The scientific backbone of plant-based developments

Insights and innovations

1·2 taste

Content

1. Introduction

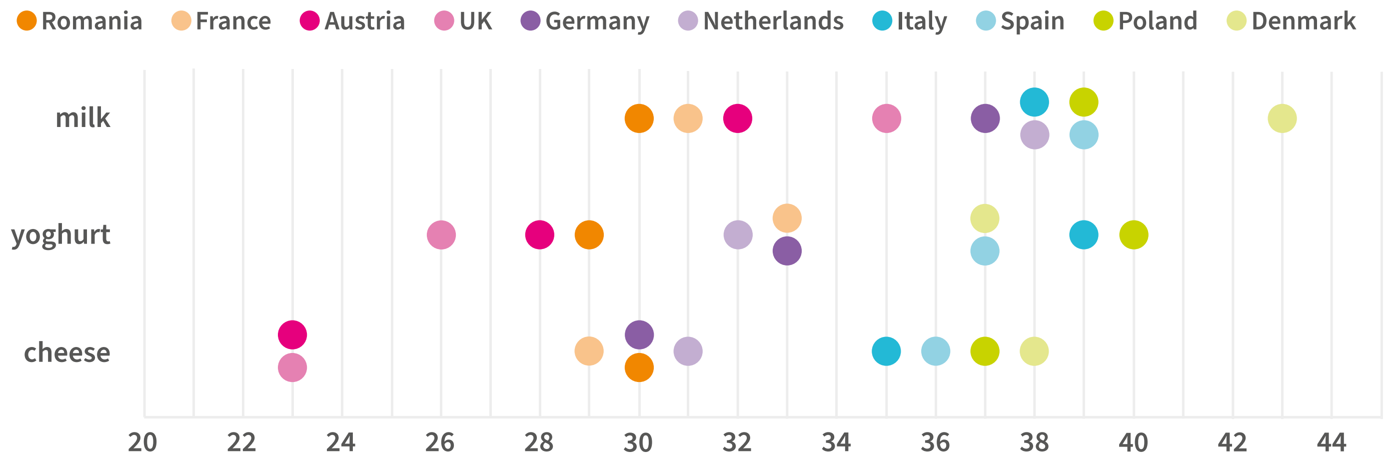
As we navigate the evolving dietary landscape of Europe, it's clear that while traditional omnivorous diets prevail, there's a significant shift towards plant-based alternatives. The **flexitarian diet** is gaining traction, embraced **by 27% of Europeans**, with Germany, Austria, and the Netherlands leading in adoption rates. This trend is supported by an increase in vegetarian and vegan diets, particularly among younger demographics like Gen Z and Millennials, highlighting a move towards more sustainable and ethical eating patterns. (Smart Protein, 2023)
This shift is crucial for the food industry as it prepares to **meet changing consumer preferences, especially in the sensory attributes of plant-based foods** discussed in the upcoming chapters. Anticipating and aligning with these changing preferences involves adapting formulations or innovating, both of which come with their challenges. In the latter part of this whitepaper, **strategic initiatives** are outlined to overcome these challenges and pave the way forward. These initiatives revolve around enhancing portfolios with innovative crossover products and leveraging social media for engagement and education to sustain growth and relevance in the plant-based market.

2. The evolution of plant-based preferences
in Europe

Plant-based dairy adoption

With 40% of Europeans keen to boost their purchase and consumption of plant-based alternatives, it's clear that the appetite for these options is growing robustly across the continent. This increasing acceptance prompts a closer look into the findings from the Smart Protein 2023 report and discover how plant-based alternatives are fitting into daily European diets.

