

## Supplementary Materials

**Table S1.** Participants' sources for recipes for soaked nuts and nut-based dairy analogs (NBDA)

| Source             | Soaked nuts<br>( <i>n</i> = 655) <sup>a</sup> | NBDA<br>( <i>n</i> = 934) <sup>a</sup> |
|--------------------|---|--|
| YouTube            | 388 (59.2)                                    | 546 (58.5)                             |
| Social media       | 341 (52.1)                                    | 487 (52.1)                             |
| Cookbooks          | 242 (36.9)                                    | 378 (40.5)                             |
| Friends/family     | 204 (31.1)                                    | 311 (33.3)                             |
| Blogs              | 168 (25.6)                                    | 256 (27.4)                             |
| Newspaper          | 117 (17.9)                                    | 124 (13.3)                             |
| Other <sup>b</sup> | 24 (3.7)                                      | 40 (4.3)                               |

<sup>a</sup> Due to multiple sources selected, calculated numbers and proportions exceed the actual number of participants.

<sup>b</sup> Other source mentioned were “web search,” “Google,” “websites,” “Pinterest,” “dietitian,” and “through my own research.”

**Table S2.** Participants' knowledge on how tree nuts are grown and harvested

| Topic     | Very knowledgeable<br>( <i>n</i> = 981) | Somewhat knowledgeable<br>( <i>n</i> = 981) | Not at all knowledgeable<br>( <i>n</i> = 981) |
|-----------|---|---|---|
| Grown     | 225 (22.9)                              | 463 (47.2)                                  | 293 (29.9)                                    |
| Harvested | 201 (20.5)                              | 458 (46.7)                                  | 312 (21.8)                                    |

**Table S3.** Participants' response to tree nut harvesting message

| Topic and information                             | No. (%) of responses<br>( <i>n</i> = 981) |
|---|---|
| Surprising information <sup>a</sup>               | 194 (19.8)                                |
| Tree nuts left on ground to dry                   | 450 (45.9)                                |
| Almonds and walnuts shaken mechanically to ground | 274 (27.9)                                |
| Tree nuts dried outside                           | 270 (27.5)                                |
| Tree nuts naturally fall to ground                | 312 (21.8)                                |
| Nothing surprising                                | 194 (19.8)                                |
| Other <sup>b</sup>                                | 6 (0.6)                                   |
| Food safety risk <sup>a</sup>                     |   |
| Contaminated with dust and other particles        | 625 (63.7)                                |
| Contaminated with foodborne pathogens             | 543 (55.4)                                |
| Contaminated with insects                         | 424 (43.2)                                |
| Other <sup>c</sup>                                | 647 (66.0)                                |

<sup>a</sup> Due to multiple responses selected, calculated numbers and proportions exceed the actual number of participants.

<sup>b</sup> Other surprising information mentioned were “never heard of cashew apples” and “how cashews are harvested.”

<sup>c</sup> Other food safety risks mentioned were “unknown risks,” “pesticides,” “ground contamination,” “didn’t know they could get contaminated,” and “I don’t know.”

**Table S4.** Tree nuts involved in foodborne outbreaks or recalls that participants were aware of

| Tree nut          | No. (%) of responses<br>( <i>n</i> = 247) <sup>a</sup> |
|-------------------|--|
| Walnuts           | 124 (50.2)   |
| Almonds           | 120 (48.6)   |
| Cashews           | 114 (46.2)   |
| Pistachios        | 83 (33.6)  |
| Does not remember | 30 (12.1)  |

<sup>a</sup> Due to multiple tree nuts selected, calculated numbers and proportions exceed the actual number of participants.

