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STUDY ON DAIRY CHEESE AND PLANT-BASED FOODS THAT MIMIC CHEESE

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BACKGROUND

Three dairy industry organizations, Wisconsin Cheese Makers Association, Edge Dairy Farmer Cooperative (representing dairy farmers and processors from across the Midwest) and Dairy Farmers of Wisconsin (the Dairy Groups) would like to understand how consumers perceive plant-based foods that mimic dairy products. These organizations represent dairy farmers and processors from across the Midwest.

The prevalence of plant-based foods that mimic dairy products continues to increase. Some of these plant-based foods use terms such as milk, cheese alternative, cheddar/gouda-style, etc. that may be misleading to the consumer. Further, natural cheeses have traditional names with federal standards of identity which describe ingredients and preparation processes that plant-based foods cannot adhere to (i.e. a plant-based food cannot meet the milkfat required in cheddar cheese). To ensure consumers understand the products they are purchasing and consuming, it is important to understand how they currently perceive plant-based foods that mimic dairy products, and what labeling modifications can or should be made to ensure consumers understand the products they are purchasing and consuming.

OBJECTIVES

The Dairy Groups want to understand:

- Why consumers purchase plant-based foods that mimic cheese.
- What consumers believe the ingredients of plant-based foods that mimic cheese are, and if that is influenced by the terminology/labeling (i.e. 'milk', 'cheese', 'cheddar-style').
- Consumer perception of the nutritional value of plant-based foods that mimic cheese compared to dairy, and if perceptions are influenced by the terminology/labeling (i.e. 'milk', 'cheese', 'cheddar-style').
- How consumers perceive plant-based foods that mimic cheese perform in various eating and cooking tasks (vs. dairy).

METHODOLOGY

A 15-minute online survey was completed among a national U.S. sample of consumers ages 18 and older.

- Respondents who reported that they purchased a dairy product (cheese, milk, or yogurt) and/or a plant-based food that mimics dairy (plant-based cheese made without dairy, plant-based milk, or plant-based yogurt made without dairy milk) within the last 4 weeks qualified for the study. This purchase history is available in Appendix Table A.
- Consumers determined to be employed in a competitive industry were excluded from the study. These industries included: consumer packaged goods; food manufacturer, retailer, wholesaler, retailer, or advocacy organization; marketing, market research, advertising, or public relations; regulatory agency related to food (e.g. FDA, USDA, FTC); and agriculture.
- Ravel, LLC programmed the survey and hosted the data collection using Confront software tools.



- Ravel, LLC partners with select, proven national online panels to provide quality targeted samples.
- Data collection period was December 21, 2018 through December 30, 2018 and paused for the holiday on December 24 and December 25.
- Ravel, LLC promoted data quality by ensuring that questions were reasonable and engaging for respondents.
- At the completion of the survey, data cleaning steps were employed to reduce sampling error:
 - Eliminated respondents who stated they could not see the images
 - Eliminated respondents who fell outside of time completion parameters (i.e. completed the survey too quickly).

PRODUCTS EVALUATED

DAIRY CHEESES



Dairy Cheddar



Dairy Mozzarella Shreds



Dairy Mozzarella Slices

PLANT-BASED FOODS THAT MIMIC CHEESE



Plant-based food that mimics cheddar



Plant-based food that mimics mozzarella shreds



Plant-based food that mimics mozzarella slices



EXECUTIVE SUMMARY

Ingredients

Over one-quarter of consumers indicated that they don't know what ingredients are in the plant-based foods that mimic cheese (Table A). Furthermore, about one-quarter mistakenly indicated that pasteurized milk was present. The high prevalence of 'don't know' and mistaken responses perhaps indicates that the use of traditional dairy names such as cheddar and mozzarella confuse consumers, leading to the selection of dairy ingredients in these plant-based foods.

Nutrients

About one-third of consumers indicate that the plant-based food that mimics mozzarella slices has protein (34%) and calcium (37%), when in actuality it does not contain either of these nutrients (Table B).

A significantly greater percentage of consumers indicate that they don't know which nutrients are in the plant-based foods, perhaps indicating that the front labeling does not clearly reveal the product nutrients (Table B).

