



HealthFerm

Innovative pulse and cereal-based food fermentations for human health and sustainable diets

Session 5: Consumer Insights, Behaviour & Policy Pathways for
Fermented Foods

Comprehensive Lessons from Consumer Studies on Plant-Based Fermented Foods

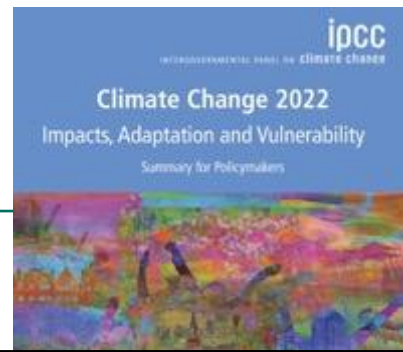
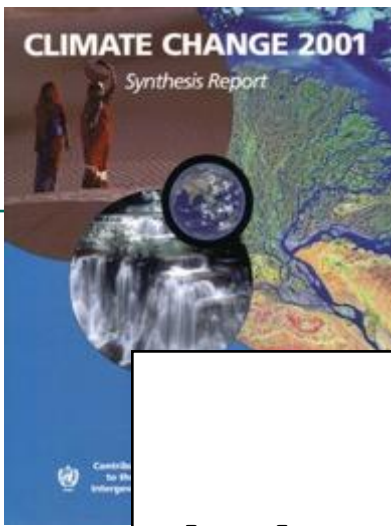
Prof. Armando Perez-Cueto, WP4 Leader

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Consensus
We are already in climate emergency
2nd year above 1.5°C

Consensus:
We need to *change* our *diets*!
Eat less, varied and mostly plants

The 2025 report of the *Lancet* Countdown on health and climate change

Marina Romanello, Maria Walawender, Shih-Che Hsu, Annalyse Moskeland, Yasna Palmeiro-Silva, Daniel Scamman, James W Smallcombe,



A just world on a safe planet: a *Lancet* Planetary Health–Earth Commission report on Earth-system boundaries, translations, and transformations



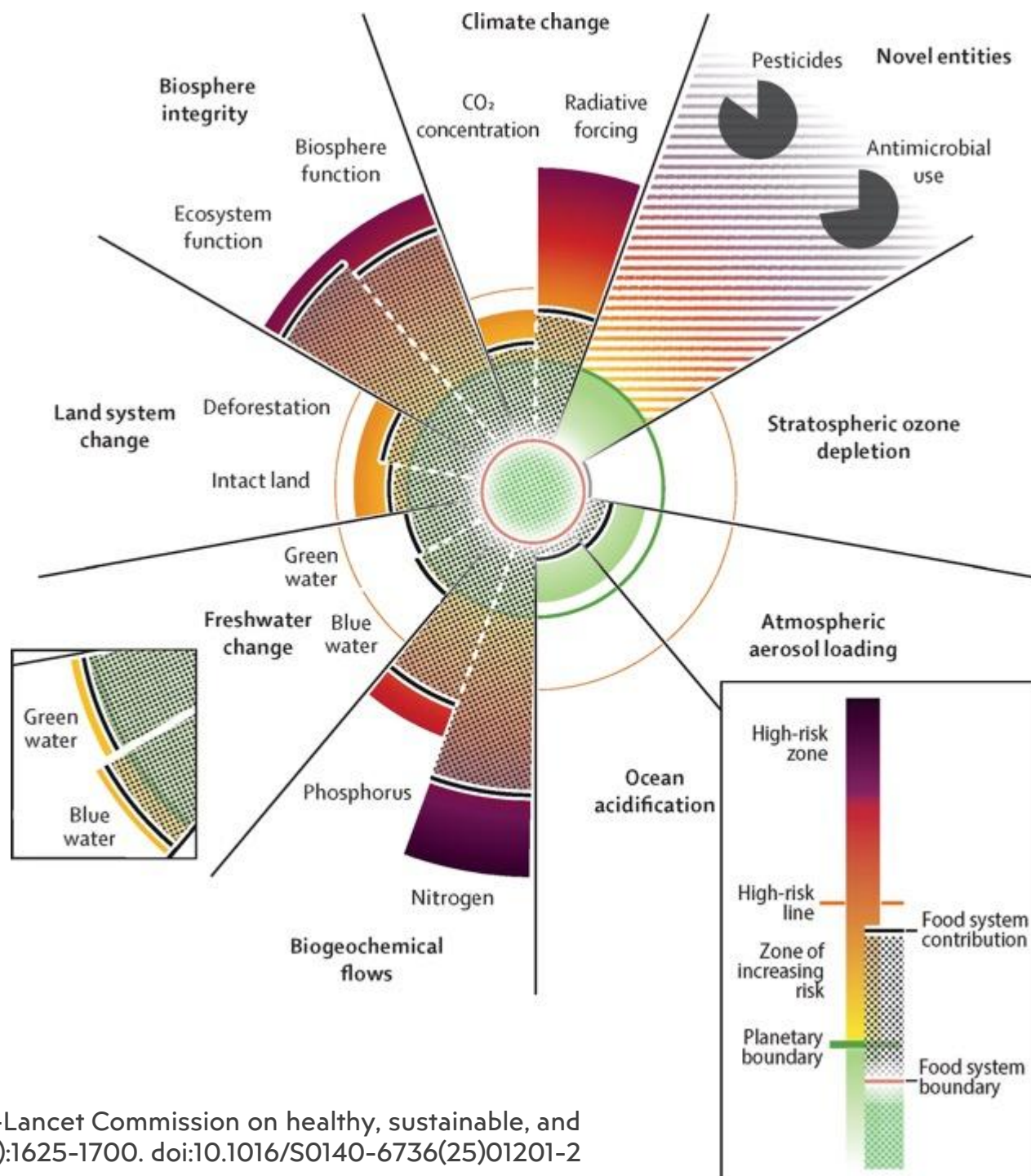
Figure 1: Status of food system pressures across all nine planetary boundaries (indicated by the black dotted pattern) and the food system boundaries (red line)

The food system boundaries are normalised in relation to planetary boundaries (green sphere). The radar plot is adapted with permission from Richardson et al (data)¹⁴ and Rockström et al (visual).¹⁵

The food system contribution (in percentages) is projected based on the wedges' lengths, starting from the planetary boundary for the six transgressed boundaries, and the food boundary for the three other boundaries (see te Wierik et al¹⁶ for details).