**Table S5.** Participants' perceptions of tree nut food safety risks

| Perception  | Agree      | No. (%) of response<br>( <i>n</i> = 981) |            |
|---|------------|--|------------|
|   |            | Neither Agree<br>nor Disagree            | Disagree   |
| I am at high risk of contracting a foodborne illness                              | 80 (8.2)   | 293 (29.7)                               | 241 (24.6) |
| Tree nuts pose a high risk for microbial contamination                            | 386 (39.3) | 341 (35)                                 | 254 (25.9) |
| Tree nuts I purchase are likely to be contaminated                                | 362 (36.9) | 361 (36.8)                               | 258 (26.3) |
| I am likely to contract a foodborne illness from consuming contaminated tree nuts | 290 (29.6) | 313 (31.9)                               | 378 (38.5) |
| I am at high risk of contracting a foodborne illness                              | 239 (24.4) | 293 (29.7)                               | 449 (45.8) |

**Table S6.** Participants' perceived raw characteristics of tree nuts lost during pasteurization

| Raw characteristic   | No. (%) of responses<br>(n = 981) <sup>a</sup> |
|--|--|
| Flavor   | 382 (38.9)                                     |
| Source of un unsaturated fats, vitamins, and minerals          | 366 (37.3)                                     |
| High protein and dietary fiber content                         | 362 (36.9)                                     |
| Freshness  | 362 (36.9)                                     |
| All-natural characteristic                                     | 271 (27.6)                                     |
| Being free of preservatives, additives, or chemical substances | 262 (26.7)                                     |
| Low saturated fat and cholesterol content                      | 196 (20.0)                                     |
| No health benefits lost  | 147 (15.0)                                     |
| Other  | 16 (1.6)                                       |

<sup>a</sup> Due to multiple rationales selected, calculated numbers and proportions exceed the actual number of participants.

**Table S7.** Participants' rationale for preferring raw over treated tree nuts

| Rationale  | No. (%) of responses<br>( <i>n</i> = 323) <sup>a</sup> |
|--|--|
| Free of preservatives, additives, or chemical substances | 153 (47.4)   |
| Nutrients intact   | 130 (40.2)   |
| Flavor   | 104 (32.2)   |
| Sustainable  | 72 (22.3)  |
| Fair trade   | 59 (18.3)  |
| Cost effective   | 55 (17.0)  |

<sup>a</sup> Due to multiple rationales selected, calculated numbers and proportions exceed the actual number of participants.

**Table S8.** Participants’ perceived benefits for soaking tree nuts for direct consumption and subsequent preparation of nut-based dairy analogs (NBDA)

| Benefit                          | No. (%) of responses<br>( <i>n</i> = 718) <sup>a</sup> |
|----------------------------------|--|
| Make nuts easier to eat or blend | 365 (50.8)   |
| Removes chemical substances      | 351 (48.9)   |
| Removes harmful bacteria         | 343 (47.8)   |
| Removes nutritional inhibitors   | 267 (37.2)   |
| Improves taste                   | 224 (31.2)   |
| Aids digestions of nutrients     | 217 (30.2)   |
| Recipe advises to do so          | 180 (25.1)   |
| “Activates” the nuts             | 124 (17.3)   |
| Other <sup>b</sup>               | 4 (0.6)  |

<sup>a</sup> Due to multiple rationales selected, calculated numbers and proportions exceed the actual number of participants.

<sup>b</sup> Other rationales for soaking mentioned were “taste,” “to soften the nuts,” “regimen recipe,” “no reason,” “allergic,” “habit,” “to clean the nuts,” and “for a specific texture.”



**Table S9.** Participants’ rationale for making nut-based dairy analogs (NBDA) at home rather than buying commercially and dairy-based products

