

Supplementary material S1
Questionnaire: "Spirulina in Food"

Section 1 – Participant Profile
(All Groups responded)

1 - What is your age?

[Dropdown list]: Options from 18 to 100.

2 - What is your sex?

[Multiple choice]

- ☐ Female
- ☐ Male
- ☐ Non-binary
- ☐ Prefer not to say

3 - In which state do you live?

[Dropdown list]: Options – AC; AL; AP; AM; BA; CE; DF; ES; GO; MA; MT; MS; MG; PA; PB; PR; PE; PI; RJ; RN; RS; RO; RR; SC; SP; SE; TO

4 - In which city do you live?

[Short answer text]

5 - How do you self-declare?

[Multiple choice]

- ☐ Black
- ☐ Brown
- ☐ White
- ☐ Yellow
- ☐ Indigenous

6 - What is your education level?

[Multiple choice]

- ☐ Incomplete elementary school
- ☐ Completed elementary school
- ☐ Completed high school
- ☐ Completed undergraduate education
- ☐ Completed postgraduate education

7 - What is your total family income? Optional

[Multiple choice]

- ☐ Up to US\$ 242.19
- ☐ Between US\$ 242.20 and US\$ 484.38
- ☐ Between US\$ 484.39 and US\$ 726.58
- ☐ Between US\$ 726.59 and US\$ 1,453.16
- ☐ Between US\$ 1,453.17 and US\$ 2,424.95
- ☐ Between US\$ 2,424.96 and US\$ 3,632.92
- ☐ Between US\$ 3,632.93 and US\$ 6,054.88
- ☐ From US\$ 6,054.89

8 - How many people live in your home?

Example: If you live alone, mark 1.

Example: If you live with only two children, mark 3.

[Dropdown list]: Options from 1.

9 - In your household, who decides which groceries to buy?

[Multiple choice]

- () Just me
 () Other people and me
 () Only other people

10 - How do you classify your diet based on the options below?

[Multiple choice]

- () Vegan or strict vegetarian (only plant-based foods)
 () Vegetarian (plant-based foods + dairy and/or eggs and/or honey)
 () Pescetarian (plant-based foods + fish and seafood + dairy and/or eggs and/or honey)
 () Flexitarian (predominantly plant-based foods + occasional and moderate consumption of animal products)
 () Omnivorous (generally does not restrict the choice of plant- or animal-based foods)
 () Other: _____

11 - Rate the frequency with which you engaged in the following habits over the past three months:

[Multiple-choice grid]

- 1 – Never
 2 – Rarely
 3 – Occasionally
 4 – Frequently
 5 - Very frequently

	1	2	3	4	5
[a] Seeking information on healthy eating	()	()	()	()	()
[b] Seeking information on physical exercise practices	()	()	()	()	()
[c] Seeking information on mental health	()	()	()	()	()
[d] Consumption of dietary supplements (This may include whey protein, omega-3, collagen, weight-loss shakes, "slimming flour," immunity shots, or others)	()	()	()	()	()

12 - Have you ever learned about the field of "food and human health" through any of the following sources?

[Multiple-choice grid]

	Yes	No	I don't remember
[a] I have a technical degree, undergraduate or postgraduate degree in this or related areas	()	()	()
[b] I work or have worked in this or related areas	()	()	()
[c] I do or have done one or more short courses in this or related areas	()	()	()
[d] Through networks and social media (TikTok, Instagram, X (Twitter), YouTube, TV programs, LinkedIn, etc.)	()	()	()

13 - Have you ever heard of Spirulina?

[Multiple choice]

- () Yes {was taken to Section 3}
 () No {was taken to Section 2}
 () I don't remember {was taken to Section 2}

Section 2 – Knowledge about Spirulina – Benefits
(Only Group 1 responded)

Read the text below or watch the short video below to answer the following questions:

Our research studies Spirulina, a microalga rich in nutrients and bioactive compounds. We are exploring its applications in food, considering three main benefits:

1 - Human health: Spirulina can provide essential amino acids, carotenoids, minerals, provide antioxidant and anti-inflammatory activities, and contribute to neuroprotective, cardioprotective, and anticarcinogenic processes, among others.