Plant-based dairy alternative items consumed at least once a week (by country, in %)



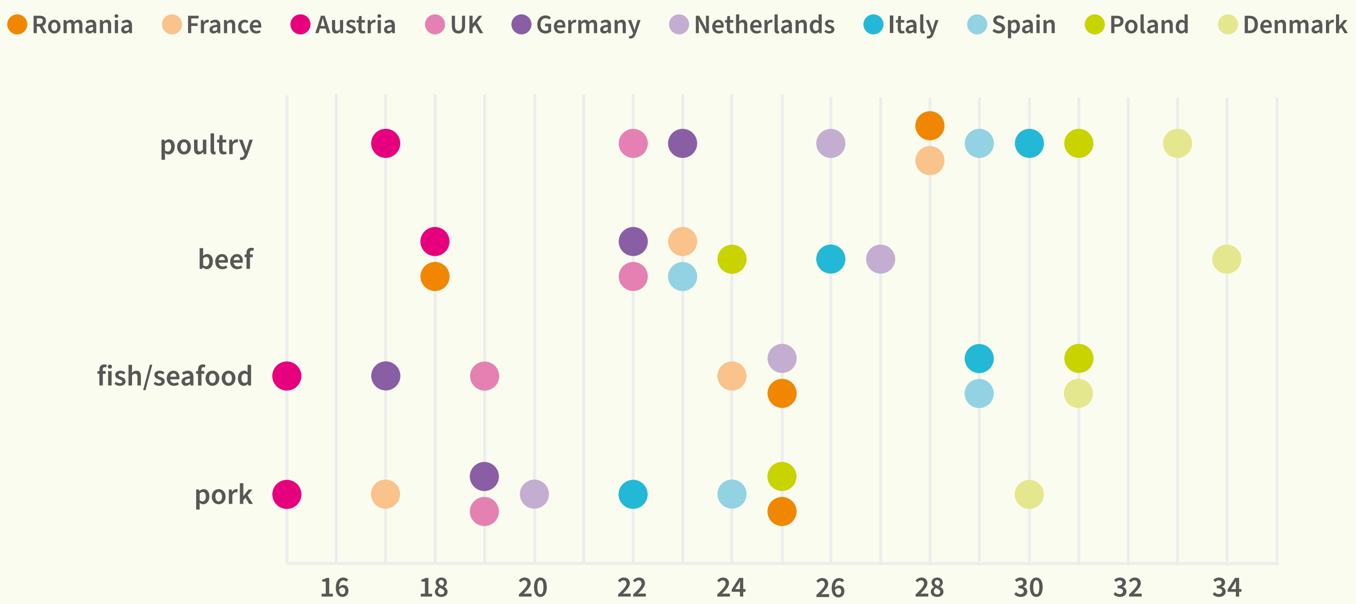
Adapted from Smart Protein, 2023

Countries like Denmark are leading the way in adopting plant-based milk, with 43% of its population including it weekly in their diets. This trend is mirrored in the popularity of plant-based yoghurt in Poland and Italy, where around 40% of the populace regularly enjoys these alternatives. Plant-based cheeses are also making a mark, especially in Denmark where 38% of people are exploring these dairy-free options, followed closely by Poland and Spain.

Plant-based meat adoption

In the meat alternatives segment, Denmark once again stands out with the highest incorporation of plant-based meats into regular diets, with an average of 32% of its population consuming these alternatives weekly. In countries like France, Austria, the UK, and Romania, though, fewer people include plant-based meats in their weekly diets, despite these countries having significant movements towards reducing meat consumption. Interestingly, Austria, despite its high number of flexitarians and vegans, shows a lower level of consumption of plant-based meat alternatives, suggesting that dietary habits may still favour less processed plant-based foods or different types of vegetarian and vegan options.