| Rationales   | No. (%) of responses<br>( <i>n</i> = 934) <sup>a</sup> |                      |
|--|--|----------------------|
|  | Buying commercially                                    | Dairy-based products |
| Healthier  | 508 (54.4)   | 595 (63.7)           |
| Fresher  | 412 (42.0)   | NA <sup>b</sup>      |
| More flavorful   | 379 (40.6)   | 322 (34.5)           |
| Control the ingredients                                  | 347 (37.2)   | NA                   |
| Free of preservatives, additives, or chemical substances | 312 (33.4)   | NA                   |
| More cost effective                                      | 303 (32.4)   | 283 (30.3)           |
| More sustainable   | 223 (23.9)   | 280 (30.0)           |
| Enjoys the process                                       | 218 (23.3)   | NA                   |
| Does not consume dairy                                   | NA   | 115 (12.3)           |
| Can use up extra tree nuts                               | 88 (9.4)   | NA                   |
| Sells (farmer’s market, roadside stand, on farm stores)  | 69 (7.4)   | NA                   |
| Other <sup>c</sup>                                       | 27 (2.9)   | 44 (4.7)             |

<sup>a</sup> Due to multiple rationales selected, calculated numbers and proportions exceed the actual number of participants.

<sup>b</sup> NA, not applicable.

<sup>c</sup> Other rationales to make NBDA at home mentioned were “wanted to try,” “no reason,” “medical reason,” “lactose intolerance,” “fun to try,” and “don’t need a lot.”

**Table S10.** Participants' method of consuming homemade nut-based dairy analogs (NBDA)

| Method of consuming                                      | No. (%) of responses<br>( <i>n</i> = 934) <sup>a</sup> |
|--|--|
| Directly as it is  | 547 (58.6)   |
| In cereals or oatmeal                                    | 508 (54.4)   |
| In baked products  | 451 (48.3)   |
| In other dishes or recipes                               | 410 (43.9)   |
| Paired with other foods (i.e., crackers, bread, granola) | 350 (37.5)   |
| As a substitute for dairy products                       | 326 (34.9)   |
| Other <sup>b</sup>                                       | 561 (60.1)   |

<sup>a</sup> Due to multiple methods selected, calculated numbers and proportions exceed the actual number of participants.

<sup>b</sup> Other methods of consuming NBDA mentioned were for smoothies, protein shakes, coffee, cakes and cookies, and hot chocolate.

**Table S11.** Participants' actions taken when tree nuts they purchased have been recalled

| Action                       | No. (%) of responses<br>( <i>n</i> = 981) <sup>a</sup> |
|------------------------------|--|
| Throw away recalled nuts     | 731 (74.5)   |
| Cook recalled nuts           | 124 (12.6)   |
| Still eat recalled nuts      | 105 (10.7)   |
| Feed recalled nuts to pets   | 50 (5.1)   |
| Use recalled nuts for crafts | 49 (5.0)   |
| Other <sup>b</sup>           | 17 (1.7)   |

<sup>a</sup> Due to multiple tree nuts selected, calculated numbers and proportions exceed the actual number of participants.

<sup>b</sup> Other actions taken with recalled tree nuts mentioned were “return to store/retailer,” “give to squirrels,” “compost,” and “depends on reason that they were recalled.”

**Table S12.** Participants’ reported information that would affect their handling of tree nuts

| Information  | No. (%) of responses<br>( <i>n</i> = 981) <sup>a</sup> |
|--|--|
| Foodborne outbreaks that can make you sick                                     | 546 (55.7)   |
| Foodborne outbreaks that can make you die                                      | 465 (47.4)   |
| Scientific research about microbial food safety risk associated with tree nuts | 379 (38.6)   |
| Other <sup>b</sup>   | 3 (0.3)  |

<sup>a</sup> Due to multiple tree nuts selected, calculated numbers and proportions exceed the actual number of participants.

<sup>b</sup> Other information that would affect their tree nut handling mentioned were “I would just purchase from another source,” “I trust my organic coop,” and “I listen to my doctor.”