The food system's contributions to pesticides and antimicrobial use are shown as pie charts (with the foodsystem share in grey) within the larger set of all novel entities (which were previously unquantified). Note that CO₂ concentration is provided in terms of CO₂ equivalents, as in table 2.

Adapted from te Wierik et al





Psychological barriers to improving carbon competence

Received: 23 September 2025

Mario Herberz¹, Lukas Engel², Claudia R. Schneider³ &

Accepted: 19 June 2026

Tobias Brosch¹

We overestimate the benefits of highly adopted actions (like recycling) & underestimate highly beneficial low adoption ones (like plant-based). (Carter, 2026)

Fig. 1 | Adoption of climate actions by their climate change mitigation potential. Average adoption rates and objective emission mitigation potentials in kilograms CO₂e per capita and year of 34 individual-level climate actions aggregated across the three US samples included in the present research ($n = 2,924$; Supplementary Table 2). The data illustrate the negative relationship

between the adoption of climate actions and their mitigation potential ($r = -0.51$, 95% CI $[-0.72; -0.21]$, $t(32) = -3.37$, $P = 0.002$, one-sample t -test, two-sided, against $r = 0$). Only short labels of the climate actions are shown; see Supplementary Table 2 for full descriptions. EV, electric vehicle.

Overview Objectives & Tasks (M16-36, Lead: UMU)

WP 4 Objective: Assess, in different social contexts, consumer acceptance of fermented foods, their technologies and their role in the transition towards a more sustainable healthy diet

O1: To perform an inventory of types and uses of fermented foods in HealthFerm countries.



O2: To identify levers to promote the consumption of foods & meals based on plant-based fermentations



O3: To assess and monitor the changes in consumer perceptions towards plant-based fermented foods in 9 EU countries



T 4.1 Inventory of types and uses of fermented food in the EU

- 4.1.1: Identification of the types of fermented foods that are usually consumed in the EU
- 4.1.2: Descriptions of uses and representations through an ethnographic study

T 4.2 Consumer acceptance of innovative fermented foods

- 4.2.1: Scoping Review (SR)
- 4.2.2: Meals design using HF prototypes
- 4.2.3: Behavioural intervention - nudge

T 4.3 Monitoring changes in consumer perceptions towards plant-based fermented foods in 9 EU countries

- 4.3.1 Questionnaire development
- 4.3.2 Two waves of surveys in HF countries

T 4.4 Linking HealthFerm through the consumer and the senses

- 4.4.1 – Profiling fermenters
- 4.4.2 – Provide sensory expectations
- 4.4.3 – Consumer data in the interventions

T 4.5 Summary of findings

- 4.5 – Executive summary – So what?



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Achievements and results per task

WP4 Consumer Studies



HealthFerm

Task 4.1 Inventory of types and uses of (pb) fermented foods in EU

Lead Institute Lyfe

Subtask 4.1.1 – Atlas of Plant-based fermented foods in Europe



PART OF THE HEALTHFERM PROJECT

Atlas of *Plant-Based* Fermented Food in Europe

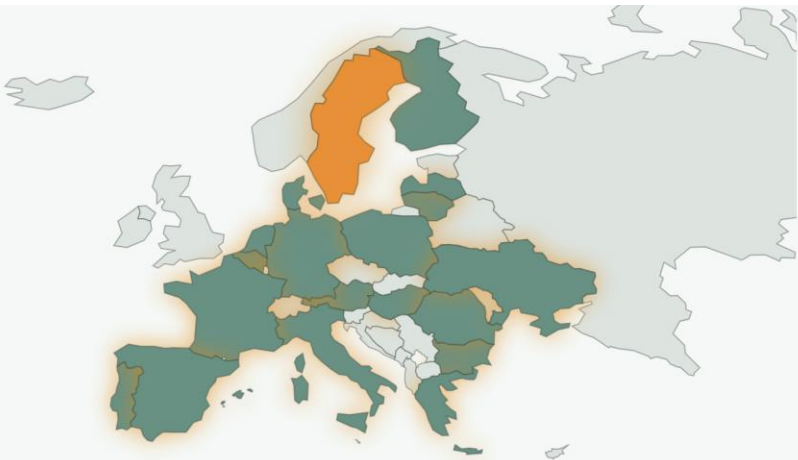
Click a country on the map to discover the fermented products associated with it — then click a product to read its full profile: origin, process, cultural uses.

70

PRODUCTS

19

COUNTRIES REPRESENTED



Countries highlighted in amber contain at least one product – found there, or originating from there.

Base map © Simplemaps.com (MIT)



PRODUCT PROFILE

Fermented carrots

LOCAL NAME

Syrade morötter

SCIENTIFIC NAME

Daucus carota subsp. Sativus

COUNTRY

Sweden

COUNTRY OF ORIGIN

Sweden

REGION OF ORIGIN

Östergötland

TYPE OF FERMENTATION

Lactic Acid

TYPE OF FOOD

Lactic Acid Fermented Foods (e.g., kimchi, sauerkraut)

FOOD TYPE – DETAILS

Not provided





Subtask 4.1.2 – Ethnographic study

14:40
Fermenting as a
Social Practice



Task 4.2 Consumer acceptance of innovative fermented foods

Lead Institute Lyfe

Sub-Task 4.2.2 – Meal design



- Recipe development – 6 recipes (LYFE)

STARTERS



Pea and mint
velouté (cream
from Valio)



Nordic Tartine
(sourdough from
Puratos)



Tempeh Ragout
(Tempeh from SLU)



Steak, pepper sauce,
purée (steak from
Planted)

DESSERTS



Pear clafoutis
(Cream from Valio)



Brioche like a french toast
(Sourdough from Puratos)



Sub-Task 4.2.2 – Consumer liking tests (FR, SE)

**14:35 Beyond the
Prototype: How Meal
Design Shapes
Acceptance of Plant-
Based
Fermented Foods**





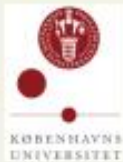
FREE THREE COURSE GOURMET PLANT-BASED LUNCH!

