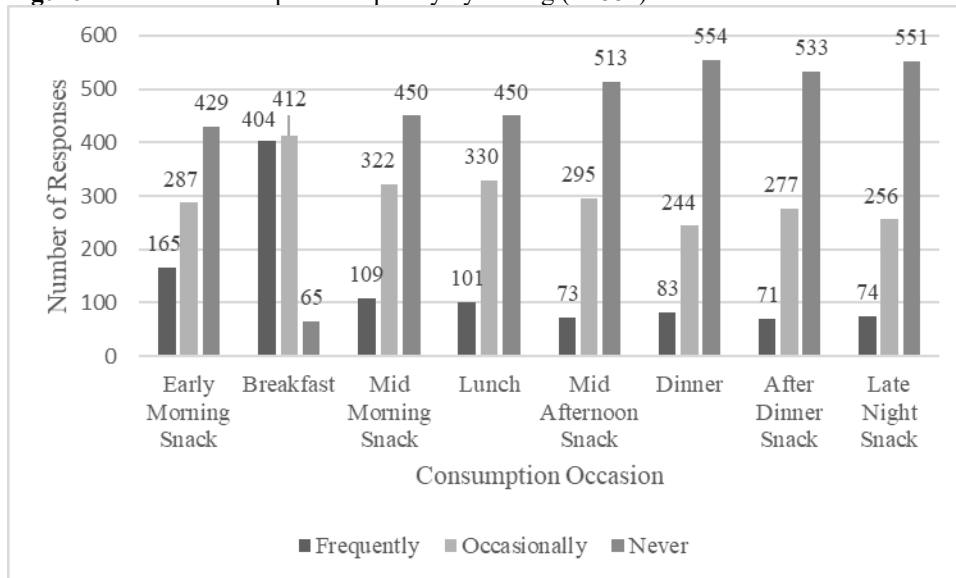


Figure 4: 881 subjects rated how often they regularly consume plant-based alternative beverages during various consumption occasions

Figure 5. Dairy milk consumption frequency by milk type (n=881)

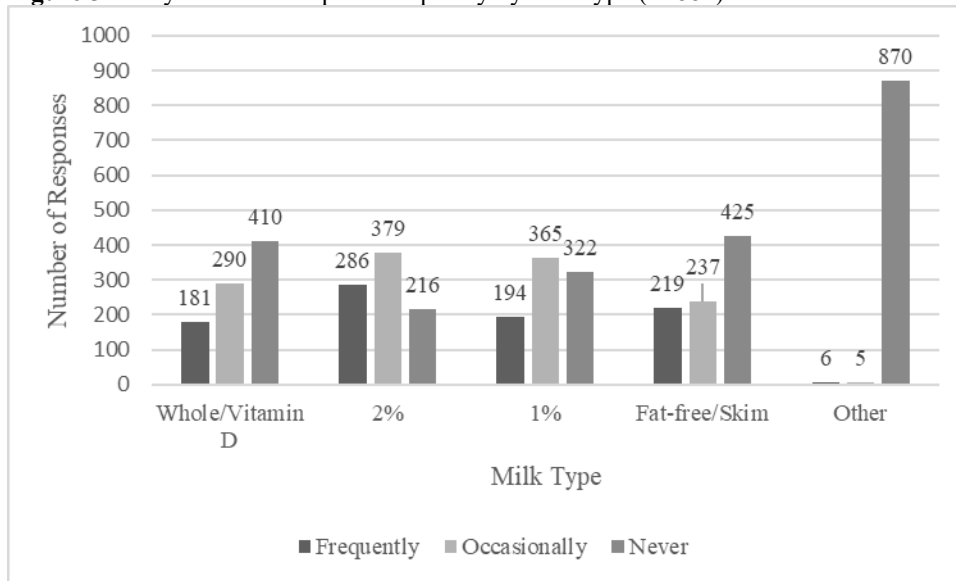


Figure 5: 881 subjects rated how often they regularly consume various types of dairy milk

Figure 6. PBAB consumption frequency by PBAB type (n=881)

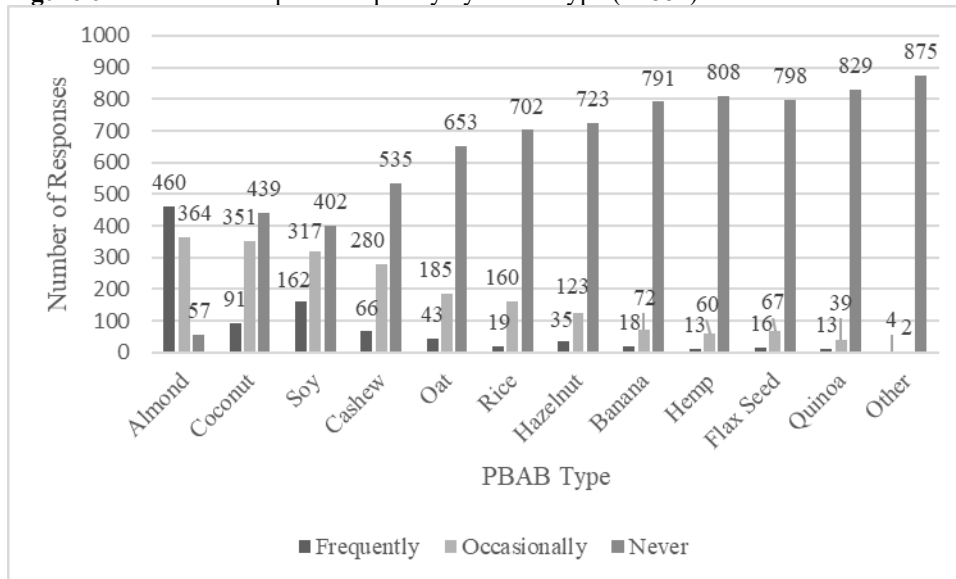


Figure 6: 881 subjects rated how often they regularly consume various types of plant-based alternative beverages