### Appendix

*In this study, we will be asking you questions about your handling practices and food safety knowledge associated with tree nuts. For this study, ‘tree nuts’ refer to almonds, walnuts, cashews, and pistachio. The study focuses on handling practices when making nut-based dairy alternatives and soaked (sometimes referred as ‘activated’ or ‘sprouted’) nuts for direct consumption. This study defines ‘nut-based dairy alternatives’ as nut milk, cheese, and yogurt.*

#### Block 0: Screening

1. Are you the primary shopper for yourself and/or your household?
  - ☐ Yes
  - ☐ No

*[End survey if consumer selected ‘No’]*
2. How often do you use tree nuts to make nut-based dairy alternatives at home?
  - ☐ Never
  - ☐ Rarely (less than 2 times in the past year)
  - ☐ Sometimes (2–12 times in the past year)
  - ☐ Regularly (more than 12 times in the past year)
3. *[If they make nut-based products]* What are the tree nuts you use to make nut-based dairy alternatives at home? (Select all that apply)
  - ☐ Almonds
  - ☐ Walnuts
  - ☐ Cashews
  - ☐ Pistachios
  - ☐ Pecans
  - ☐ Peanuts
  - ☐ None of the above
4. How often do you soak tree nuts for direct consumption at home?
  - ☐ Never
  - ☐ Rarely (less than 2 times in the past year)
  - ☐ Sometimes (2–12 times in the past year)
  - ☐ Regularly (more than 12 times in the past year)
5. *[If they soak nuts for consumption only]* What are the tree nuts you soak for direct consumption at home? (Select all that apply)

- Almonds
- Walnuts
- Cashews
- Pistachios
- Pecans
- Peanuts
- None of the above

*[End survey if consumer selected 'Never' or 'Rarely' for question 2 AND 4 or selected 'None of the above' for question 3 AND 5]*

## **Block 2: Handling Tree Nut-Based Dairy Alternatives**

*[This block will only be displayed for consumers that selected 'Sometimes' or 'Regularly' in screening question 2]*

*In this section, we will ask questions about your handling of tree nuts when making nut-based dairy alternatives at home. For this study, 'nut-based dairy alternatives' refer to nut-based milk, cheese, and yogurt made from tree nuts and 'tree nuts' refer to almonds, walnuts, cashews, and pistachios.*

1. *[If they soak all tree nuts the same]* Why do you soak your tree nuts? (select all that apply)
  - To remove nutritional inhibitors (e.g., tannin, phytic acid, or enzyme inhibitors)
  - To remove chemical substances (e.g., pesticides, preservatives, additives)
  - To remove harmful bacteria
  - To aid in digestion of nutrients
  - To make the nuts easier to blend
  - To sprout or activate the nuts
  - For a better taste of the final product
  - The recipe advises me to soak
  - Other, please specify: \_\_\_\_\_
2. *[If they soak each tree nut variety differently]* Why do you soak your tree nuts? (Select all that apply)

|  | Almonds               | Cashews               | Walnuts               | Pistachios            |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| To remove nutritional inhibitors (i.e., tannin, phytic acid, or enzyme inhibitors) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To remove chemical substances (i.e., pesticides, preservatives, additives)         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To remove harmful bacteria   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To aid in digestion of nutrients   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To make the nuts easier to blend   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To sprout or activate the nuts   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| For a better taste of the final product  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The recipe advises to soak   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I don't soak this nut  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other, please specify: _____   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

3. *[If they remove the skin from their almonds]* Why do you remove the skins from your almonds? (Select all that apply)
  - To remove nutritional inhibitors within the skin (e.g., tannin or phytic acid)