- WE ARE LOOKING FOR PARTICIPANTS FOR A STUDY IN WHICH PEOPLE EAT A **FREE** THREE COURSE PLANT-BASED LUNCH DEVELOPPED BY FRENCH CHEFS!
- IT TAKES AROUND 1 HOUR TO PARTICIPATE. OPTIONS ARE EITHER 11:00 OR 12:00 ON ONE OF THE FOLLOWING DAYS: 20/11, 21/11, 24/11, 25/11 OR 26/11.
- LOCATION: ROLIGHEDSVEJ 26, FREDERIKSBERG
- YOU WILL ALSO RECEIVE A GOODIEBAG WORTH 120 DKK.
- TO BE ELIGIBLE FOR THE STUDY YOU HAVE TO:
 1. EAT MEAT.
 2. BE BETWEEN 18 AND 70 YEARS OLD.
 3. BE WILLING TO FILL OUT THE SURVEY (SEE QR CODE) TO CHECK FURTHER ELIGIBILITY.



Sub-Task 4.2.3 – Behavioural intervention

**13:55 – 14:15 From
Expectations to Experience –
How Tasting Fermented Plant-
Based Foods Shapes
Consumption Intentions**



Task 4.3 Monitoring consumer perceptions towards pbff in 9 EU Countries

Lead Umeå University

Task 4. 3 Consumer studies – Two rounds of a Pan EU Survey



July 2024

PLANT-BASED FERMENTED FOODS

EUROPEAN CONSUMER ATTITUDES AND PREFERENCES



PRELIMINARY FINDINGS FROM THE HEALTHFERM CONSUMER SURVEY



Project funded by



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra



Co-funded by the European Union

4 citations

2 policy report – ESAC 2025

2 peer reviewed articles



EU Open Research Repository

by European Commission  <https://research-and-innovation.ec.europa.eu>

Research and Innovation

Published July 31, 2024 | Version v2

Plant-Based Fermented Foods. European Consumer Attitudes and Preferences.

Perez-Cueto, Federico J.A. (Work package leader)¹ ; Garin, Jean-Paul (Researcher)¹ ; Turillazzi, Arturo (Researcher)¹ ; Blanchet, Maxence (Researcher)², ¹ 

Contributors

Other: Jorinde, Verschueren¹ 

Researcher: Love, Naropa² 

Report  Open

Show affiliations

Show affiliations

Report with the consolidated information obtained from the first wave of HealthFerm Consumer Surveys in 8 EU Countries and Switzerland, addressing their preferences and attitudes towards plant-based fermented foods. The research is part of the [HealthFerm project](#), which aims to create plant-based fermented foods that offer health benefits to the population in general.

5K VIEWS

3K DOWNLOADS

Show more details

	All versions	This version
Views ?	4,532	387
Downloads ?	2,572	355
Data volume ?	90.8 GB	7.8 GB

[More info on how stats are collected....](#)

Online impact

<https://www.foodnavigator.com/Article/2024/07/02/consumers-don-t-want-cheap-plant-based-meat-and-dairy/>

<https://foodimagine.org/2025/08/26/interview-with-professor-armando-perez-cueto/>

<https://www.foodanddrinktechnology.com/news/53795/swedish-researchers-provide-guidance-for-developing-plant-based-fermented-foods/>

<https://www.newprotein.net/news/consumer-attitudes-towards-plant-based-fermented-foods>

https://www.medicine.net/news/Health_science/Consumer-study-explores-future-diet-of-plant-based-fermented-foods.html