2 - Environment: It can be cultivated sustainably, not requiring extensive cultivation areas or causing soil degradation, in addition to contributing to the sequestration of carbon from the atmosphere. It can also be used to generate several high-value products with low waste production, such as in biorefineries that use it to produce food coloring, biofuels and for wastewater treatment.

3 - Food production: Natural dyes can be produced from Spirulina and its compounds, providing greenish and bluish colors to foods. This microalga can also increase the protein content of foods, which is especially interesting for some restrictive diets, such as vegan diets.

14 - How has your willingness to start consuming Spirulina changed when considering each benefit individually?

Rate from 1 to 5.

[Multiple-choice grid]

1 - Very low willingness

2 - Low willingness

3 - Neither low nor high willingness

4 - High willingness

5 - Very high willingness

	1	2	3	4	5
[a] Benefit 1 - Human health	()	()	()	()	()
[b] Benefit 2 – Environment	()	()	()	()	()
[c] Benefit 3 - Food production	()	()	()	()	()

Section 3 – Knowledge about Spirulina
(Only Groups 2 and 3 responded)

15 - Regarding Spirulina, mark each statement as True (T), False (F), or I don't know:

Don't worry about getting the answers right or wrong, and please don't search for them. We just want to understand your prior knowledge about Spirulina.

[Multiple choice grid]

	T	F	I don't know
[a] It has antioxidant, anti-inflammatory, and cardioprotective properties	()	()	()
[b] It is rich in proteins, contains essential amino acids, and B vitamins	()	()	()
[c] It can be consumed by people who do not eat animal-derived foods	()	()	()
[d] It contains phycocyanin, a blue antioxidant pigment that can be used as a natural food colorant	()	()	()
[e] Cultivating Spirulina can help capture carbon dioxide (CO ₂) from the atmosphere	()	()	()
[f] Large land areas are not required to cultivate Spirulina	()	()	()

16 - Which of the following Spirulina brands have you seen in physical or online stores in Brazil? You may select more than one option and indicate other brands you have seen.

[Checkboxes]

- () Brand 1
 - () Brand 2
 - () Brand 3
 - () Brand 4
 - () Brand 5
 - () Bulk product without brand label
 - () I don't remember
 - () Other: _____
-

Section 4 – Knowledge about Spirulina – Benefits
(Only Groups 2 and 3 responded)

Read the text below or watch the short video below to answer the following questions:

Our research studies Spirulina, a microalga rich in nutrients and bioactive compounds. We are exploring its applications in food, considering three main benefits:

1 - Human health: Spirulina can provide essential amino acids, carotenoids, minerals, provide antioxidant and anti-inflammatory activities, and contribute to neuroprotective, cardioprotective, and anticarcinogenic processes, among others.

2 - Environment: It can be cultivated sustainably, not requiring extensive cultivation areas or causing soil degradation, in addition to contributing to the sequestration of carbon from the atmosphere. It can also be used to generate several high-value products with low waste production, such as in biorefineries that use it to produce food coloring, biofuels and for wastewater treatment.

3 - Food production: Natural dyes can be produced from Spirulina and its compounds, providing greenish and bluish colors to foods. This microalga can also increase the protein content of foods, which is especially interesting for some restrictive diets, such as vegan diets.

17 - How has your willingness to start consuming Spirulina — or to consume it more frequently — changed when considering each benefit individually? Rate from 1 to 5.

[Multiple-choice grid]

1 - Very low willingness

2 - Low willingness

3 - Neither low nor high willingness

4 - High willingness

5 - Very high willingness

	1	2	3	4	5
[a] Benefit 1 - Human health	()	()	()	()	()
[b] Benefit 2 – Environment	()	()	()	()	()
[c] Benefit 3 - Food production	()	()	()	()	()

18 - Have you ever consumed Spirulina at least once?