- To remove chemical substances (e.g., pesticides, preservatives, additives)
  - To remove harmful bacteria
  - To aid in digestion of nutrients
  - To create a smoother consistency for the final product
  - To make the almonds easier to blend
  - For a better taste of the final product
  - The recipe advises to remove the skin
  - Other, please specify: \_\_\_\_\_
4. *[If they strain their nut-based dairy alternatives]* What do you do with the leftover pulp (the by-product from making nut milk)? (Select all that apply)
- Discard it
  - Compost it
  - Make nut flour
  - Use in other recipes
  - Other, please specify: \_\_\_\_\_
5. Where do you find recipes to make nut-based dairy alternatives at home? (Select all that apply)
- Blog
  - Newspaper
  - YouTube
  - Social media (e.g., Instagram, TikTok, Facebook, Twitter, etc.)
  - Cookbooks
  - Friends/Family
  - Other, please specify: \_\_\_\_\_
6. Why do you make nut-based dairy alternatives at home than buying commercially? (Select all that apply)
- Homemade is healthier than the store bought
  - Homemade is more flavorful than store bought
  - Homemade is fresher than store bought
  - Homemade is more cost effective than store bought
  - Homemade is more sustainable than store bought
  - Homemade is free of preservatives, additives, and chemical substances
  - I can control and know what ingredients are going into the products
  - I sell my homemade products (i.e., farmer's market, roadside stands, on farm stores)
  - I enjoy the process of making homemade nut-based products
  - I can use up extra tree nuts
  - Other, please specify: \_\_\_\_\_
7. Why do you make nut-based dairy alternatives at home rather than dairy-based products? (Select all that apply)
- Nut-based is healthier
  - Nut-based is easier to make
  - Nut-based is more cost effective
  - Nut-based is more sustainable
  - Nut-based tastes better
  - I do not consume dairy products

- Other, please specify: \_\_\_\_\_
8. *[If they do not consume dairy products]* Why do you not consume dairy-based products? (Select all that apply)
- ☐ Health reasons (i.e., dairy products are higher in saturated fats, cholesterol, and sugar)
  - ☐ Lactose intolerant or sensitive
  - ☐ Do not like the taste
  - ☐ Want to lose weight
  - ☐ Want to avoid animal products
  - ☐ Prefer plant-based products
  - ☐ Other, please specify: \_\_\_\_\_
9. How do you use your homemade nut-based dairy alternatives? (Select all that apply)
- ☐ Directly as it is
  - ☐ In baked products
  - ☐ In other dishes or recipes
  - ☐ In cereals or oatmeal
  - ☐ Paired with other foods (i.e., crackers, bread, granola)
  - ☐ As substitute to dairy products
  - ☐ Other, please specify: \_\_\_\_\_

### Block 3: Handling Soaked Nuts for Consumption

*[This block will only be displayed if consumers selected 'Sometimes' or Regularly' in screening question 4].*

*In this section, we will ask questions about your handling practices when soaking (sometimes referred at 'activating' or 'sprouting') tree nuts for consumption use only. Again, in this study, 'tree nuts' refer to almonds, walnuts, cashews, and pistachios.*

1. *[If they soak all tree nuts the same]* Why do you soak your almonds for direct consumption? (Select all that apply)
- ☐ To remove nutritional inhibitors (e.g., tannin, phytic acid, or enzyme inhibitors)
  - ☐ To remove chemical substances (e.g., pesticides, preservatives, additives)
  - ☐ To remove harmful bacteria
  - ☐ To aid in digestion of nutrients
  - ☐ To make the nuts easier to eat
  - ☐ For a better taste
  - ☐ Other, please specify: \_\_\_\_\_
2. *[If they soak each tree nut variety differently]* Why do you soak your tree nuts for direct consumption? (Select all that apply)

|  | Almonds               | Cashews               | Walnuts               | Pistachios            |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| To remove nutritional inhibitors (i.e., tannin, phytic acid, or enzyme inhibitors) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To remove chemical substances (i.e., pesticides, preservatives, additives)         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To remove harmful bacteria   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To aid in digestion of nutrients   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To make the nuts easier to blend   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| To sprout or activate the nuts   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| For a better taste   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|                              |                       |                       |                       |                       |
|------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| The recipe advises to soak   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I do not soak this nut       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Other, please specify: _____ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