Cheese Type

About half of consumers say plant-based foods that mimic cheese are actually cheddar or mozzarella cheese (Table C). And compared to the dairy cheeses, a significantly higher percentage don't know if the plant-based foods are cheddar or mozzarella cheese.

Together, these answers indicate more than half of consumers surveyed mistook a plant-based food mimicking cheddar or mozzarella to be traditional cheddar or mozzarella or were unclear about applying these traditional cheese names to plant-based foods.

Nutrition

A statistically greater percentage of all consumers surveyed believe that dairy cheese is more nutritious than plant-based food that mimics cheese, versus consumers who believe the opposite (Table D). However, this varies by food type purchased. Consumers who purchase plant-based foods that mimic cheese are significantly more likely to believe that these foods are more nutritious than dairy cheese (Table E).

Protein

About one-third of consumers don't know or think that the plant-based cheese has higher quality protein, even though plant-based foods that mimic cheese have little to no protein content (Table F). The prevalence of consumers who don't know or mistakenly identify the higher quality protein food may be an indication that the use of traditional dairy names such as cheddar and mozzarella confuses consumers, leading to the expectation of significant amounts of high quality protein in these plant-based foods.

The percentage of consumers who indicate that the plant-based foods have higher quality protein is significantly greater among plant-based food purchasers (Table G), perhaps indicating



that they believe their food choice is providing an adequate protein source, when in actuality plant-based foods that mimic cheese contain little to no protein.

Natural

A statistically greater percentage of consumers believe that dairy cheese is more natural than plant-based foods that mimic cheese (Table H). However, this varies by food type purchased. Consumers who purchase plant-based foods that mimic cheese are significantly more likely to believe that these foods are more natural than dairy cheese (Table I).

Substitute

About one in five consumers do not believe that dairy cheese and plant-based food that mimics cheese are good substitutes for each other (Table J). Dairy cheese consumers are significantly more likely than plant-based dairy consumers to believe that plant-based foods that mimic cheese cannot be substituted for dairy cheese (Table K).

Buy

Almost one in five dairy purchasers said they would buy a plant-based food based on the front label, even though these consumers do not purchase plant-based dairy products (Table L). This may indicate that plant-based food labels do not clearly indicate the non-dairy nature of these foods, or the use of traditional dairy names such as cheddar and mozzarella confuses consumers, leading to the selection of these plant-based foods.

Some of the reasons consumers purchase plant-based foods that mimic cheese do not correlate with the product. Specifically, significantly more consumers indicate that they would buy one of the plant-based foods that mimic cheese because they are low in calories, low in fat, and contain no additives (Table M). In actuality, plant-based foods that mimic cheese contain an equal or comparable amount of fat and calories and contain substantially more additives than dairy cheeses.



INGREDIENTS

Consumers were asked to identify the ingredients of three dairy cheeses and three plant-based foods that mimic cheese based on the front packaging of the product. Options available to consumers included the most common ingredients of both dairy cheese and plant-based food that mimics cheese.

About one-quarter of consumers were able to correctly identify the ingredients of the plant-based foods that mimic cheese (Table A). However, over one-quarter of consumers, significantly more than in the dairy cheese products, indicated that they don't know what ingredients are in the plant-based foods that mimic cheese. Furthermore, about one-quarter mistakenly indicated that pasteurized milk was present. The high prevalence of 'don't know' and mistaken responses perhaps indicates that the use of traditional dairy names such as cheddar and mozzarella confuse consumers, leading to the selection of dairy ingredients in these plant-based foods.

Table A: INGREDIENTS

Based on what you see, which ingredients do you believe are included in this food?	Dairy cheddar	Dairy mozzarella shreds	Dairy mozzarella slices	Plant-based food that mimics cheddar	Plant-based food that mimics mozzarella shreds	Plant-based food that mimics mozzarella slices
	n=450 A (%)	n=450 B (%)	n=450 C (%)	n=450 D (%)	n=450 E (%)	n=450 F (%)
DAIRY CHEESE INGREDIENTS						
Pasteurized milk	68 DEF	69 DEF	69 DEF	24	21	25
Cheese culture	62 DEF	63 DEF	62 DEF	31	30	32
Enzymes	27 EF	28 EF	27 EF	24	22	22
PLANT-BASED INGREDIENTS						
Filtered water	23	24	24	26	29 ABC	27
Modified Food Starch	18	15	16	19	21 BC	20 B
Canola and/or Safflower oil	14	12	12	22 ABC	19 ABC	20 ABC
Potato Starch	10	9	9	18 ABC	18 ABC	18 ABC
Pea protein	10	9	8	18 ABC	20 ABC	17 ABC
Coconut oil	9	9	10	17 ABC	17 ABC	16 ABC
Tapioca	6	6	7	11 ABC	13 ABC	12 ABC
OTHER						
Salt	52 BDEF	47 DEF	50 DEF	38	37	38
Other	0	1	0	1	1	1
Don't know	8	9	9	26 ABC	27 ABC	27 ABC