Plant-based meat alternative items consumed at least once a week (by country, in %)

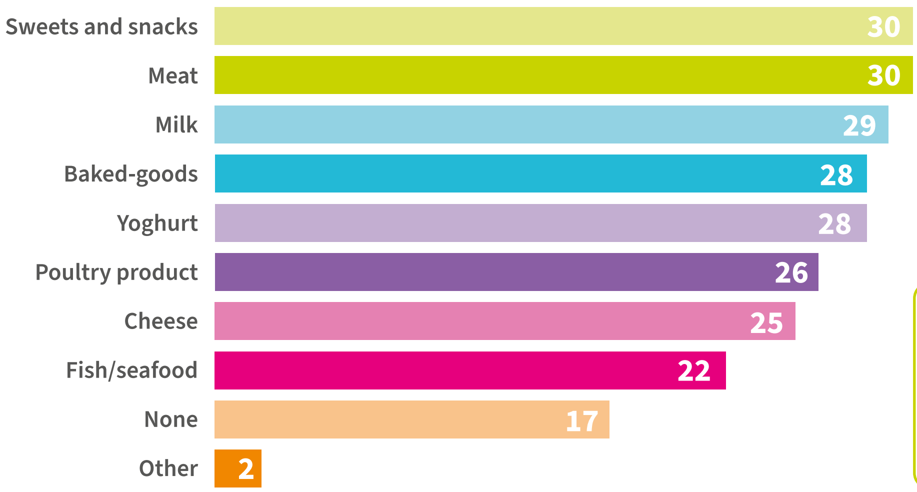


Adapted from Smart Protein, 2023

Plant-based alternatives that Europeans wish they could buy more

With a notable 27% of Europeans expressing a desire for more plant-based alternatives in supermarkets, **the demand for plant-based sweets, meat alternatives, and milk substitutes is particularly strong.** This trend highlights a significant market opportunity for companies to expand their offerings in these categories. In specific countries consumer, preferences vary; for instance, 39% of Romanians show a keen interest in plant-based sweets and snacks, leading the demand in this category. Meanwhile, Spanish consumers are at the forefront of seeking more plant-based milk alternatives, with 37% expressing this preference. In the realm of plant-based meats, Spain, the UK, and Denmark each have 35% of their consumers looking for more options, indicating a robust interest that businesses could capitalise on. This diverse consumer interest across different countries underscores the potential for tailored market strategies that address specific regional demands for plant-based products.

Products that European consumers want to see the most (Total sample, in %)



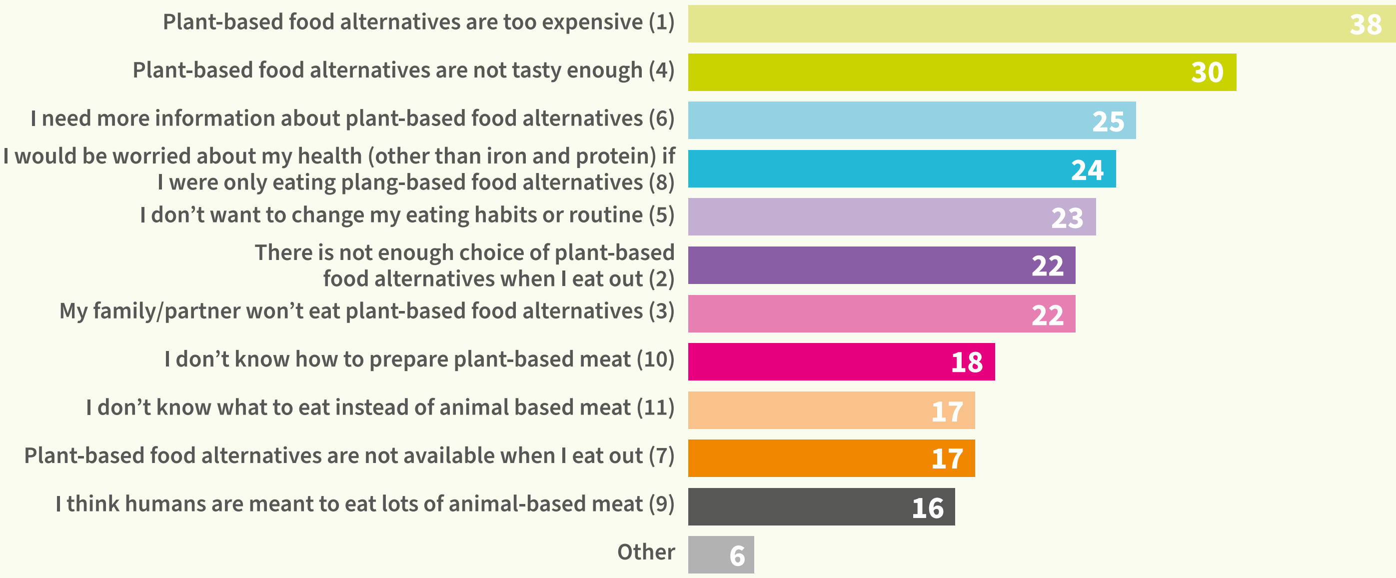
What kind of plant-based food alternative(s) do you wish you could buy more often in the supermarket or at points of consumption (e.g restaurants, cafes, etc.)? (Multiple choice, Total= 7500)