3. *[If they remove the skin from their almonds]* Why do you remove the skin from your almonds? (Select all that apply)
- ☐ To remove nutritional inhibitors (i.e., tannin or phytic acid)
  - ☐ To remove chemical substances (i.e., pesticides, preservatives, additives)
  - ☐ To remove harmful bacteria
  - ☐ To aid in digestion of nutrients
  - ☐ To make the almonds easier to eat
  - ☐ For a better taste
  - ☐ Other, please specify: \_\_\_\_\_
4. Where do you find recipes to soak tree nuts for direct consumption? (Select all that apply)
- ☐ Blog
  - ☐ Newspaper
  - ☐ YouTube
  - ☐ Social media (e.g., Instagram, TikTok, Facebook, Twitter, etc.)
  - ☐ Cookbooks
  - ☐ Friends/Family
  - ☐ Other, please specify: \_\_\_\_\_

#### Block 4: Raw Tree Nuts

*[Question 1 is only displayed if the consumer selected 'Sometimes' or 'Regularly' in screening question 2]*

1. When making nut-based dairy alternatives at home, what kind of tree nuts do you prefer to use?
- ☐ Roasted
  - ☐ Blanched (tree nuts have been briefly boiled to remove the skins)
  - ☐ Pasteurized (exposed to heat to remove pathogens)
  - ☐ Depends, please specify: \_\_\_\_\_

*[Question 2 is only displayed if the consumer selected 'Sometimes' or 'Regularly' in screening question 4]*

1. When soaking nuts for direct consumption, what kind of tree nuts do you prefer to use?
- ☐ Roasted
  - ☐ Blanched (tree nuts have been briefly boiled to remove the skins)
  - ☐ Pasteurized (exposed to heat to remove pathogens)
  - ☐ Depends, please specify: \_\_\_\_\_
2. *[If they prefer to use raw tree nuts]* For the following question, rate how important each factor is in choosing raw over treated tree nuts from "Not at all important" to "Extremely important".

|                | Not at all<br>Important | Slightly<br>Important | Moderately<br>Important | Very<br>Important     | Extremely<br>Important |
|----------------|-------------------------|-----------------------|-------------------------|-----------------------|------------------------|
| Cost Effective | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/>  |
| Sustainable    | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/>  |
| Flavor         | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/>  |



|   |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Free of preservatives, additives, or chemical substances  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fair trading (agreement between trading entities to pay fair prices to achieve equitable trade relationships) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

*Pasteurization refers to exposure to heat to destroy pathogens in foods and beverages.*

3. Are you aware that there are pasteurization processes that maintain the raw characteristics of tree nuts?
  - ☐ Yes
  - ☐ No
  - ☐ I don't know
4. Are you aware that some tree nuts labeled as raw have been pasteurized?
  - ☐ Yes
  - ☐ No
  - ☐ I don't know
5. Are you aware that raw (not roasted, blanched, pasteurized) tree nuts have a higher risk for contamination?
  - ☐ Yes
  - ☐ No
  - ☐ I don't know
6. For the following question, please rate how strongly you disagree or agree with the following statement from "Strongly disagree" to "Strongly agree"

|   | Strongly Disagree     | Somewhat Disagree     | Neither Agree nor Disagree | Somewhat Agree        | Strongly Agree        |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Raw, unpasteurized tree nuts have more of a health benefit than treated tree nuts | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |

7. What health benefits do you believe are lost during pasteurization? (Select all that apply)
  - ☐ Low saturated and cholesterol content
  - ☐ High protein and dietary fiber content
  - ☐ Source of unsaturated fats, vitamin E, vitamin B-6, potassium, phosphorus, or magnesium
  - ☐ Flavor
  - ☐ Freshness
  - ☐ Being free of preservatives, additives, or chemical substances
  - ☐ All natural
  - ☐ I do not believe any health benefits are lost during treatment
  - ☐ Other, please specify: \_\_\_\_\_

8. For the following question, please rate how strongly you disagree or agree with the following statement from “Strongly disagree” to “Strongly agree”

|   | Strongly Disagree     | Somewhat Disagree     | Neither Agree nor Disagree | Somewhat Agree        | Strongly Agree        |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| The health benefits of raw, unpasteurized tree nuts are more important than the microbial risks | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |

9. Pathogens, such as *Salmonella*, can survive for sufficient time on low-moisture foods, such as tree nuts, to cause foodborne illness. *Salmonella* infections can lead to diarrhea, fever, and abdominal cramps and for the immunocompromised, elderly, and young children can cause a much more serious infection.