Table 11: Concepts associated with select terms in the context of dairy milk and plant-based alternative beverages (PBABs) by focus group participants (n=27)

Term	Beverage Type	
	Dairy milk	Plant-based alternative beverages
Nutrition	Nutritional composition, vitamin D, fat, calcium, vitamins, minerals, calories, dairy perceived to be a main food group	Healthier than dairy milk, protein, lower fat than dairy milk, doubt presence of calcium, unsure whether nutrition is comparable to dairy milk, more expensive than dairy milk, flavored water, thin texture, weight loss, better health, additives
Safety	Presence of pus, safer in general than PBABs, highly regulated by government,	Unknown origin of plant source, uncertain amount of GMOs present, safer than dairy milk for those with allergies, soy-based PBAB contains estrogen, coconut- and almond-based PBABs are better than soy, hormones in cows are not a concern for PBABs
Economic Impact	Torn between supporting local farmers and getting a better deal, cheaper than PBABs, cow treatment can impact taste, more trusting of local than national farmers, “clover-fed” is memorable messaging	Higher cost than dairy milk, PBABs would be preferable to dairy milk if priced the same as it,
Environmental Impact	Production has negative environmental impact including bad smell, greenhouse gasses, and soil impact, unsure of extent of environmental impact, production byproducts such as manure are beneficial, average consumer doesn’t know how fertilizer impacts water, feeding grain and fertilizer used for it may additionally affect the environment	Impact of animal-sourced foods is worse than plant-sourced ones, significant toll from growing, spraying, and harvesting plants, plants are a renewable resource, nutrition from plant itself may be better than from associated PBAB
Value	Unsure of value of milk in human nutrition, unsure if PBABs have the same nutritional value as dairy milk, PBABs would be preferred if less expensive than dairy milk	Unsure of PBAB composition, unsure if “water” label would have same impact as “milk” label, unsure if PBABs legally can be called “milk,” more expensive than dairy milk
Quality	Cow treatment directly affects dairy milk quality	Quality between PBAB brands is consistent, texture and degree of sliminess are important PBAB features, BYU dairy milk is significantly better than store brand dairy milk, more expensive PBABs last longer in the refrigerator

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APPENDIX I: SURVEY 1 QUESTIONNAIRE

The purpose of this questionnaire is to gauge consumer perceptions and attitudes about **dairy milk** and plant-based alternative beverages. By answering this survey, your feedback will help to identify ways to make dairy and non-dairy products that are more appealing to consumers. *For the purpose of this survey, **dairy milk** is milk that comes from a cow. A **plant-based alternative beverage (PBAB)** is a beverage made from almond, coconut, soy, rice, and/or other plant sources that contains no dairy ingredients.*

In which state do you currently reside?

▼ Alabama (1) ... I do not reside in the United States (53)

To better understand you as a consumer, please answer the following demographic questions.

What is your age in years?

- ☐ Under 18 years (1)
- ☐ 18 - 24 years (2)
- ☐ 25 - 34 years (3)
- ☐ 35 - 44 years (4)
- ☐ 45 - 54 years (5)
- ☐ 55 years or older (6)

What is your biological sex?

- ☐ Male (1)
- ☐ Female (2)

What is your current marital status?

- ☐ Never married (1)
- ☐ Married (2)
- ☐ Partner (3)
- ☐ Divorced (4)
- ☐ Separated (5)
- ☐ Widowed (6)

What is the highest level of education you have completed?

- ☐ Less than high school (1)
- ☐ High school graduate (2)
- ☐ Some college (3)
- ☐ 2 year degree (4)
- ☐ 4 year degree (5)
- ☐ Master's degree (6)
- ☐ Professional degree (7)
- ☐ Doctorate (8)
- ☐ Other (Please specify) (9) _____

How do you identify your ethnicity? Choose all that apply.

- ☐ American Indian or Alaska Native (3)
- ☐ Asian (1)
- ☐ Black or African American (2)
- ☐ Native Hawaiian or Other Pacific Islander (4)
- ☐ White (5)
- ☐ Other (7) _____
- ☐ ☒ Prefer not to answer (6)

What is your household's combined annual income? The term household refers to yourself and any individuals living with you in your current residence/dwelling who share finances.

- ☐ Below \$10,000 (1)
- ☐ \$10,000 - \$19,999 (2)
- ☐ \$20,000 - \$29,999 (3)
- ☐ \$30,000 - \$39,999 (4)
- ☐ \$40,000 - \$49,999 (5)
- ☐ \$50,000 - \$59,999 (6)
- ☐ \$60,000 - \$69,999 (7)
- ☐ \$70,000 - \$79,999 (8)
- ☐ \$80,000 - \$89,999 (9)
- ☐ \$90,000 - \$99,999 (10)

☐ \$100,000 - \$149,999 (11)

☐ \$150,000 or more (12)

☐ Prefer not to answer (13)

How healthy/unhealthy would you consider your dietary/eating habits?