Notes:
Data in each column may not add up to 100% as consumers could choose more than one response.
A/B/C/D/E/F indicates significance, significance is tested at the 95% confidence level.



NUTRIENTS

Consumers were asked to identify the nutrients contained in three dairy cheeses and three plant-based foods that mimic cheese, based on the front packaging of the product. Options available to consumers included macronutrients (i.e. fat, carbohydrate, protein) and the micronutrients listed on the ingredient label of the products.

Dairy cheese and plant-based food that mimic cheese tend to have similar nutrients which primarily include fat, carbohydrates, proteins, and calcium. However, the quantity of these nutrients varies by product. Generally, dairy cheese is higher in fat, protein and calcium and plant-based food that mimics cheese is higher in carbohydrates.

The percentage of consumers who expect these nutrients to be present varies by food type and by nutrient (Table B). A significantly greater percentage of consumers indicated that the dairy cheeses contain protein and calcium. However, about one-third of consumers indicated that the plant-based food that mimics mozzarella slices has protein (34%) and calcium (37%) when in actuality it does not contain either of these nutrients.

The plant-based foods that mimic cheddar and mozzarella shreds do contain protein (1g), but at a much lower level than dairy cheddar (6g) and dairy mozzarella shreds (7g). The plant-based food that mimics mozzarella shreds has a much lower level of calcium (2% DV) than dairy mozzarella shreds (15% DV), and the plant-based food that mimics cheddar contains 10% DV calcium (from tricalcium phosphate) vs. 15 % DV natural-occurring calcium in dairy cheddar.

A significantly greater percentage of consumers indicated they don't know which nutrients are in the plant-based foods, perhaps indicating that the front labeling does not clearly reveal the product nutrients.

Table B: NUTRIENTS

Based on what you see, which <u>nutrients</u> do you believe are included in this food?	Dairy cheddar	Dairy mozzarella shreds	Dairy mozzarella slices	Plant-based food that mimics cheddar	Plant-based food that mimics mozzarella shreds	Plant-based food that mimics mozzarella slices
	n=450 A (%)	n=450 B (%)	n=450 C (%)	n=450 D (%)	n=450 E (%)	n=450 F (%)
Calcium	65 DEF	65 DEF	64 DEF	49 EF	36	37
Vitamin D	47 DEF	48 DEF	49 DEF	30	31	32
Protein	47 DEF	46 DEF	44 DEF	37	37	34
Carbohydrate	25 D	25 D	23	20	21	21
Fat	44 BDEF	38 DEF	42 BDEF	27 E	23	26
Vitamin A	27 EF	27 EF	26	24	22	23
Vitamin C	25 DE	23	26 DEF	20	20	21
Iron	22 DEF	21 E	20 E	18	16	18
Potassium	21 D	19	21 F	19	18	17
Don't know	10	11	11	23 ABC	30 ABCD	30 ABCD

Notes:
Data in each column may not add up to 100% as consumers could choose more than one response.
A/B/C/D/E/F indicates significance, significance is tested at the 95% confidence level.



CHEESE TYPE

Consumers were asked if the food they evaluated is a cheddar or mozzarella cheese based on the front packaging of the product and the most relevant cheese type.

Nine in ten consumers correctly identify the dairy cheeses as a cheddar or mozzarella cheese (Table C; 91% dairy cheddar, 90% dairy mozzarella shreds, 92% dairy mozzarella slices).