After reading the food safety message above, rate how strongly you disagree or agree with the following statement from “Strongly disagree” to “Strongly agree.”

|   | Strongly Disagree     | Somewhat Disagree     | Neither Agree nor Disagree | Somewhat Agree        | Strongly Agree        |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Raw, unpasteurized tree nuts have more of a health benefit than treated tree nuts               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The health benefits of raw, unpasteurized tree nuts are more important than the microbial risks | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |

### Block 5: Tree Nut Food Safety Knowledge and Risk Perception

1. For the following question, please indicate if you believe the following statements are true or false.

|  | True                  | False                 | I Don't Know          |
|--|-----------------------|-----------------------|-----------------------|
| Tree nuts can be contaminated with harmful bacteria                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Harmful bacteria can survive on tree nuts for a long period of time      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Harvesting and processing provides opportunities for cross contamination | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Freezing will destroy any harmful bacteria on tree nuts                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

2. Do you expect the tree nuts you purchase to be free of harmful bacteria?
- ☐ Yes
  - ☐ No

- I don't know
- 3. For the following question, please rate how strongly you disagree or agree with each of the following statements from "Strongly disagree" to "Strongly agree."

|  | Strongly Disagree     | Somewhat Disagree     | Neither Agree nor Disagree | Somewhat Agree        | Strongly Agree        |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| I am at a high-risk level for contracting a foodborne illness.                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| Tree nuts pose a high-risk for microbial contamination.                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| The tree nuts I purchase are likely to be contaminated.                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |
| I am likely to contract a foodborne illness from consuming contaminated tree nuts. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>      | <input type="radio"/> | <input type="radio"/> |

- 4. Have you heard of recent tree nut related foodborne illness outbreaks or recalls?
  - Yes
  - No
  - I don't know
- 5. *[If they have heard of recent outbreaks or recalls]* What tree nuts were associated with the foodborne outbreak(s) or recall(s) that you heard about? (Select all that apply)
  - Almonds
  - Walnuts
  - Cashews
  - Pistachios
  - I do not remember
- 6. What information regarding tree nut related foodborne illness outbreaks or recalls would affect your handling or purchase of tree nuts? (Select all that apply)
  - Foodborne outbreaks that can make you sick
  - Foodborne outbreaks that can make you die
  - Scientific research about the microbial food safety risk associated with tree nuts
  - I don't know
  - Other, please specify: \_\_\_\_\_
- 7. Would you throw away the tree nuts you purchased that were recalled?
  - Yes, I would throw them away
  - No, I would still eat them as is
  - No, I would cook them
  - No, I would feed them to my pets
  - No, I would use them for crafts
  - Other, please specify: \_\_\_\_\_

8. For the following question, please rate how strongly you disagree or agree that each of the following entities are responsible for a tree nut related foodborne outbreak and recall from “Strongly disagree” to “Strongly agree.”

|  | Strongly Disagree     | Somewhat Disagree     | No Opinion            | Somewhat Agree        | Strongly Agree        |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| The farmer                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The processor                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The company                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The supermarket (i.e., Meijer, Aldi, Costco) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The government (e.g., FDA, USDA, CDC)        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

9. For the following question, please rate how much trust you would continue to have with each of the following entities following a tree nut related foodborne outbreak and recall from “Strongly distrust” to “Strongly trust”

|   | Strongly Distrust     | Somewhat Distrust     | No Opinion            | Somewhat Trust        | Strongly Trust        |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| The company                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The processors                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The farmers                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The supermarkets (e.g., Meijer, Aldi, Costco) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The government (e.g., FDA, USDA, CDC)         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