☐ Very unhealthy (1)

☐ Somewhat unhealthy (2)

☐ Neither healthy nor unhealthy (3)

☐ Somewhat healthy (4)

☐ Very healthy (5)

How would you rate your level of physical activity?

☐ Very inactive (1)

☐ Somewhat inactive (2)

☐ Neither active nor inactive (3)

☐ Somewhat active (4)

☐ Very active (5)

What is your height in feet and inches?

Feet (1)

Inches (2)

▼ 1 (1) ... 8 ~ 11 (104)

What is your weight, rounded to the nearest 5 pounds (lbs)?

Pounds (lbs) (1)

▼ Less than 50 (1) ... More than 400 (73)

What type of diet do you follow? Check all that apply.

☐

None of these (1)

☐

Atkins (2)

☐

Flexitarian (3)

☐

Keto (4)

☐

Paleo (5)

☐

Vegan (6)

☐

Vegetarian (7)

☐

Weight Watchers (8)

☐

Other (please specify) (9) _____

Are you a primary shopper?

A primary shopper has at least 50% of the household responsibility for grocery shopping.

☐

Yes (1)

☐

No (2)

On average, which of the following do you consume at least once a month, as a standalone beverage or in any other way? Choose all that apply.

- ☐ Dairy Milk (1)
- ☐ Coffee (2)
- ☐ Plant-Based Alternative Beverage (3)
- ☐ Tea or Kombucha (4)
- ☐ Juice (5)
- ☐ Water (6)
- ☐ Other (please specify) (7) _____

Including yourself, how many people live in your home?

People who live in your home (1)

▼ 1 (1) ... More than 15 (16)

Including yourself, how many people who live in your home regularly consume **dairy milk** and **plant-based alternative beverages**?

People who consume dairy milk (1)

People who consume plant-based alternative beverages (2)

▼ 0 (1) ... More than 15 ~ More than 15 (306)

Including yourself, how many people who live in your home regularly consume dairy milk and/or plant-based alternative beverages?

People who ONLY consume dairy milk (1)	▼ 1 (1) ... More than 15 (16)
People who ONLY consume plant-based alternative beverages (2)	▼ 1 (1) ... More than 15 (16)
People who consume BOTH dairy milk AND plant-based alternative beverages (4)	▼ 1 (1) ... More than 15 (16)
People who DO NOT consume dairy milk OR plant-based alternative beverages (18)	▼ 1 (1) ... More than 15 (16)

Including yourself, how many people who live in your home regularly consume dairy milk and/or plant-based alternative beverages?

People who ONLY consume dairy milk (1)	▼ 0 (17) ... More than 15 (16)
People who ONLY consume plant-based alternative beverages (2)	▼ 0 (17) ... More than 15 (16)
People who consume BOTH dairy milk AND plant-based alternative beverages (4)	▼ 0 (17) ... More than 15 (16)
People who DO NOT consume dairy milk OR plant-based alternative beverages (18)	▼ 0 (17) ... More than 15 (16)

The following questions relate to your usage habits for **dairy milk** and **plant-based alternative beverages**.

Below are various settings in which you might consume a beverage, with or without a meal. Indicate how often you consume **dairy milk** in these settings.

	Dairy Milk		
	Frequently (1)	Occasionally (2)	Never (3)

At home (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At work (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a sit-down restaurant (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a fast food restaurant (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a convenience store (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a grocery store or supermarket (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a mall or store (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At someone else's home (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At school (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a park (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a place of worship/fellowship (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a community recreation center (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a gym/workout facility (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On the go (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (If not applicable, select "Never.") (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Below are various settings in which you might consume a beverage, with or without a meal. Indicate how often you consume **dairy milk** in these settings.

	Dairy Milk		
	Frequently (1)	Occasionally (2)	Never (3)
At home (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At work (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a sit-down restaurant (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a fast food restaurant (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a convenience store (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a grocery store or supermarket (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a mall or store (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At school (If not applicable, select "Never.") (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On the go (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (If not applicable, select "Never.") (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please specify in what other setting(s) you frequently or occasionally consume **dairy milk**, with or without a meal.

Below are various settings in which you might consume a beverage, with or without a meal. Indicate how often you regularly consume **plant-based alternative beverages** in these settings.

	Plant-Based Alternative Beverage(s)

	Frequently (1)	Occasionally (2)	Never (3)
At home (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At work (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a sit-down restaurant (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a fast food restaurant (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a convenience store (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a grocery store or supermarket (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a mall or store (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At someone else's home (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At school (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a park (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a place of worship/fellowship (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a community recreation center (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a gym/workout facility (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On the go (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (If not applicable, select "Never.") (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Below are various settings in which you might consume a beverage, with or without a meal. Indicate how often you regularly consume **plant-based alternative beverages** in these settings.

	Plant-Based Alternative Beverage(s)		
	Frequently (1)	Occasionally (2)	Never (3)
At home (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At work (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a sit-down restaurant (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a fast food restaurant (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a convenience store (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a grocery store or supermarket (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At a mall or store (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At school (If not applicable, select "Never.") (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On the go (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (If not applicable, select "Never.") (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please specify in what other setting(s) you frequently or occasionally consume **plant-based alternative beverages**, with or without a meal.

Below are various occasions during which you might consume **dairy milk** with or without a meal. Indicate how often you regularly consume **dairy milk** during these occasions.