About half of consumers identify the plant-based foods that mimic cheese as a cheddar or mozzarella cheese. And, a significantly higher percentage, versus the dairy cheeses, don't know. Together, these answers indicate more than half of consumers surveyed mistook a plant based food mimicking cheddar or mozzarella to be traditional cheddar or mozzarella or were unclear about applying these traditional cheese names to plant-based foods.

Table C: Cheese Type

Is this a cheddar/mozzarella cheese?	Dairy cheddar	Dairy mozzarella shreds	Dairy mozzarella slices	Plant-based food that mimics cheddar	Plant-based food that mimics mozzarella shreds	Plant-based food that mimics mozzarella slices
	n=450 A (%)	n=450 B (%)	n=450 C (%)	n=450 D (%)	n=450 E (%)	n=450 F (%)
Yes	91 DEF	90 DEF	92 DEF	50 E	46	49
No	4	4	4	42 ABC	45 ABCDF	42 ABC
Don't know	5	6	4	8 AC	8 AC	9 ABC

Notes:
Data in each column may not add up to 100% due to rounding.
A/B/C/D/E/F indicates significance, significance is tested at the 95% confidence level.



NUTRITION

Consumers were asked if the food they evaluated is more nutritious, less nutritious, or equally as nutritious as the corresponding food (i.e., paired together were dairy cheddar and plant-based food that mimics cheddar; dairy mozzarella shreds and plant-based food that mimics mozzarella shreds; and dairy mozzarella slices and plant-based food that mimics mozzarella slices). The food shown first was randomized to minimize potential bias.

A statistically greater percentage of all consumers surveyed believe that dairy cheese is more nutritious than plant-based food that mimics cheese (Table D). However, this varies by food type purchased. Consumers who purchase plant-based foods that mimic cheese are significantly more likely to believe that these foods are more nutritious than dairy cheese (Table E).

Table D: NUTRITION

Based on what you see, do you believe Food A is more nutritious, less nutritious, or equally as nutritious as Food B?	Dairy cheese is more nutritious	Equally nutritious	Plant-based food is more nutritious
	n=450 A (%)	n=450 B (%)	n=450 C (%)
Cheddar	37 C	38 C	25
Mozzarella shreds	37 C	43 C	20
Mozzarella slices	33 C	44 AC	23

*Notes:
Data in each row may not add up to 100% due to rounding.
A/B/C indicates significance, significance is tested at the 95% confidence level.*



Table E: NUTRITION BY FOOD GROUP

Based on what you see, do you believe Food A is more nutritious, less nutritious, or equally as nutritious as Food B?	Total Sample n=450 (%)	Dairy Purchasers n=250 A (%)	Dairy and plant-based food purchaser n=150 B (%)	Plant-based food purchaser n=50* C (%)
CHEDDAR				
Dairy cheese is more nutritious	37	42 C	33	26
Equally nutritious	38	39 C	43 C	20
Plant-based food is more nutritious	25	19	24	54 AB
MOZZARELLA SHREDS				
Dairy cheese is more nutritious	37	44 BC	33 C	18
Equally nutritious	43	43	47	36
Plant-based food is more nutritious	20	14	21	46 AB
MOZZARELLA SLICES				
Dairy cheese is more nutritious	33	40 BC	25	20
Equally nutritious	44	43	49 C	30
Plant-based food is more nutritious	23	17	25 A	50 AB

Notes:

Data in each column may not add up to 100% due to rounding.

*Indicates small sample size.

A/B/C indicates significance, significance is tested at the 95% confidence level.



PROTEIN

Consumers were asked which of two corresponding foods (i.e., paired together were dairy cheddar and plant-based food that mimics cheddar; dairy mozzarella shreds and plant-based food that mimics mozzarella shreds; and dairy mozzarella slices and plant-based food that mimics mozzarella slices) they expect to have a higher quality protein content. The food shown first was randomized to minimize potential bias.

A statistically greater percentage of consumers believe that dairy cheese has a higher quality protein content than plant-based food that mimics cheese (Table F).

About one-third of consumers don't know or think that the plant-based food has higher quality protein, even though plant-based foods that mimic cheese have little to no protein content. The prevalence of consumers who don't know or mistakenly identify the higher quality protein food may be an indication that the front labeling of the plant-based foods does not clearly indicate the non-dairy nature of these foods, or the use of traditional dairy names such as cheddar and mozzarella confuses consumers, leading to the expectation of significant amounts of high quality protein in these plant-based foods.