Respondents



11% in
each HF
Country

50%
urban

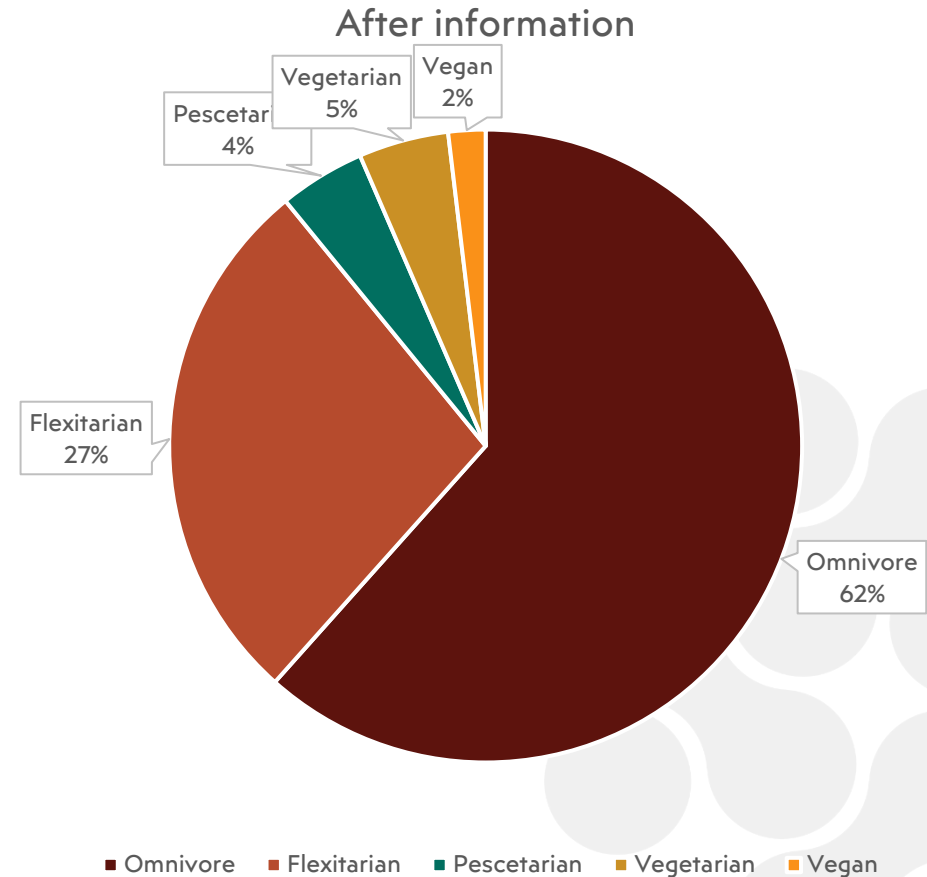
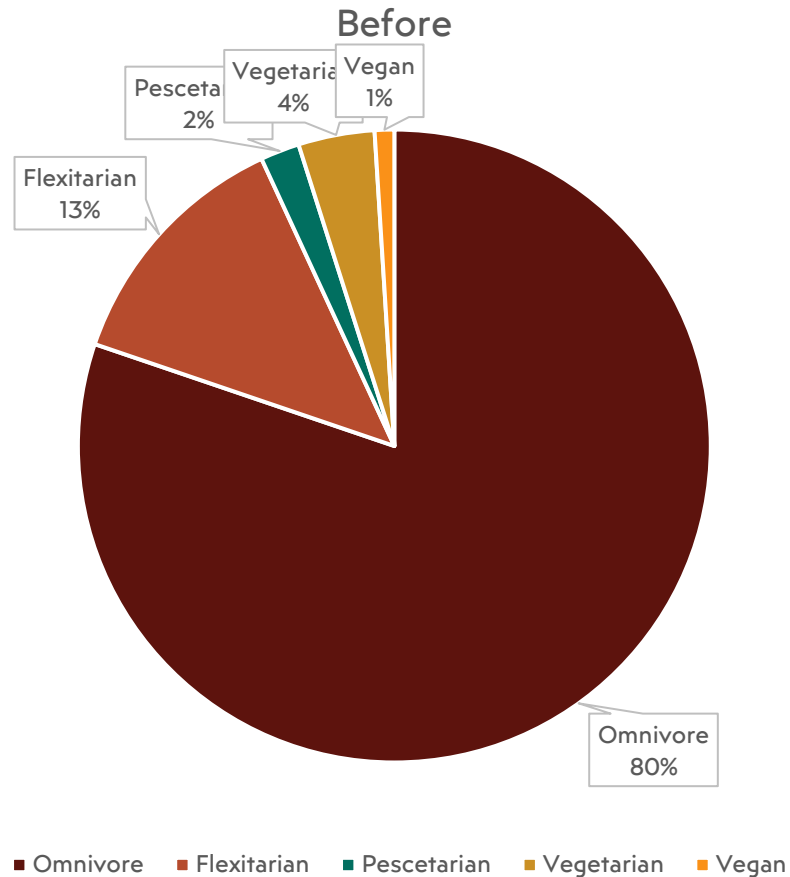
Category	Subcategory	Round 1	Round 2
Sex, N (%)	Female	3723 (51)	3739 (50)
	Male	3561 (49)	3799 (50)
	Other/Prefer not to say	11 (0.2)	14 (0.4)
Country, N (%)	France	778 (11)	830 (11)
	Romania	819 (11)	801 (11)
	Sweden	800 (11)	834 (11)
	Belgium	741 (10)	810 (11)
	Switzerland	706 (10)	821 (11)
	Denmark	711 (10)	839 (11)
	Germany	1226 (17)	848 (11)
	Finland	768 (11)	884 (12)
	Italy	746 (10)	885 (12)
Age, Mean (SD)		49 (16)	48 (16)
Level of Education, N (%)	Finished primary school	356 (5)	358 (5)
	Finished secondary school	1846 (25)	2166 (29)
	Other post- secondary studies (professional bachelors, associate degree, vocational/technical training or qualification,	1894 (26)	1951 (26)
	Undergraduate studies (Bachelors, etc)	2012 (26)	1935 (26)
	Graduate and post-graduate studies (Masters (in BA, of Science, of Arts, etc), Doctorate)	1187 (15)	1142 (15)
Area of Residency, N (%)	Rural	1734 (24)	1860 (25)
	Suburban	1396 (19)	1899 (25)
	Urban	4165 (57)	3793 (50)
Financial Situation, N (%)	Extremely difficult	345 (5)	382 (5)
	Somewhat difficult	1268 (17)	1503 (20)
	Neither easy nor difficult	2842 (39)	2797 (37)
	Somewhat easy	2314 (32)	2353 (31)
	Extremely easy	526 (7)	517 (7)
Dietary Lifestyle, N (%)	Omnivore	5508 (76)	6061 (80)
	Flexitarian	1160 (16)	972 (13)
	Pescetarian	149 (2)	150 (2)
	Vegetarian	315 (4)	292 (4)
	Vegan	163 (2)	77 (1)
Total		7295	7552