	Dairy Milk		
	Frequently (1)	Occasionally (2)	Never (3)
Early morning snack (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breakfast (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mid morning snack (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lunch (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mid afternoon snack (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dinner (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After dinner snack (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Late night snack (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Below are various occasions during which you might consume **plant-based alternative beverages**, with or without a meal. Indicate how often you consume **plant-based alternative beverages** during these occasions.

	Plant-Based Alternative Beverage(s)		
	Frequently (1)	Occasionally (2)	Never (3)

Early morning snack (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breakfast (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mid morning snack (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lunch (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mid afternoon snack (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dinner (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After dinner snack (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Late night snack (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How often do you regularly consume the following varieties of **dairy milk**, flavored or unflavored, as a standalone beverage or in any other way?

	Frequently (1)	Occasionally (2)	Never (3)
Whole/Vitamin D Milk (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2% Fat Milk (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1% Fat Milk (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fat-free/Skim Milk (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (If not applicable, select "Never.") (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please specify what other variety or varieties of **dairy milk** you frequently or occasionally consume.

How often do you regularly consume the following varieties of **plant-based alternative beverages**, flavored or unflavored, as a standalone beverage or in any other way?

	Frequently (1)	Occasionally (2)	Never (3)
Almond Milk (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coconut Milk (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Soy Milk (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cashew Milk (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oat Milk (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rice Milk (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazelnut Milk (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Banana Milk (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Select "Never" for this row (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hemp Milk (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flax Seed Milk (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quinoa Milk (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (If not applicable, select "Never.") (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please specify what other variety or varieties of plant-based alternative beverages you regularly consume.

The following questions relate to the importance of various characteristics of dairy milk in general. Answer the following questions according to how important/unimportant each characteristic is to you, personally.

In general, how **important/unimportant** would you rate the following **nutrition** characteristics of **dairy milk** in your decision to purchase it?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall nutrition (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of protein (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of calcium (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of calories (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of vitamin D (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of fat (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of sugar (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to meet your body's daily nutritional needs (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In general, how **important/unimportant** would you rate the following **food safety** characteristics of **dairy milk** in your decision to purchase it?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall food safety (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of antibiotics (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowing the source of the ingredients (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of steroids used during production (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of bioengineered ingredients (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In general, how **important/unimportant** would you rate the following **retail cost** characteristics of **dairy milk** in your decision to purchase it?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall cost (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price relative to plant-based alternative beverages (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In general, how **important/unimportant** would you rate the following **environmental impact** characteristics of **dairy milk** in your decision to purchase it?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall environmental impact (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainability (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of processing required (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In general, how **important/unimportant** would you rate the following **quality** characteristics of **dairy milk** in your decision to purchase it?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall quality (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taste (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mouthfeel (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Length of shelf life (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions relate to the importance of various characteristics of plant-based alternative beverages (PBABs) in general. Answer the following questions according to how important/unimportant each characteristic is to you, personally.

In general, how **important/unimportant** would you rate the following **nutrition** characteristics of plant-based alternative beverages (PBABs) in your decision to purchase them?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall nutrition (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of protein (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of calcium (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of calories (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of vitamin D (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of fat (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of sugar (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to meet your body's daily nutritional needs (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In general, how **important/unimportant** would you rate the following **food safety** characteristics of plant-based alternative beverages (PBABs) in your decision to purchase them?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall food safety (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of herbicides (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowing the source of the ingredients (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of fertilizer used during production (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of bioengineered ingredients (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In general, how **important/unimportant** would you rate the following **retail cost** characteristics of plant-based alternative beverages (PBABs) in your decision to purchase them?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall cost (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price relative to dairy milk (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In general, how **important/unimportant** would you rate the following **environmental impact** characteristics of plant-based alternative beverages (PBABs) in your decision to purchase them?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall environmental impact (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainability (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of processing required (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In general, how **important/unimportant** would you rate the following **quality** characteristics of plant-based alternative beverages (PBABs) in your decision to purchase them?

	Definitely important (1)	Somewhat important (2)	Neither important nor unimportant (3)	Somewhat unimportant (4)	Definitely unimportant (5)
Overall quality (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taste (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mouthfeel (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Length of shelf life (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions relate to various characteristics of dairy milk you regularly purchase. Answer the following questions according to how acceptable/unacceptable each characteristic is to you, personally, in the beverage that your regularly purchase.

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the following **nutrition** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall nutrition (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of protein (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of calcium (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of calories (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of vitamin D (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of fat (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of sugar (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to meet your body's daily nutritional needs (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the following **food safety** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall food safety (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of antibiotics (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of ingredient sourcing information on label (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of steroids used during production (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of bioengineered ingredients (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the following **retail cost** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall cost (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price relative to plant-based alternative beverages (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the following **environmental impact** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall environmental impact (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainability (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of processing required (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the following **quality** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall quality (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taste (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mouthfeel (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Length of shelf life (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions relate to various characteristics of the plant-based alternative beverage (PBAB) you regularly purchase. Answer the following questions according to how acceptable/unacceptable each characteristic is to you, personally, in the beverage that you regularly purchase.

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the following **nutrition** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall nutrition (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of protein (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of calcium (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of calories (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of vitamin D (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of fat (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of sugar (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to meet your body's daily nutritional needs (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the following **food safety** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall food safety (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of herbicides (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of ingredient sourcing information on label (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of fertilizer used during production (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of bioengineered ingredients (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the following **retail cost** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall cost (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price relative to dairy milk (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the following **environmental impact** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall environmental impact (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainability (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of processing required (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the following **quality** characteristics?