The percentage of consumers who indicate that the plant-based foods have higher quality protein is significantly greater among plant-based food purchasers (Table G), perhaps indicating they believe their food choice is providing an adequate protein source, when in actuality plant-based foods that mimic cheese contain little to no protein.

Table F: PROTEIN

Proteins may vary in nutritional quality. Based on what you see, how do you expect the protein in Food A to compare to the protein in Food B?	Dairy cheese has higher quality protein	The protein is of the same quality	Plant-based food has higher quality protein	Don't know
	n=450 A (%)	n=450 B (%)	n=450 C (%)	n=450 D (%)
Cheddar	34 CD	31 CD	21 D	14
Mozzarella shreds	32 CD	34 CD	20	15
Mozzarella slices	32 CD	33 CD	21 D	14

Notes:
Data in each row may not add up to 100% due to rounding.
A/B/C/D indicates significance, significance is tested at the 95% confidence level.



Table G: PROTEIN BY FOOD GROUP

Proteins may vary in nutritional quality. Based on what you see, how do you expect the protein in Food A to compare to the protein in Food B?	Total Sample n=450 (%)	Dairy Purchasers n=250 A (%)	Dairy and plant-based food purchaser n=150 B (%)	Plant-based food purchaser n=50* C (%)
CHEDDAR				
Dairy cheese has higher quality protein	34	39 C	31	20
The protein is of the same quality	31	28	35	32
Plant-based food has higher quality protein	21	16	23	38 A
Don't know	14	18 B	10	10
MOZZARELLA SHREDS				
Dairy cheese has higher quality protein	32	36 C	33 C	12
The protein is of the same quality	34	33	36	30
Plant-based food has higher quality protein	20	13	23 A	42 AB
Don't know	15	18 B	8	16
MOZZARELLA SLICES				
Dairy cheese has higher quality protein	32	35 C	31	20
The protein is of the same quality	33	31	38	28
Plant-based food has higher quality protein	21	16	24 A	42 AB
Don't know	14	19 B	7	10

Notes:

Data in each column may not add up to 100% due to rounding.

*Indicates small sample size.

A/B/C indicates significance, significance is tested at the 95% confidence level.



NATURAL

Consumers were asked if the food they evaluated is more natural, less natural, or equally as natural as the corresponding food (i.e. paired together were dairy cheddar and plant-based food that mimics cheddar; dairy mozzarella shreds and plant-based food that mimics mozzarella shreds; and dairy mozzarella slices and plant-based food that mimics mozzarella). The food shown first was randomized to minimize potential bias.

A statistically greater percentage of consumers believe that dairy cheese is more natural than plant-based foods that mimic cheese (Table H). However, this varies by food type purchased. Consumers who purchase plant-based foods that mimic cheese are significantly more likely to believe that these foods are more natural than dairy cheese (Table I).

Table H: NATURAL

Looking at the labels of Food A and Food B, would you consider Food A more natural, less natural, or equally natural as Food B?	Dairy cheese is more natural	Equally natural	Plant-based food is more natural
	n=450 A (%)	n=450 B (%)	n=450 C (%)
Cheddar	38 C	36 C	26
Mozzarella shreds	40 C	38 C	22
Mozzarella slices	37 C	38 C	25

Notes:
Data in each row may not add up to 100% due to rounding.
A/B/C indicates significance, significance is tested at the 95% confidence level.



Table I: NATURAL BY FOOD GROUP

Looking at the labels of Food A and Food B, would you consider Food A more natural, less natural, or equally natural as Food B?	Total Sample n=450 (%)	Dairy Purchasers n=250 A (%)	Dairy and plant-based food purchaser n=150 B (%)	Plant-based food purchaser n=50* C (%)
CHEDDAR				
Dairy cheese is more natural	38	47 BC	30	22
Equally natural	36	33	41	34
Plant-based food is more natural	26	20	29	44 A
MOZZARELLA SHREDS				
Dairy cheese is more natural	40	50 BC	27	28
Equally natural	38	38	41	28
Plant-based food is more natural	22	12	31 A	44 A
MOZZARELLA SLICES				
Dairy cheese is more natural	37	46 BC	29	22
Equally natural	38	34	43	38
Plant-based food is more natural	25	20	28	40 A

Notes:

Data in each column may not add up to 100% due to rounding.