10. How knowledgeable do you think you are about how tree nuts are grown and harvested?

|           | Very Knowledgeable    | Somewhat Knowledgeable | Not at all Knowledgeable |
|-----------|-----------------------|------------------------|--------------------------|
| Grown     | <input type="radio"/> | <input type="radio"/>  | <input type="radio"/>    |
| Harvested | <input type="radio"/> | <input type="radio"/>  | <input type="radio"/>    |

11. Tree nuts are grown on trees. After the fruits ripen, the tree nuts, like almonds and walnuts, fall to the ground either naturally or by mechanical shakers. Walnuts are usually collected soon after shaking and then dried at commercial dehydrators. Almonds are often dried on the ground before collection. Cashews are separated from fallen or harvested cashew apples, the fruit from which they are grown, and then dried in the sun. After drying, the tree nuts may be stored under cool conditions before they are processed and packaged.

After reading the statement, what information surprises you? (Select all that apply)

- ☐ Tree nuts are dried outside
- ☐ Tree nuts are left on the ground to dry
- ☐ Tree nuts fall natural to the ground
- ☐ Almonds and walnuts are shaken mechanically to the ground
- ☐ Nothing
- ☐ Other, please specify: \_\_\_\_\_

12. After reading the statement, what do you believe is the food safety risk associated with raw, unpasteurized tree nuts? (Select all that apply)
- ☐ Contaminated with foodborne pathogens
  - ☐ Contaminated with dust and other particles
  - ☐ Contaminated with insects
  - ☐ Other, please specify: \_\_\_\_\_

**Block 6: Delivery Format of the Information**

1. How would you like to learn more about tree nut food safety? (Select all that apply)
- ☐ Brochure
  - ☐ Government websites (e.g., FDA, USDA, CDC)
  - ☐ Nut company website
  - ☐ Social Media (e.g., Instagram, TikTok, Facebook, Twitter, etc.)
  - ☐ TV
  - ☐ Newspapers
  - ☐ Word of mouth
  - ☐ Other, please specify: \_\_\_\_\_

**Demographic Questions**

1. What is your age?
- ☐ 18–24
  - ☐ 25–34
  - ☐ 35–44
  - ☐ 45–54
  - ☐ 55–64
  - ☐ 65 or above
  - ☐ Prefer not to answer
2. What gender do you identify with the most?
- ☐ Female
  - ☐ Male
  - ☐ Prefer not to answer
3. What ethnicity do you identify with the most? (Select all that apply)
- ☐ White (Non-Hispanic)
  - ☐ Hispanic
  - ☐ African American
  - ☐ Asian or Pacific Islander
  - ☐ Native American
  - ☐ Other, please specify: \_\_\_\_\_
  - ☐ Prefer not to answer
4. Which of the following best describes the general area you live in?
- ☐ Rural
  - ☐ Urban
  - ☐ Suburban
5. What state do you currently reside in?
- ☐ Drop list of states
6. What is the highest degree or level of education you have completed?
- ☐ Less than HS diploma
  - ☐ HS diploma/GED
  - ☐ Some college (no degree)
  - ☐ Associate degree

- ☐ Bachelor's degree
  - ☐ Graduate degree
  - ☐ Prefer not to answer
7. Can you give us an estimate of your household income after taxes from last year?
- ☐ Less than \$25,000
  - ☐ \$25,000–\$49,999
  - ☐ \$50,000–\$74,999
  - ☐ \$75,000–\$99,999
  - ☐ \$100,000–\$149,999
  - ☐ \$150,000–\$199,999
  - ☐ \$200,000 and above
  - ☐ Prefer not to answer
8. How would you describe your diet?
- ☐ Vegan
  - ☐ Vegetarian
  - ☐ Keto
  - ☐ Paleo
  - ☐ Whole30
  - ☐ Dairy-free
  - ☐ Gluten-free
  - ☐ No specific diet
  - ☐ Other, please specify: \_\_\_\_\_