50%
women

40%
superior
education

25%
difficult

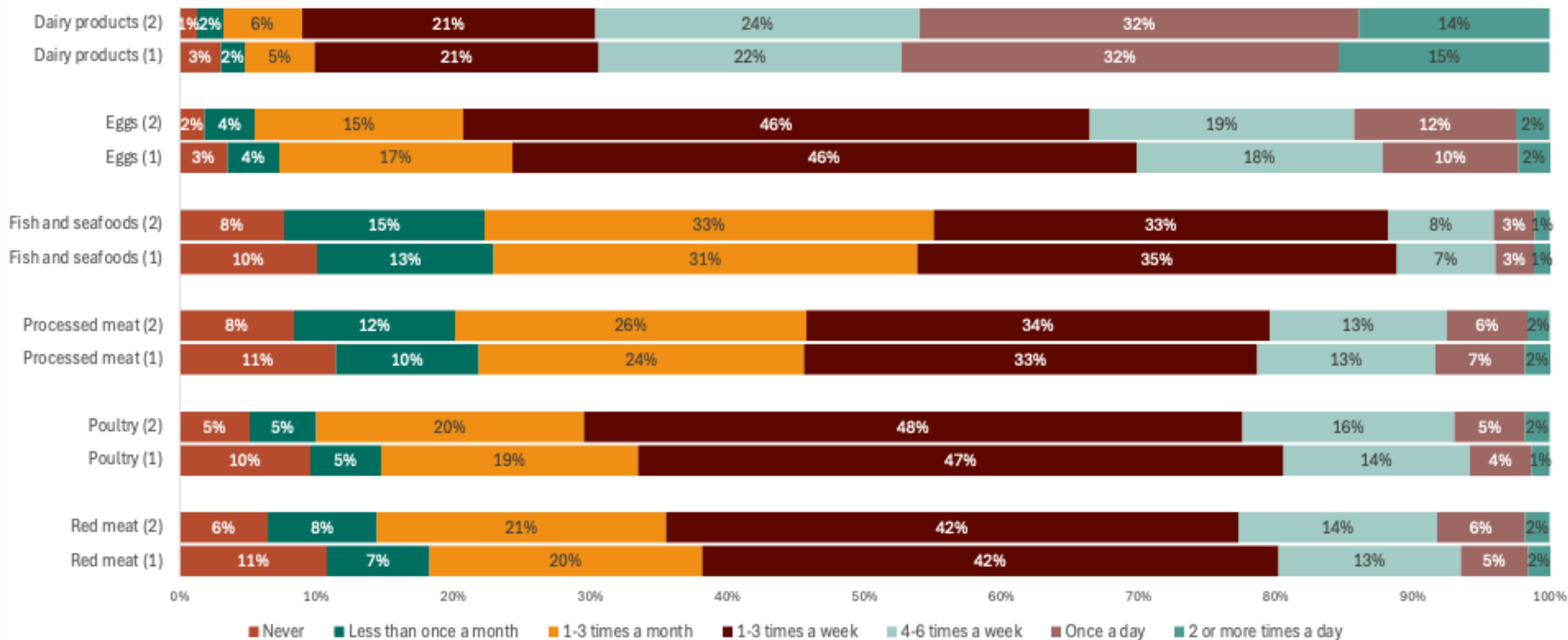
Dietary lifestyle



29% of participants changed their dietary self-classification after standardized definitions were provided.