*Indicates small sample size.

A/B/C indicates significance, significance is tested at the 95% confidence level.



SUBSTITUTE

Consumers were asked if the food they evaluated is a good substitute for the corresponding food (i.e. paired together were dairy cheddar and plant-based food that mimics cheddar; dairy mozzarella shreds and plant-based food that mimics mozzarella shreds; and dairy mozzarella slices and plant-based food that mimics mozzarella slices). Approximately half of consumers were asked if a dairy cheese is a good substitute for a plant-based food that mimics cheese, and the other half were asked if a plant-based food that mimics cheese is a good substitute for dairy cheese.

About one in five consumers do not believe dairy cheese and plant-based food that mimics cheese are good substitutes for each other (Table J). Dairy cheese consumers are significantly more likely than plant-based dairy consumers to disagree with the statement that plant-based food that mimics cheese is a good substitute for dairy cheese (Table K).

Table J: SUBSTITUTE

Looking at the labels of Food A and Food B, do you agree or disagree with the following statement: Food A is a good substitute for Food B?	Dairy cheddar	Dairy mozzarella shreds	Dairy mozzarella slices	Plant-based food that mimics cheddar	Plant-based food that mimics mozzarella shreds	Plant-based food that mimics mozzarella slices
	n=226 A (%)	n=231 B (%)	n=228 C (%)	n=224 D (%)	n=219 E (%)	n=222 F (%)
Strongly/Somewhat agree that this food can be substituted	50	54	51	54	49	51
Neither agree or disagree	31	29	31 D	24	32 DF	25
Strongly/Somewhat disagree that this food can be substituted	19	16	18	22	19	24

Notes:
Data in each column may not add up to 100% due to rounding.
A/B/C/D/E/F indicates significance, significance is tested at the 95% confidence level.



Table K: SUBSTITUTE BY FOOD GROUP

Looking at the labels of Food A and Food B, do you agree or disagree with the following statement: Food A is a good substitute for Food B?	Total Sample n=>219*** (%)	Dairy Purchasers n=>109 A (%)	Dairy and plant-based food purchaser n=>68* B (%)	Plant-based food purchaser n=>21** C (%)
DISAGREE THAT DAIRY CHEESE CAN BE SUBSTITUTED				
Cheddar	19	21	14	27
Mozzarella shreds	16	18	12	23
Mozzarella slices	18	16	15	33
DISAGREE THAT PLANT-BASED FOODS CAN BE SUBSTITUTED				
Cheddar	22	33 B	14	0
Mozzarella shreds	19	27 B	9	18
Mozzarella slices	24	32 B	13	17

Notes:

*/**Indicates small/very sample size.

***Sample size varies due to randomization.

A/B/C indicates significance, significance is tested at the 95% confidence level.



BUY

Consumers were asked which of two corresponding foods (i.e. dairy cheddar and plant-based food that mimics cheddar; dairy mozzarella shreds and plant-based food that mimics mozzarella shreds; and dairy mozzarella slices and plant-based food that mimics mozzarella slices) they would be more likely to buy. The order of the foods was randomized to eliminate potential placement bias. Consumers were then asked why they would purchase the food they selected.

As to be expected, dairy purchasers were significantly more likely than plant-based food purchasers to select a dairy cheese and vice versa (Table L). However, about 18 percent of dairy purchasers selected a plant-based food, even though these are consumers that do not purchase plant-based dairy products. This may indicate that plant-based food labels do not clearly indicate the non-dairy nature of these foods, or the use of traditional dairy names such as cheddar and mozzarella confuses consumers, leading to the selection of these plant-based foods.

Significantly more consumers indicate that they are likely to buy dairy cheese versus plant-based foods that mimic cheese because it tastes good, it is flavorful, it is a good source of calcium, habit, and it has a good texture (Table M). Consumers also noted several 'other' reasons they would purchase a dairy cheese including: it's real cheese, contains dairy, and trust the brand.