	Definitely acceptable (1)	Somewhat acceptable (2)	Neither acceptable nor unacceptable (3)	Somewhat unacceptable (4)	Definitely unacceptable (5)
Overall quality (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taste (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mouthfeel (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Length of shelf life (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX II: SURVEY 2 QUESTIONNAIRE

Statements 1-5 Template

The purpose of this questionnaire is to gauge consumer perceptions and attitudes about **dairy milk** and plant-based alternative beverages. By answering this survey, your feedback will help to identify ways to make dairy and non-dairy products that are more appealing to consumers. *For the purpose of this survey, **dairy milk** is milk that comes from a cow. A **plant-based alternative beverage (PBAB)** is a beverage made from almond, coconut, soy, rice, and/or other plant sources that contains no dairy ingredients.*

In which state do you currently reside?

▼ Alabama (1) ... I do not reside in the United States (53)

To better understand you as a consumer, please answer the following demographic questions.

What is your age in years?

- ☐ Under 18 years (1)
- ☐ 18 - 24 years (2)
- ☐ 25 - 34 years (3)
- ☐ 35 - 44 years (4)
- ☐ 45 - 54 years (5)
- ☐ 55 years or older (6)

What is your biological sex?

- ☐ Male (1)
- ☐ Female (2)

What is your current marital status?

- ☐ Never married (1)
- ☐ Married (2)
- ☐ Partner (3)
- ☐ Divorced (4)
- ☐ Separated (5)
- ☐ Widowed (6)

What is the highest level of education you have completed?

- ☐ Less than high school (1)
- ☐ High school graduate (2)
- ☐ Some college (3)
- ☐ 2 year degree (4)
- ☐ 4 year degree (5)
- ☐ Master's degree (6)
- ☐ Professional degree (7)
- ☐ Doctorate (8)
- ☐ Other (Please specify) (9) _____

How do you identify your ethnicity? Choose all that apply.

- ☐ American Indian or Alaska Native (3)
- ☐ Asian (1)
- ☐ Black or African American (2)
- ☐ Native Hawaiian or Other Pacific Islander (4)
- ☐ White (5)
- ☐ Other (7) _____
- ☐ ☒ Prefer not to answer (6)

What is your household's combined annual income? The term household refers to yourself and any individuals living with you in your current residence/dwelling who share finances.

- ☐ Below \$10,000 (1)
- ☐ \$10,000 - \$19,999 (2)
- ☐ \$20,000 - \$29,999 (3)
- ☐ \$30,000 - \$39,999 (4)
- ☐ \$40,000 - \$49,999 (5)
- ☐ \$50,000 - \$59,999 (6)
- ☐ \$60,000 - \$69,999 (7)
- ☐ \$70,000 - \$79,999 (8)
- ☐ \$80,000 - \$89,999 (9)
- ☐ \$90,000 - \$99,999 (10)

☐ \$100,000 - \$149,999 (11)

☐ \$150,000 or more (12)

☐ Prefer not to answer (13)

How healthy/unhealthy would you consider your dietary/eating habits?

☐ Very unhealthy (1)

☐ Somewhat unhealthy (2)

☐ Neither healthy nor unhealthy (3)

☐ Somewhat healthy (4)

☐ Very healthy (5)

How would you rate your level of physical activity?

☐ Very inactive (1)

☐ Somewhat inactive (2)

☐ Neither active nor inactive (3)

☐ Somewhat active (4)

☐ Very active (5)

What is your height in feet and inches?

Feet (1)

Inches (2)

▼ 1 (1) ... 8 ~ 11 (104)

What is your weight, rounded to the nearest 5 pounds (lbs)?

Pounds (lbs) (1)

▼ Less than 50 (1) ... More than 400 (73)

What type of diet do you follow? Check all that apply.

☐

None of these (1)

☐

Atkins (2)

☐

Flexitarian (3)

☐

Keto (4)

☐

Paleo (5)

☐

Vegan (6)

☐

Vegetarian (7)

☐

Weight Watchers (8)

☐

Other (please specify) (9) _____

Are you a primary shopper?

A primary shopper has at least 50% of the household responsibility for grocery shopping.

☐

Yes (1)

☐

No (2)

On average, which of the following do you consume at least once a month, as a standalone beverage or in any other way? Choose all that apply.

- ☐ Dairy Milk (1)
- ☐ Coffee (2)
- ☐ Plant-Based Alternative Beverage (3)
- ☐ Tea or Kombucha (4)
- ☐ Juice (5)
- ☐ Water (6)

How do you feel about the following types of dairy milk?

	I like it (1)	I neither like it nor dislike it (2)	I dislike it (3)
Whole Milk (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2% Milk (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1% Milk (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Skim/Fat-free Milk (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How do you feel about the following types of plant-based alternative beverages (PBABs)?

	I like it (1)	I neither like it nor dislike it (2)	I dislike it (3)
Almond Milk (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coconut Milk (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Soy Milk (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cashew Milk (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oat Milk (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rice Milk (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazelnut Milk (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Banana Milk (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hemp Milk (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flax Seed Milk (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quinoa Milk (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Including yourself, how many people live in your home?

People who live in your home (1)

▼ 1 (1) ... More than 15 (16)

Including yourself, how many people who live in your home regularly consume dairy milk and/or plant-based alternative beverages?