[Multiple choice]

() Yes { was taken to Section 6}

() No { was taken to Section 5}

() I don't remember {se was taken to Section 5}

Section 5 – Barriers to Spirulina Consumption
(Only Group 2 responded)

19 - To what extent do you agree or disagree that the following reasons prevent you from starting to consume Spirulina? Rate from 1 to 5 according to the scale below:

[Multiple-choice grid]

1 - Strongly disagree

2 – Disagree

3 - Neither disagree nor agree

4 – Agree

5 - Totally agree

	1	2	3	4	5
[a] I don't know what Spirulina is used for	()	()	()	()	()
[b] I don't know Spirulina's benefits	()	()	()	()	()
[c] Its color is unpleasant	()	()	()	()	()
[d] Its smell is unpleasant	()	()	()	()	()
[e] Its price is not compatible with my income	()	()	()	()	()
[f] It is a product that is hard to find in the market	()	()	()	()	()
[g] I don't like consuming capsules or tablets	()	()	()	()	()
[h] I don't like consuming powdered products for making shakes, juices, or other beverages	()	()	()	()	()
[i] I don't like trying new things that are new to me	()	()	()	()	()

20 - Is there any reason not listed above that prevents you from consuming Spirulina?

[Short answer text]

**Section 6 – Experiences with Spirulina in Food
(Only Group 3 responded)**

21 - Indicate how you consume Spirulina based on the following forms (presentations).

[Multiple choice grid]

	Never consumed	Tried it once	Consumed it for a period	Regularly consume
[a] Spirulina powder with water	()	()	()	()
[b] Spirulina capsules or tablets	()	()	()	()
[c] Spirulina powder added to a homemade recipe (bread, cakes, cookies, etc.)	()	()	()	()
[d] Spirulina powder added to a homemade dish from main meals (fruit salad, rice, beans, soup, stews, etc.)	()	()	()	()
[e] Spirulina powder added to a beverage (juices, teas, coffee, etc.)	()	()	()	()
[f] Spirulina in ready-to-eat products (shakes, thermogenic drinks, snacks, bread, etc.)	()	()	()	()

22 - Indicate your frequency of Spirulina consumption for the following brands.

[Multiple choice grid]

	Never consumed	Tried it once	Consumed it for a period	Regularly consume
[a] Brand 1	()	()	()	()
[b] Brand 2	()	()	()	()
[c] Brand 3	()	()	()	()
[d] Brand 4	()	()	()	()
[e] Brand 5	()	()	()	()
[f] Bulk product without brand label	()	()	()	()

23 - Is there any other Spirulina brand that you have at least tried?

[Short answer text]

24 - How often do you usually consume Spirulina? Added or not to food and beverages.

[Multiple choice]

- () Tried it only once
- () Less than once every 6 months
- () Once every 3 to 6 months
- () Once every two months
- () Once per month
- () Twice per month
- () At least once per week

25 - In which food category or categories would you like Spirulina to be added?

Select one or more options.

[Checkboxes]

- () No food category
- () Bread, cakes, cookies, and similar items
- () Preserves, jams and similar items
- () Yogurts, cheeses, and other dairy products
- () Noodles and pasta
- () Food bars
- () Savory snacks

- () Ice cream
 () Ready-made powdered food mixes
 () Sausages, burgers, and other meat derivatives
 () Other:_____

26 - To what extent do you agree or disagree that the following reasons prevent you from consuming Spirulina more often Rate from 1 to 5 according to the scale below:

[Multiple-choice grid]

- 1 - Strongly disagree
 2 – Disagree
 3 - Neither disagree nor agree
 4 – Agree
 5 - Totally agree

	1	2	3	4	5
[a] I haven't noticed the benefits of Spirulina	()	()	()	()	()
[b] Its color is unpleasant	()	()	()	()	()
[c] Its smell is unpleasant	()	()	()	()	()
[d] Its flavor is unpleasant	()	()	()	()	()
[e] Its price is not compatible with my income	()	()	()	()	()
[f] I don't like consuming it in capsules or tablets	()	()	()	()	()
[g] I don't like consuming it added to beverages	()	()	()	()	()
[h] I believe I already consume an adequate amount	()	()	()	()	()
[i] I can't find pleasant or tasty ways (homemade or industrial) to consume it	()	()	()	()	()
[j] It is a product that is hard to find in the market	()	()	()	()	()

27 - Is there any reason not listed above that prevents you from consuming Spirulina?

[Short answer text]