Adapted from Smart Protein, 2023

Barriers to choosing plant-based alternatives

While the interest in plant-based alternatives is on the rise across Europe, several barriers still hinder their widespread adoption. The primary obstacles include concerns about **cost, taste, and a lack of sufficient information** about the benefits and variety of plant-based options.

Barriers to choosing plant-based alternatives (Total sample, in %)



Which of the following do you encounter as barriers when choosing plant-based food alternatives? (Multiple choice (max 5) Total= 7500). Number in brackets: Top 10 ranking in 2021

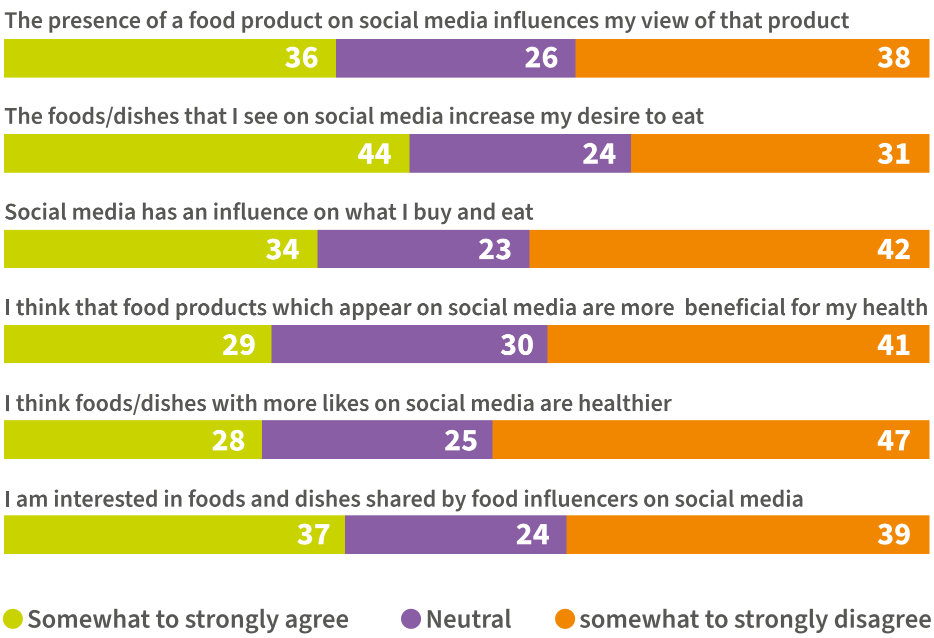
Adapted from Smart Protein, 2023

Cost remains a significant concern, with 38% of respondents across Europe citing it as a deterrent, reflecting persistent doubts about the affordability of plant-based choices compared to traditional animal-based products. Taste is another major hurdle, with **30% of survey participants indicating that plant-based alternatives fail to meet their flavour expectations**. Additionally, 25% of Europeans feel they need more information about the benefits and variety of plant-based foods, highlighting a gap in consumer education that requires attention.
A comparison with 2021 results reveals that affordability has gained increased prominence as a barrier compared to previous years, likely due to inflationary pressures felt across the continent. To boost adoption in regions with low uptake of plant-based meats, food producers could focus on creating alternatives that closely mimic the flavours and textures of local meat dishes, making them more familiar and appealing to consumers.