People who ONLY consume dairy milk (1)	▼ 0 (17) ... More than 15 (16)
People who ONLY consume plant-based alternative beverages (2)	▼ 0 (17) ... More than 15 (16)
People who consume BOTH dairy milk AND plant-based alternative beverages (4)	▼ 0 (17) ... More than 15 (16)
People who DO NOT consume dairy milk OR plant-based alternative beverages (18)	▼ 0 (17) ... More than 15 (16)

The following questions relate to various characteristics of dairy milk you regularly purchase. Answer the following questions according to how acceptable/unacceptable you would expect to rate each characteristic in the beverage that you regularly purchase, if "**Statement**" was printed on the label.

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall nutrition**, if "**Statement**" was printed on the label?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall food safety**, if "*Statement*" was printed on the label?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall cost**, if "*Statement*" was printed on the label?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall environmental impact**, if "*Statement*" was printed on the label?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall quality**, if "*Statement*" was printed on the label?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of dairy milk that you regularly purchase, how would you expect to rate the **overall drinking experience**, if "*Statement*" was printed on the label?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of dairy milk that you regularly purchase, how much more or less **willing would you be to purchase** it, if "*Statement*" was printed on the label?

- ☐ Definitely more willing to purchase (1)
- ☐ Somewhat more willing to purchase (2)
- ☐ Neither more willing nor less willing to purchase (3)
- ☐ Somewhat less willing to purchase (4)
- ☐ Definitely less willing to purchase (5)

How much more or less acceptable would you rate the following characteristics of dairy milk that you regularly purchase, if "*Statement*" was printed on the label?

	Definitely more acceptable (1)	Somewhat more acceptable (2)	Neither more acceptable nor less acceptable (3)	Somewhat less acceptable (4)	Definitely less acceptable (5)
Overall nutrition (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall food safety (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall cost (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall environmental impact (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall quality (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Data quality is important to us. Please select 'Grape' below to indicate that you are paying attention.

- ☐ Orange (1)
- ☐ Papaya (2)
- ☐ Grape (3)
- ☐ Starfruit (4)
- ☐ Kiwi (5)
- ☐ Banana (7)
- ☐ Other (please specify) (6) _____

The following questions relate to various characteristics of plant-based alternative beverages (PBABs) you regularly purchase. Answer the following questions according to how

acceptable/unacceptable you would expect to rate each characteristic in the beverage that you regularly purchase, if "**Statement**" was printed on the label.

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall nutrition**, if "**Statement**" was printed on the label?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall food safety**, if "**Statement**" was printed on the label?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall cost**, if "**Statement**" was printed on the label?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)

☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall environmental impact**, if "*Statement*" was printed on the label?

☐ Definitely acceptable (1)

☐ Somewhat acceptable (2)

☐ Neither acceptable nor unacceptable (3)

☐ Somewhat unacceptable (4)

☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you expect to rate the **overall quality**, if "*Statement*" was printed on the label?

☐ Definitely acceptable (1)

☐ Somewhat acceptable (2)

☐ Neither acceptable nor unacceptable (3)

☐ Somewhat unacceptable (4)

☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how would you expect to rate the **overall drinking experience**, if "*Statement*" was printed on the label?

☐ Definitely acceptable (1)

☐ Somewhat acceptable (2)

☐ Neither acceptable nor unacceptable (3)

☐ Somewhat unacceptable (4)

☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how much more or less **willing would you be to purchase it**, if "*Statement*" was printed on the label?

- ☐ Definitely more willing to purchase (1)
- ☐ Somewhat more willing to purchase (2)
- ☐ Neither more willing nor less willing to purchase (3)
- ☐ Somewhat less willing to purchase (4)
- ☐ Definitely less willing to purchase (5)

How much more or less acceptable would you rate the following characteristics of the plant-based alternative beverage (PBAB) that you regularly purchase, if "*Statement*" was printed on the label?

	Definitely more acceptable (1)	Somewhat more acceptable (2)	Neither more acceptable nor less acceptable (3)	Somewhat less acceptable (4)	Definitely less acceptable (5)
Overall nutrition (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall food safety (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall cost (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall environmental impact (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall quality (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Control Template

The purpose of this questionnaire is to gauge consumer perceptions and attitudes about **dairy milk** and plant-based alternative beverages. By answering this survey, your feedback will help to identify ways to make dairy and non-dairy products that are more appealing to consumers. *For the purpose of this survey, **dairy milk** is milk that comes from a cow. A **plant-based alternative beverage (PBAB)** is a beverage made from almond, coconut, soy, rice, and/or other plant sources that contains no dairy ingredients.*

In which state do you currently reside?

▼ Alabama (1) ... I do not reside in the United States (53)

To better understand you as a consumer, please answer the following demographic questions.

What is your age in years?

- ☐ Under 18 years (1)
- ☐ 18 - 24 years (2)
- ☐ 25 - 34 years (3)
- ☐ 35 - 44 years (4)
- ☐ 45 - 54 years (5)
- ☐ 55 years or older (6)

What is your biological sex?

- ☐ Male (1)
- ☐ Female (2)

What is your current marital status?

- ☐ Never married (1)
- ☐ Married (2)
- ☐ Partner (3)
- ☐ Divorced (4)
- ☐ Separated (5)
- ☐ Widowed (6)

What is the highest level of education you have completed?