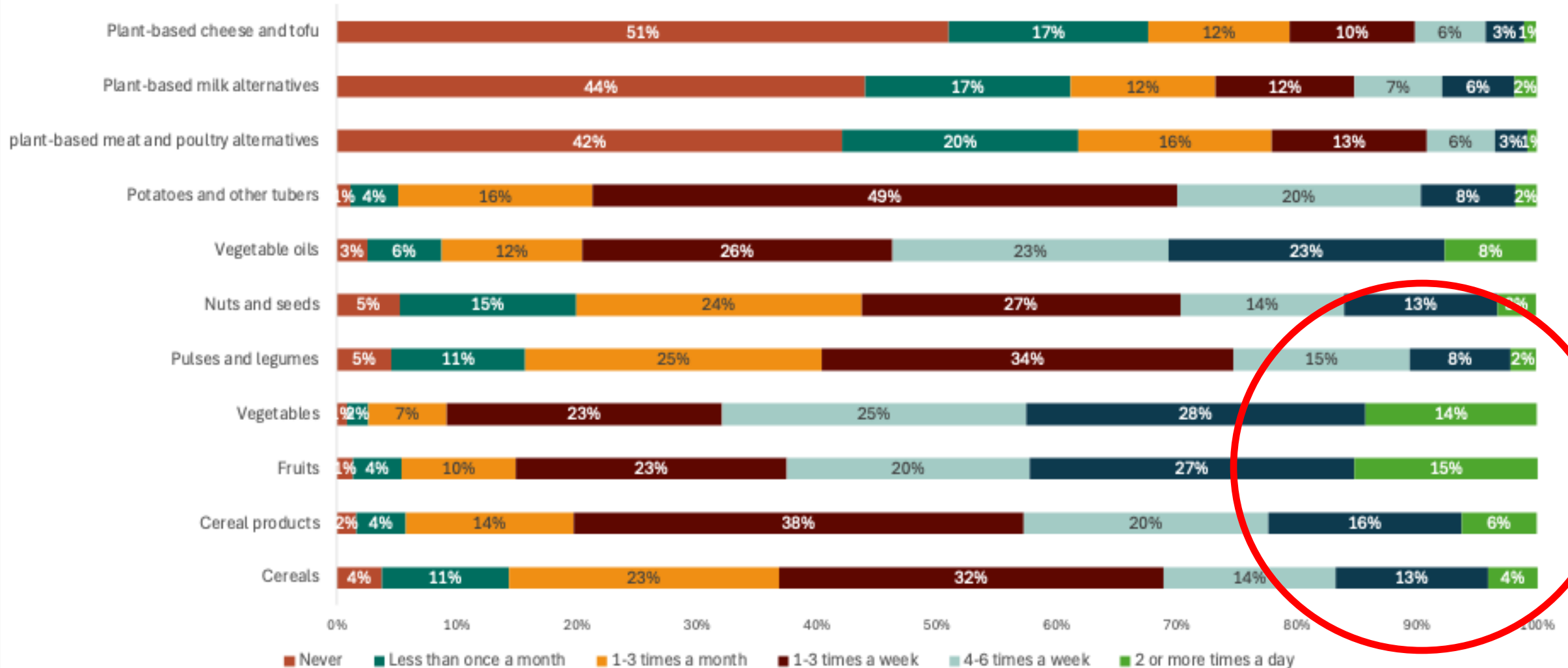
Food consumption – a bit too much

Comparison: consumption of animal-based products

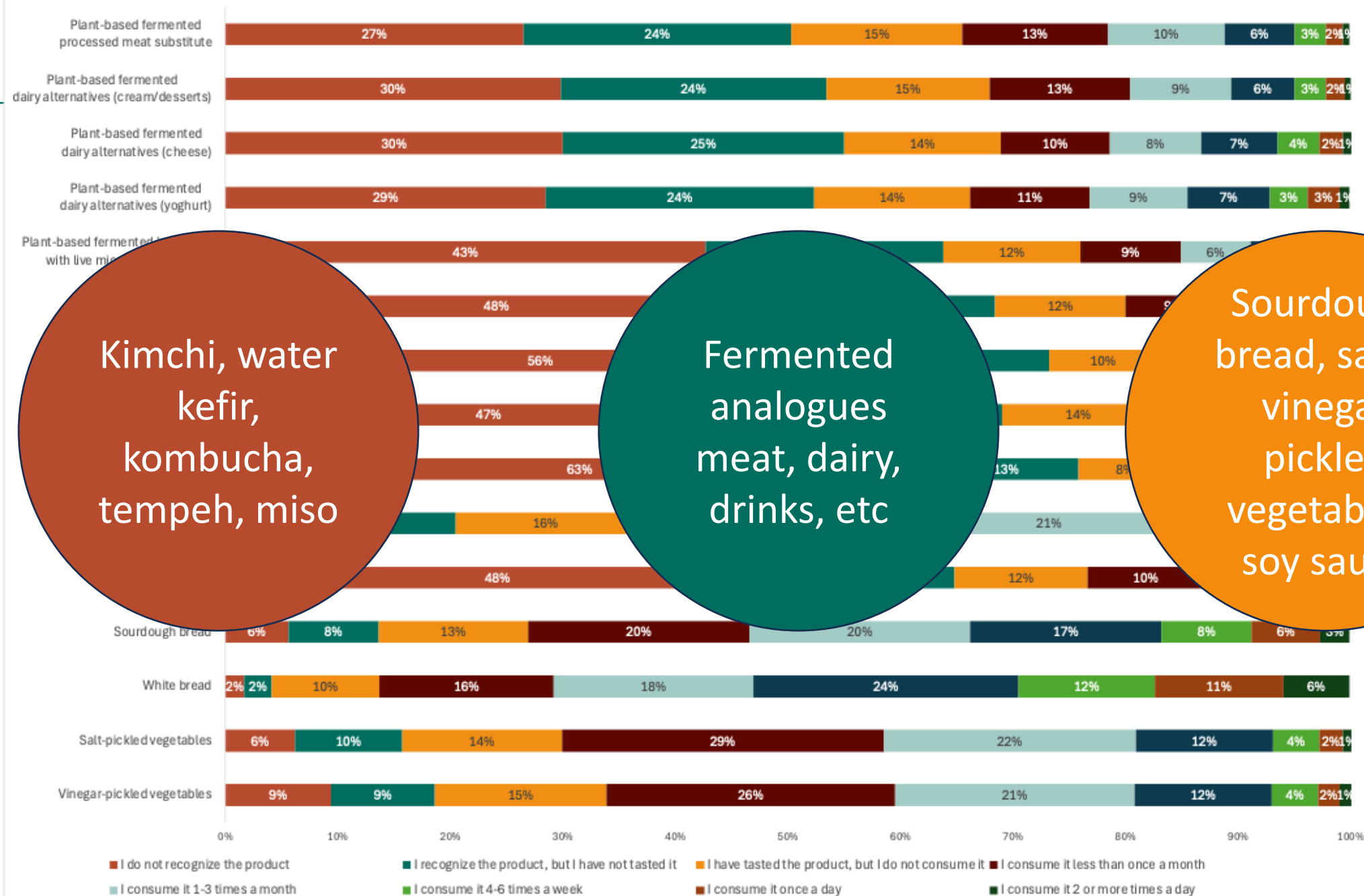


Food consumption – too little

Current consumption of plant-based foods



Current consumption of plant-based fermented foods



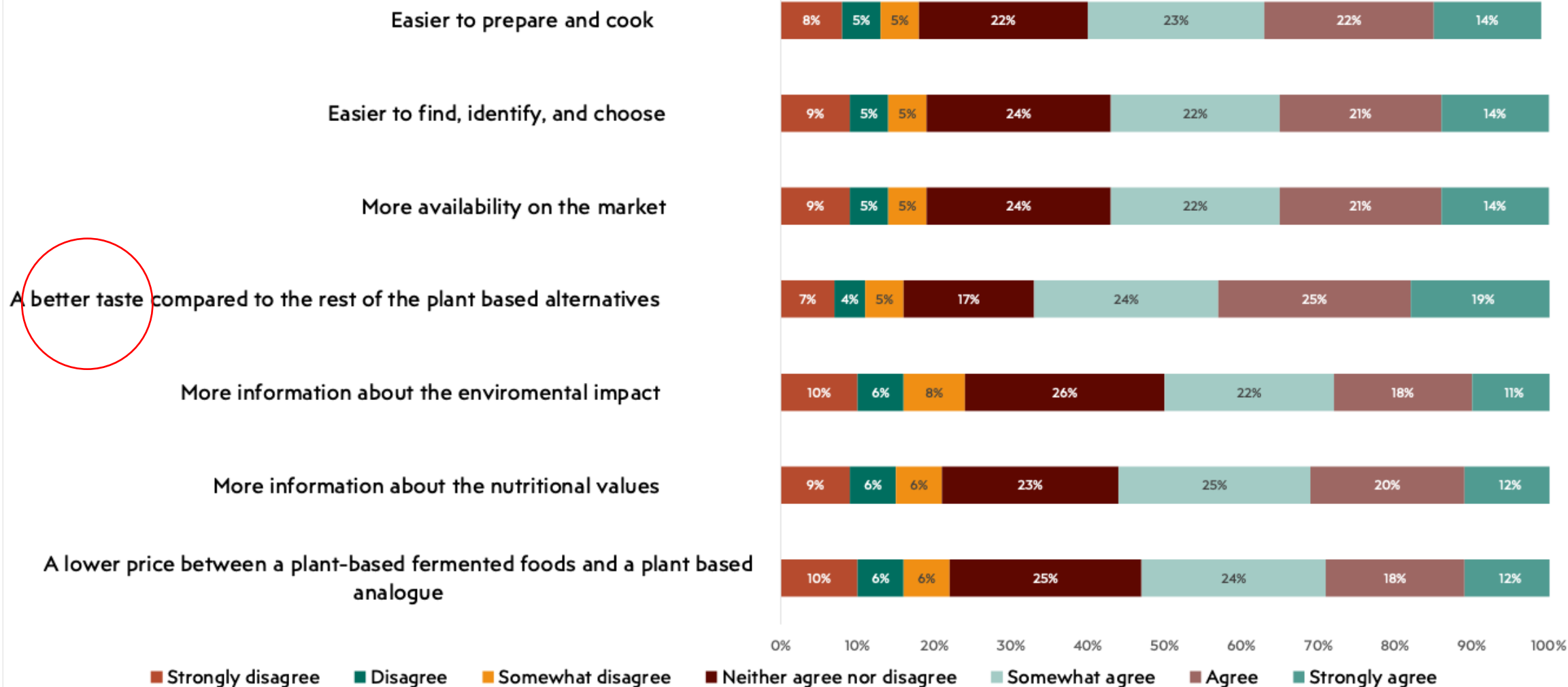