Social media impact

Social media significantly impacts food behaviours and attitudes across Europe, with 44% of consumers reporting that general social media content increases their desire to eat, while influencer-driven content changes the perceptions of 37% towards specific food products. This underscores the substantial influence of social media in shaping dietary choices, presenting a strategic opportunity for brands to leverage these platforms effectively. However, **only 34% of consumers perceive the health benefits of plant-based alternatives positively when influenced by social media**, highlighting a communication gap. This situation offers a valuable chance to enhance social media strategies by delivering credible, health-focused content that aligns more closely with consumer expectations and drives informed food choices.

Social media influence on food behaviours and attitudes (Total sample, in %)



Please indicate how much you disagree or agree with each of the following statements concerning social media and food attitudes (Single choice, Total= 7378)

Adapted from Smart Protein, 2023

3. Navigating sensory challenges
in plant-based applications

Taste is a primary driver of consumer choices, influencing the adoption of new products significantly. The Theory of Planned Behaviour explains that an individual's actions are guided by three factors: their personal attitudes towards the behaviour, the social norms associated with the behaviour, and their perceived control over the behaviour (Ajzen, 1991). In the plant-based market, this translates to consumers being more likely to choose these products if they find them tasty, believe that choosing them is viewed positively by their peers, and feel that these options are accessible and convenient.

These principles are crucial as sensory attributes of plant-based alternatives are aligned with those of traditional foods. Insights from focused research into Western consumer preferences (Waehrens et. al, 2023) inform sensory analysis, guiding efforts to match these products to familiar tastes and textures. By applying these insights, **manufacturers can create plant-based offerings that satisfy consumer expectations for familiarity, which supports wider acceptance and the success of the plant-based products**.

Plant-based milk alternatives

In the sensory profile of plant-based milk alternatives, consumer data shows a preference for tastes akin to traditional dairy milk. Consumers report "beany" flavours and "grain-like" notes, highlighting these as less desirable traits and indicating a need for reformulation. The sweetness attribute is desired at a lower intensity of 1.2, compared to its current rating of 1.9, suggesting a gap in the current market offerings. Texturally, a more liquid consistency is preferred at an ideal 2.6 rate, echoing the traditional dairy milk experience, steering away from thicker, creamier textures.

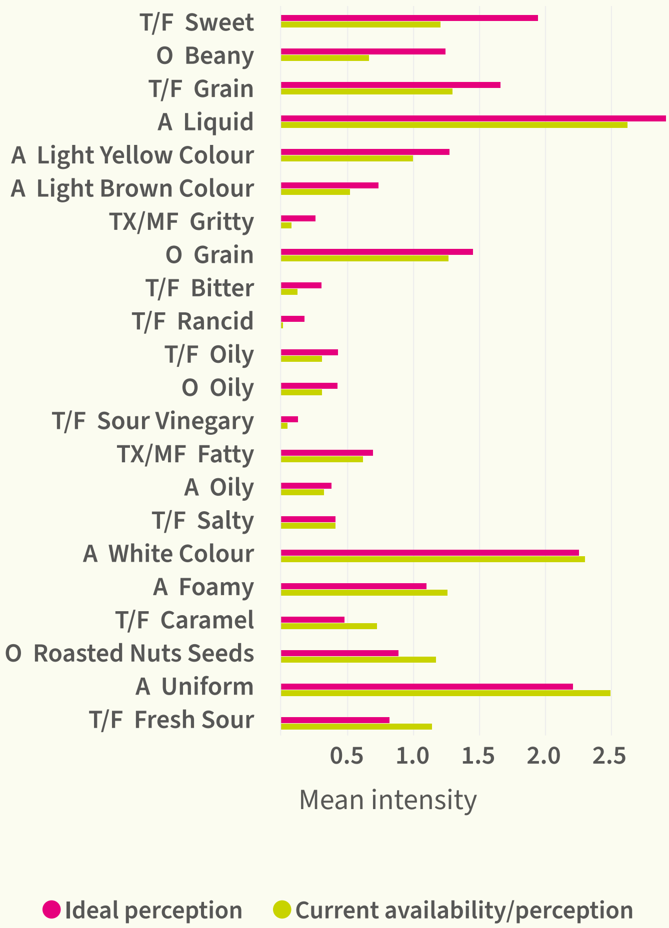
Food development challenge:
Beany flavours and grain-like notes