- ☐ Less than high school (1)
- ☐ High school graduate (2)
- ☐ Some college (3)
- ☐ 2 year degree (4)
- ☐ 4 year degree (5)
- ☐ Master's degree (6)
- ☐ Professional degree (7)
- ☐ Doctorate (8)
- ☐ Other (Please specify) (9) _____

How do you identify your ethnicity? Choose all that apply.

- ☐ American Indian or Alaska Native (3)
- ☐ Asian (1)
- ☐ Black or African American (2)
- ☐ Native Hawaiian or Other Pacific Islander (4)
- ☐ White (5)
- ☐ Other (7) _____
- ☐ ☒ Prefer not to answer (6)

What is your household's combined annual income? The term household refers to yourself and any individuals living with you in your current residence/dwelling who share finances.

- ☐ Below \$10,000 (1)
- ☐ \$10,000 - \$19,999 (2)
- ☐ \$20,000 - \$29,999 (3)
- ☐ \$30,000 - \$39,999 (4)
- ☐ \$40,000 - \$49,999 (5)
- ☐ \$50,000 - \$59,999 (6)
- ☐ \$60,000 - \$69,999 (7)
- ☐ \$70,000 - \$79,999 (8)
- ☐ \$80,000 - \$89,999 (9)
- ☐ \$90,000 - \$99,999 (10)

☐ \$100,000 - \$149,999 (11)

☐ \$150,000 or more (12)

☐ Prefer not to answer (13)

How healthy/unhealthy would you consider your dietary/eating habits?

☐ Very unhealthy (1)

☐ Somewhat unhealthy (2)

☐ Neither healthy nor unhealthy (3)

☐ Somewhat healthy (4)

☐ Very healthy (5)

How would you rate your level of physical activity?

☐ Very inactive (1)

☐ Somewhat inactive (2)

☐ Neither active nor inactive (3)

☐ Somewhat active (4)

☐ Very active (5)

What is your height in feet and inches?

Feet (1)

Inches (2)

▼ 1 (1) ... 8 ~ 11 (104)

What is your weight, rounded to the nearest 5 pounds (lbs)?

Pounds (lbs) (1)

▼ Less than 50 (1) ... More than 400 (73)

What type of diet do you follow? Check all that apply.

☐

☒ None of these (1)

☐

Atkins (2)

☐

Flexitarian (3)

☐

Keto (4)

☐

Paleo (5)

☐

Vegan (6)

☐

Vegetarian (7)

☐

Weight Watchers (8)

☐

Other (please specify) (9) _____

Are you a primary shopper?

A primary shopper has at least 50% of the household responsibility for grocery shopping.

☐ Yes (1)

☐ No (2)

On average, which of the following do you consume at least once a month, as a standalone beverage or in any other way? Choose all that apply.

- ☐ Dairy Milk (1)
- ☐ Coffee (2)
- ☐ Plant-Based Alternative Beverage (3)
- ☐ Tea or Kombucha (4)
- ☐ Juice (5)
- ☐ Water (6)

How do you feel about the following types of dairy milk?

	I like it (1)	I neither like it nor dislike it (2)	I dislike it (3)
Whole Milk (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2% Milk (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1% Milk (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Skim/Fat-free Milk (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How do you feel about the following types of plant-based alternative beverages (PBABs)?

	I like it (1)	I neither like it nor dislike it (2)	I dislike it (3)
Almond Milk (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coconut Milk (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Soy Milk (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cashew Milk (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oat Milk (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rice Milk (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazelnut Milk (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Banana Milk (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hemp Milk (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flax Seed Milk (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quinoa Milk (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Including yourself, how many people live in your home?

People who live in your home (1)

▼ 1 (1) ... More than 15 (16)

Including yourself, how many people who live in your home regularly consume dairy milk and/or plant-based alternative beverages?

People who ONLY consume dairy milk (1)	▼ 0 (17) ... More than 15 (16)
People who ONLY consume plant-based alternative beverages (2)	▼ 0 (17) ... More than 15 (16)
People who consume BOTH dairy milk AND plant-based alternative beverages (4)	▼ 0 (17) ... More than 15 (16)
People who DO NOT consume dairy milk OR plant-based alternative beverages (18)	▼ 0 (17) ... More than 15 (16)

The following questions relate to various characteristics of dairy milk you regularly purchase. Answer the following questions according to how acceptable/unacceptable each characteristic is to you, personally, in the beverage that you regularly purchase.

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the **overall nutrition**?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the **overall food safety**?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the **overall cost**?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the **overall environmental impact**?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of **dairy milk** that you regularly purchase, how acceptable/unacceptable would you rate the **overall quality**?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Data quality is important to us. Please select 'Grape' below to indicate that you are paying attention.

- ☐ Orange (1)
- ☐ Papaya (2)
- ☐ Grape (3)
- ☐ Starfruit (4)
- ☐ Kiwi (5)
- ☐ Banana (6)
- ☐ Other (please specify) (7) _____

The following questions relate to various characteristics of plant-based alternative beverages (PBABs) you regularly purchase. Answer the following questions according to how acceptable/unacceptable each characteristic is to you, personally, in the beverage that you regularly purchase.

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the **overall nutrition**?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the **overall food safety**?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the **overall cost**?