Kimchi, water kefir, kombucha, tempeh, miso

Fermented analogues meat, dairy, drinks, etc

Sourdough bread, salt & vinegar pickled vegetables, soy sauce

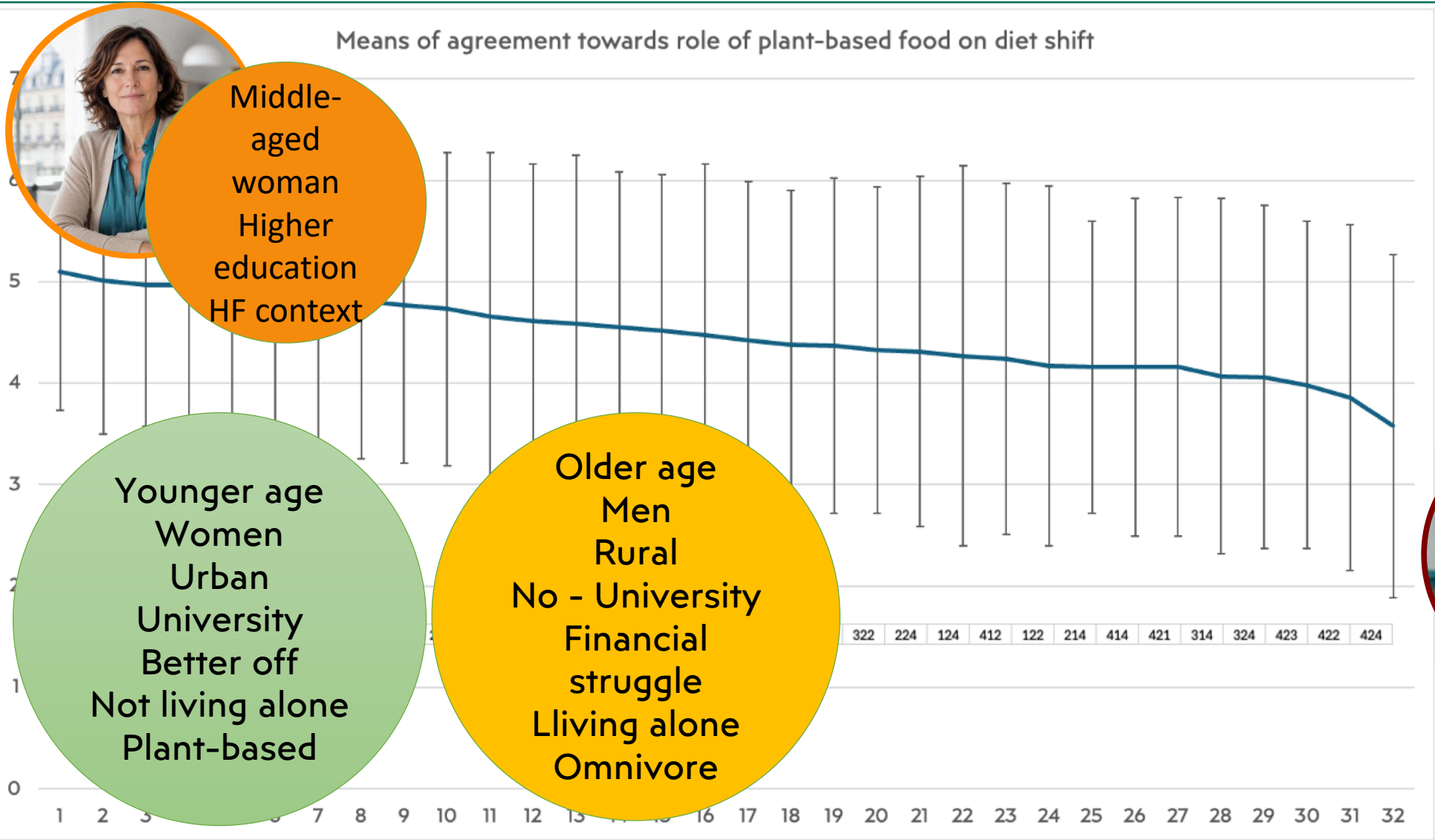
What would encourage consumption of PBFF

What would encourage you to purchase/eat Plant-Based Fermented Foods?