Solution
>> Bitter masking system

Food development challenge:
Thick consistency

Solution
>> Plant-based milk bases

Sensory profile of milk alternatives



O Odour A Appearance T/F Taste/flavour
TX/MF Texture/Mouthfeel

Intensity ratings:
0 = Not present 1 = Slightly present 2 = Moderately present 3 = Very much present 4 = Extremely present

Adapted from Waehrens, 2023

Plant based yoghurt alternatives

In plant-based yoghurt alternatives, sensory expectations are similar to those of milk alternatives, with consumers favouring minimal "beany" and "grain" flavours, and showing a distinct preference for the "fresh-sour" taste at a higher ideal rating of 2.2, above its current 1.7. This continuity suggests a shared solution in fermentation methods to enhance the fresh sourness or the utilisation of flavour enhancers. Moreover, there is a notable preference for reducing the "liquid-watery layer", rated currently at 1.1 with an ideal of 0.4, pointing to the need for stabilisers to improve texture and consistency, emphasising the necessity for a visually appealing and texturally pleasing product that aligns closely with traditional yoghurt experiences.

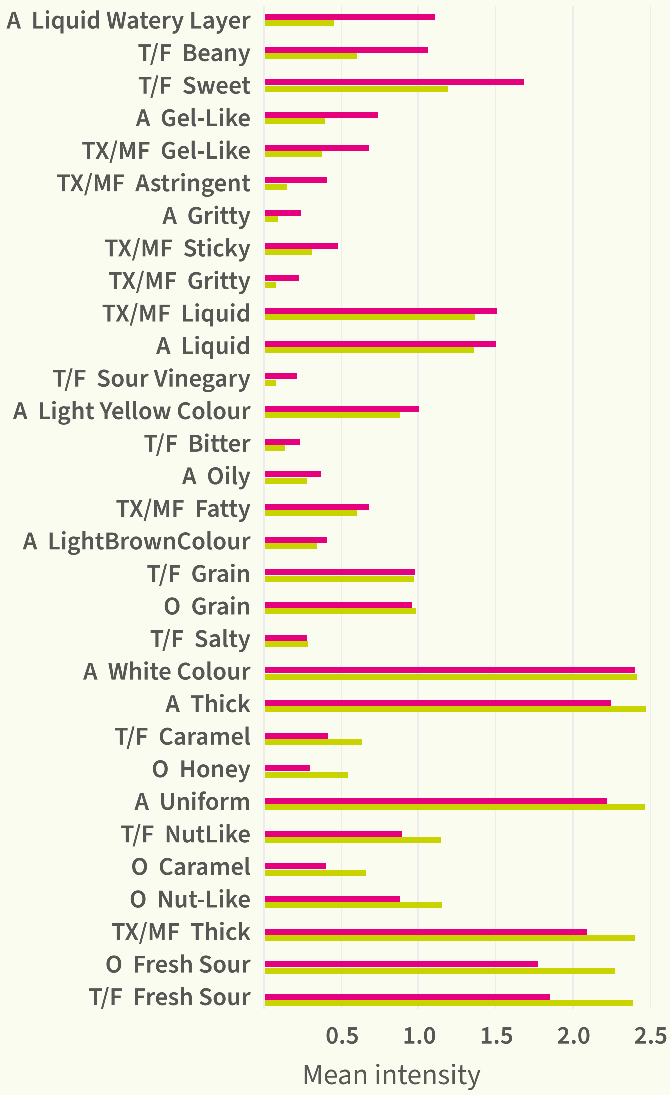
Food development challenge:
Syneresis

Solution
>> Texturisers, Thickeners & Starches