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the **overall environmental impact?**

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

Thinking of the PBAB that you regularly purchase, how acceptable/unacceptable would you rate the **overall quality?**

- ☐ Definitely acceptable (1)
- ☐ Somewhat acceptable (2)
- ☐ Neither acceptable nor unacceptable (3)
- ☐ Somewhat unacceptable (4)
- ☐ Definitely unacceptable (5)

APPENDIX III: SENSORY PANELS QUESTIONNAIRE

Statements 1-5 and Control Template

Name_____

Signature_____

(Sign after reading consent form)

Welcome to the Food Science Sensory Laboratory. A copy of the form titled “Consent to Be a Research Subject” is posted in each booth. Please read it carefully before continuing. By signing your name above, you acknowledge that you have read and understand the consent form and desire of your own free will and volition to participate in this study. Inform the receptionist if you wish to withdraw.

In this session, you will evaluate **ONE** sample of **DAIRY MILK**. Read all instructions and questions carefully; we are counting on your conscientious evaluation. Before you receive the sample, please answer these questions by marking the appropriate circles.

- * The purpose of this questionnaire is to gauge consumer perceptions and attitudes about dairy milk. By answering this survey, your feedback will help to identify ways to make dairy beverages more appealing to consumers.

For the purpose of this survey, dairy milk is milk that comes from a cow.

- * What is your age category?
- ☐ Younger than 18 years
 - ☐ 18 - 24 years
 - ☐ 25 - 34 years
 - ☐ 35 - 44 years
 - ☐ 45 - 54 years
 - ☐ 55 years or older

- * Please indicate your biological sex.
- ☐ Male
 - ☐ Female

- * What is your current marital status?

- ☐ Never married
- ☐ Married
- ☐ Partner
- ☐ Divorced
- ☐ Separated
- ☐ Widowed

* How do you identify your ethnicity? Choose all that apply.

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Other (please specify)
- ☐ Prefer not to answer

* Are you a primary shopper? A primary shopper has at least 50% of the household responsibility for grocery shopping.

- ☐ Yes
- ☐ No

* On average, which of the following do you consume at least once every three months, as a standalone beverage or in any other way? Choose all that apply.

Dairy milk is milk that comes from a cow. A plant-based alternative beverage is a beverage made from almond, coconut, soy, rice, and/or other plant sources that contains no dairy ingredients.

- ☐ Dairy Milk
- ☐ Coffee
- ☐ Plant-Based Alternative Beverage
- ☐ Tea or Kombucha
- ☐ Juice
- ☐ Water

* How do you feel about the following types of dairy milk?

I like it	I neither like it nor dislike it	I dislike it
-----------	--	--------------

Whole Milk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2% Milk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1% Milk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Skim/Fat-free Milk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* Do you have any food allergies or sensitivities to any of the following food ingredients?

- ☐ Milk
- ☐ Eggs
- ☐ Fish
- ☐ Crustaceans/Shellfish
- ☐ Tree Nuts
- ☐ Peanuts
- ☐ Wheat
- ☐ Soy
- ☐ I have no food allergies or sensitivities to these food ingredients

* For the **DAIRY MILK** you regularly purchase, how acceptable/unacceptable would you expect to rate its overall drinking experience, if “Statement” was printed on the label?

Definitely acceptable	<input type="radio"/>
Somewhat acceptable	<input type="radio"/>
Neither acceptable nor unacceptable	<input type="radio"/>
Somewhat unacceptable	<input type="radio"/>
Definitely unacceptable	<input type="radio"/>

* For the **DAIRY MILK** you regularly purchase, how much more or less acceptable would you expect to rate the following characteristics, if “Statement” was printed on the label?

	Definitely more acceptable	Somewhat more acceptable	Neither more acceptable nor less acceptable	Somewhat less acceptable	Definitely less acceptable
Overall nutrition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Overall food safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall environmental impact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* For the **DAIRY MILK** you regularly purchase, how willing would you be to purchase it, if “Statement” was printed on the label?

- Definitely more willing to purchase ☐
- Somewhat more willing to purchase ☐
- Neither more willing to purchase nor less willing to purchase ☐
- Somewhat less willing to purchase ☐
- Definitely less willing to purchase ☐

Locate the set of lights to the right of the computer screen and press the red button next to the **green “READY” light** to indicate that you are ready to receive your sample. Please be patient; it should arrive shortly.

When the sample arrives, don’t taste it until instructed to do so. Press the button by the **“HELP” LIGHT** to the right of the screen if you need help.

This sample of **DAIRY MILK** came from a container with “Statement” printed on the label. Please taste it before continuing the survey.

TASTE THE SAMPLE.

* For this **DAIRY MILK** sample, how acceptable/unacceptable would you rate its overall drinking experience, given that “Statement” was printed on the label?

- Definitely acceptable ☐
- Somewhat acceptable ☐
- Neither acceptable nor unacceptable ☐
- Somewhat unacceptable ☐
- Definitely unacceptable ☐

* For this **DAIRY MILK** sample, how much more or less acceptable would you rate the following characteristics, given that “Statement” was printed on the label?

	Definitely more acceptable	Somewhat more acceptable	Neither more acceptable nor less acceptable	Somewhat less acceptable	Definitely less acceptable
Overall nutrition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall food safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall environmental impact	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* For this **DAIRY MILK** sample, how willing would you be to purchase it, given that “Statement” was printed on the label?

- Definitely more willing to purchase ☐
- Somewhat more willing to purchase ☐
- Neither more willing to purchase nor less willing to purchase ☐
- Somewhat less willing to purchase ☐
- Definitely less willing to purchase ☐

You are finished. Please place the sample and tray in the pass-through compartment and **PRESS THE BUTTON BY THE “FINISHED” LIGHT**. Please give this questionnaire to the receptionist. **THANK YOU!**