Intersectional gradient – perception of PBF on diet shift

Means of agreement towards role of plant-based food on diet shift



Middle-aged woman
Higher education
HF context

Younger age
Women
Urban
University
Better off
Not living alone
Plant-based

Older age
Men
Rural
No - University
Financial struggle
Living alone
Omnivore



Older man
Primary education
HF context

Results : Changes in attitudes and values

Positive changes ↑

- More **favourable attitudes** towards PB fermented foods
- Improved **perceived knowledge** and **confidence** in using these products

Less favourable developments ↓

- **Sustainability** motives became **less important** in food choices
- Values **shifted towards security and tradition**, away from universalism and openness to change



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Results : Changes in product perceptions

Higher acceptance ↑

- Trust in traditional fermentation
- Perceived health benefits

Greater uncertainty ↓

- Lower perceived sustainability benefits of PBFF
- Lower trust in **novel fermentation** technologies

Results : Changes in adoption potential

Higher acceptance ↑

- Willingness to buy
- Willingness to try

- Positive future consumption intentions
- Increased market readiness

Task 4.4 Linking HF through the consumer and the senses

Lead Umeå University



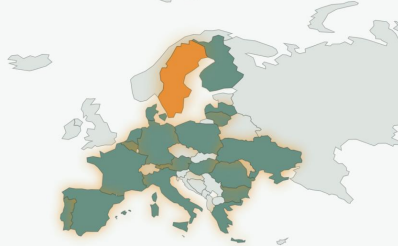
HealinFerm PART OF THE HEALTHFERM PROJECT

Atlas of *Plant-Based* Fermented Food in Europe

Click a country on the map to discover the fermented products associated with it — then click a product to read its full profile: origin, process, cultural uses.

70 PRODUCTS 19 COUNTRIES REPRESENTED

Q Search a product, a region, a type of fermentation...



Countries highlighted in amber contain at least one product — found there, or originating from there.
Base map © Simplemaps.com (MIT)

PRODUCT PROFILE

Fermented carrots

LOCAL NAME
Syrade morötter

SCIENTIFIC NAME
Daucus carota subsp. *Sativus*

COUNTRY
Sweden

COUNTRY OF ORIGIN
Sweden

REGION OF ORIGIN
Östergötland

TYPE OF FERMENTATION
Lactic Acid

TYPE OF FOOD
Lactic Acid Fermented Foods (e.g., kimchi, sauerkraut)

FOOD TYPE — DETAILS
Not provided



Reflections on multidisciplinary work in HF

14:15 Understanding Fermentation Behaviour and Acceptance: Outputs from a Socio-anthropological Approach and its Complementary Nature with Behavioural and Economical Approaches

Sub-task 4.4.2 Sensory feedback to WP2

- Feedback on sensory attributes expected by consumers
- Inform product development and refining



creamy, smooth,
and uniform
textures,
combined with
grain-based and
roasted nut/seed
flavour notes

“chicken-like”
sensory qualities,
including flavour
authenticity,
tenderness, and
juiciness, as well
as a natural
appearance

small air
bubbles,
cohesive
structure, and a
hard crust,
alongside nutty
and roasted
flavour notes

Plant-gurt

WP2

- Use of baseline survey with consumer expectations for fermented foods
- Designing meals implementing WP2 products

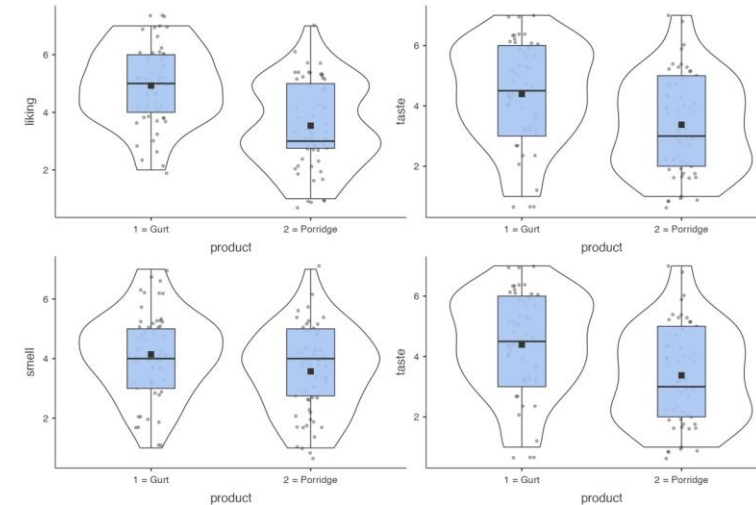


Chicken-like

Bread

Sub-task 4.4.3 Consumer data in intervention studies

- Consumer scales have been included in the participants questionnaires by WP3
- WP3 choice before intervention and after, not during the intervention



Key takeaways

- Attitudes and knowledge improved
- Values became less sustainability-driven and more security-oriented
- Consumers differentiated between **traditional and novel technologies**, while becoming less convinced about **sustainability benefits**



So what home messages

Two rounds of the pan EU Consumer survey

- Favourable attitudes towards this food category
- Social gradients must be taken into consideration
- Taste facilitates adoption
- **Plant-based fermentation plays a role in sustainable future**

Six meals developed and tested

- Challenge the narrative that eating plant-based is boring or untasty
- Made the category „credible“
- Contribute evidence supporting the dietary transition