Significantly more consumers indicate that they are likely to buy plant-based foods that mimic cheese because it is healthy, it is all natural, it contains no artificial ingredients, it contains no additives, it is low in fat, it comes from a sustainable food source, it is lactose free, it is low in calories, it contains no added sugar, and it is produced in an environmentally friendly way (Table M).

Interestingly, some of the reasons consumers purchase plant-based foods that mimic cheese do not correlate with the product. Specifically, significantly more consumers indicate that they would buy plant-based foods that mimic cheese because they are low in calories, low in fat, and contain no additives. In actuality, plant-based foods that mimic cheese contain an equal or comparable amount of fat and calories and contain substantially more additives than dairy cheeses.



Table L: BUY

Based on the label, which food are you more likely to buy?	Total Sample n=450 (%)	Dairy Purchasers n=250 A (%)	Dairy and plant-based food purchaser n=150 B (%)	Plant-based food purchaser n=50* C (%)
Dairy				
Cheddar	71	78 BC	67 C	50
Mozzarella shreds	75	86 BC	68 C	44
Mozzarella slices	70	82 BC	61 C	38
Plant-based foods				
Cheddar	29	22	33 A	50 AB
Mozzarella shreds	25	14	32 A	56 AB
Mozzarella slices	30	18	39 A	62 AB

Notes:

Data in each column may not add up to 100% due to rounding.

*Indicates small sample size.

A/B/C indicates significance, significance is tested at the 95% confidence level.



Table M: WHY BUY

Why are you more likely to buy _____?	Dairy cheddar n=321 A (%)	Dairy mozzarella shreds n=338 B (%)	Dairy mozzarella slices n=315 C (%)	Plant-based food that mimics cheddar n=129 D (%)	Plant-based food that mimics mozzarella shreds n=112 E (%)	Plant-based food that mimics mozzarella slices n=135 F (%)
It tastes good	53 DEF	54 DEF	49 DEF	22	22	36 DE
It is flavorful	40 DEF	41 DEF	39 DEF	19	20	17
It is a good source of calcium	30 D	34 D	33 D	21	25	26
It is nutritious	28	28	27	32	36	37 C
It is a good source of protein	27	29	28	27	26	25
Habit, I always buy this type of product	27 DEF	28 DEF	25 DEF	7	16 D	12
It is safe to consume	26 C	22	19	22	22	27 C
It has a good texture	26 DE	23	21	16	17	19
It is healthy	23	23	20	42 ABC	39 ABC	41 ABC
It is all natural	23	20	22	33 ABC	31 B	37 ABC
It is a good source of vitamins and minerals	21	21	19	19	21	21
It contains no artificial ingredients	11	14	12	20 A	19	24 ABC
It contains no additives	11	9	10	22 ABC	27 ABC	23 ABC
It is low in fat	10	12	11	29 ABC	23 ABC	24 ABC
It has a limited number of ingredients	10	11	10	15	17	16
It comes from a sustainable food source	10	12	8	18 AC	18 AC	17 AC
It is lactose free	9	10	11	22 ABC	16	25 ABC
It is low in calories	8	8	6	27 ABC	26 ABC	21 ABC
Manufacturers are transparent about how it is produced	7	10	8	17 AC	17 AC	19 ABC
It is low in cholesterol	7	9	7	21 ABC	29 ABC	24 ABC
It contains no added sugar	7	9	7	22 ABC	17 ABC	15 AC
It is produced in an environmentally responsible way	4	7	6	16 ABC	18 ABC	16 ABC
It is good for someone with milk allergies*	-	-	-	20	25	21
Animals are not used in their production*	-	-	-	18	17	21
Other	9 DF	10 DF	11 DF	2	0	1

Notes:

Data in each column may not add up to 100% as consumers could choose more than one option.

A/B/C/D/E/F indicates significance, significance is tested at the 95% confidence level.

*Asked only of plant-based foods



Appendix



SHOPPING HISTORY

Consumers who reported that they purchased a dairy product (cheese, milk, or yogurt) and/or a plant-based food that mimics dairy (plant-based milk, plant-based cheese made without dairy, or plant-based yogurt made without dairy milk) within the last 4 weeks qualified for this study. To mask the purpose of the study a list of common foods was presented for consumers to choose from.

Appendix Table A: SHOPPING HISTORY

Which of these foods have you purchased in the <u>last 4 weeks</u> ?	Total Sample	Dairy Purchasers	Dairy and plant-based food purchaser	Plant-based food purchaser
	n=450 (%)	n=250 A (%)	n=150 B (%)	n=50* C (%)
Bread	81	86 C	83 C	46
Eggs	80	85 C	84 C	44
Fresh fruit	80	80 C	89 AC	52
Dairy milk	75	88 C	79	-
Dairy cheese	74	84	84	-
Pasta	65	64 C	75 AC	38
Frozen vegetables	62	58	74 AC	48
Baking ingredients (e.g. flour, sugar)	62	57	75 AC	46
Dairy yogurt	55	50	82 AC	-
Plant-based milk (e.g. almond, soy, rice)	38	-	87	76
Gluten-free bread or pasta	17	6	31 A	28 A
Plant-based cheese made without dairy milk	17	-	37	40
Plant-based yogurt made without dairy milk	16	-	35	40
Egg substitutes	14	2	31 A	22 A

Notes:

Data in each column may not add up to 100% as consumers could choose more than one option.

*Indicates small sample size

A/B/C indicates significance, significance is tested at the 95% confidence level.



Appendix Table B: Demographics Table 1

	Total Sample n=450 (%)	Dairy Purchasers n=250 A (%)	Dairy and plant-based food purchaser n=150 B (%)	Plant-based food purchaser n=50* C (%)
GENDER				
Female	42	42	37	60 AB
Male	58	58 C	63 C	40
AGE				
18 to 24	16	14	18	20
25 to 34	16	9	21 A	32 A
35 to 44	16	13	19	18
45 to 54	20	19	23	14
55 to 64	16	22 BC	9	8
65 or older	17	23 BC	10	8
GEOGRAPHIC RESIDENCE				
South	36	35	39	32
West	24	22	22	36
Northeast	21	22	20	22
Midwest	19	21 C	19	10
HOUSEHOLD INCOME				
Under \$25,000	16	16	17	10
\$25,000 - \$49,999	24	21	23	38 AB
\$50,000 - \$74,999	21	25 B	16	18
\$75,000 - \$99,999	16	13	25 AC	10
\$100,000 - \$149,999	13	14	9	20
\$150,000 - \$199,999	5	5	7	2
\$200,000 or more	4	5	4	2
NUMBER IN HOUSEHOLD				
1	24	27 B	15	36 B
2	34	42 B	23	30
3	19	16	25 A	16
4	16	11	24 A	16
5	5	4	8	-
6 or more	2	2	4	2
CHILDREN IN HOUSEHOLD				
Yes	36	25	57 AC	32
No	64	75 B	43	68 B

Notes:

Data in each column may not add up to 100% due to rounding.

*Indicates small sample size

A/B/C indicates significance, significance is tested at the 95% confidence level.



Appendix Table C: Demographics Table 2

	Total Sample n=450 (%)	Dairy Purchasers n=250 A (%)	Dairy and plant-based food purchaser n=150 B (%)	Plant-based food purchaser n=50* C (%)
EDUCATION				
Some schooling completed, no high school diploma	1	1	3	0
High school graduate or equivalent (GED)	19	19	17	22
Some college credit, no degree	19	21	18	12
Associate's degree	11	12	10	6
Bachelor's degree	30	28	30	34
Post-graduate work, no degree	4	4	3	6
Master's degree	12	12	12	16
Professional/Doctorate degree	5	3	7	4
ETHNICITY**				
White/Caucasian	78	82 C	78 C	60
Black/African American	10	10	6	24 AB
Hispanic/Non-white	7	6	9	10
Asian/Pacific Islander	5	3	8 A	6
Native American/Aleutian Eskimo	1	1	1	-
Other	1	-	2	2
EMPLOYMENT STATUS				
Employed full-time	46	38	54 A	62 A
Employed part-time	11	10	13	10
Self-employed	7	8	6	8
Student	4	3	5	4
Retired	21	27 BC	13	10
Homemaker	5	6	5	2
Unemployed/not currently working	6	8	4	4

Notes:

Data in each column may not add up to 100% due to rounding.

*Indicates small sample size

**Respondents could select all that apply.

A/B/C indicates significance, significance is tested at the 95% confidence level.