Food development challenge:
Fresh sour taste

Solution
>> Natural sour cream type flavour

Sensory profile of yoghurt alternatives



O Odour A Appearance T/F Taste/flavour
TX/MF Texture/Mouthfeel

Intensity ratings:
0 = Not present 1 = Slightly present 2 = Moderately present 3 = Very much present 4 = Extremely present

Adapted from Waehrens, 2023

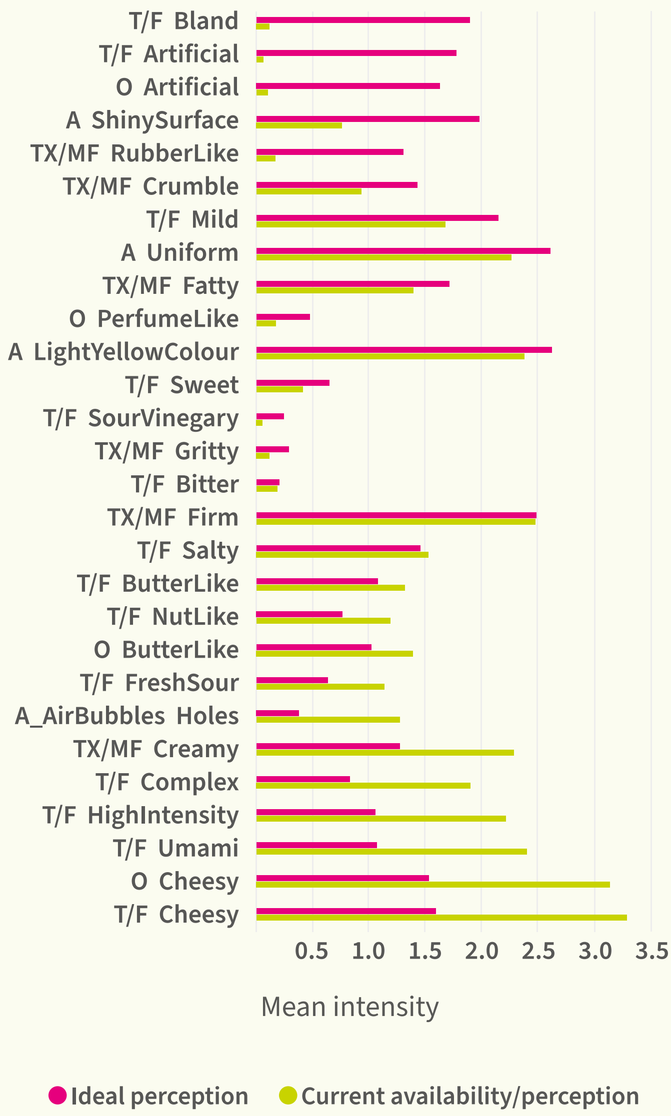
Plant-based cheese alternatives

For semi-hard cheese alternatives, consumers desire a stronger "cheesy" flavour, with ideal intensity at 3.2 compared to the lower current 1.5. "Umami" is also preferred more intensely, at an ideal 3.4 versus 1.0. These indicate opportunities for enhancing flavour profiles using fermentation and ageing processes to amplify these characteristics. The less favoured "artificial" and "bland" attributes, which are far below their ideal ratings, suggest a need for natural flavour enhancers and richer ingredient profiles. Consumers' high rating for "creamy" texture (2.8 ideal vs. 1.4 current) points towards the use of plant-based fats for a smoother, richer mouthfeel. Balancing these flavours and textures can bring plant-based cheeses closer to their dairy counterparts in sensory appeal.

Food development challenge:
Lack of umami and cheese taste

Solution
>> Umami, Cheese flavour

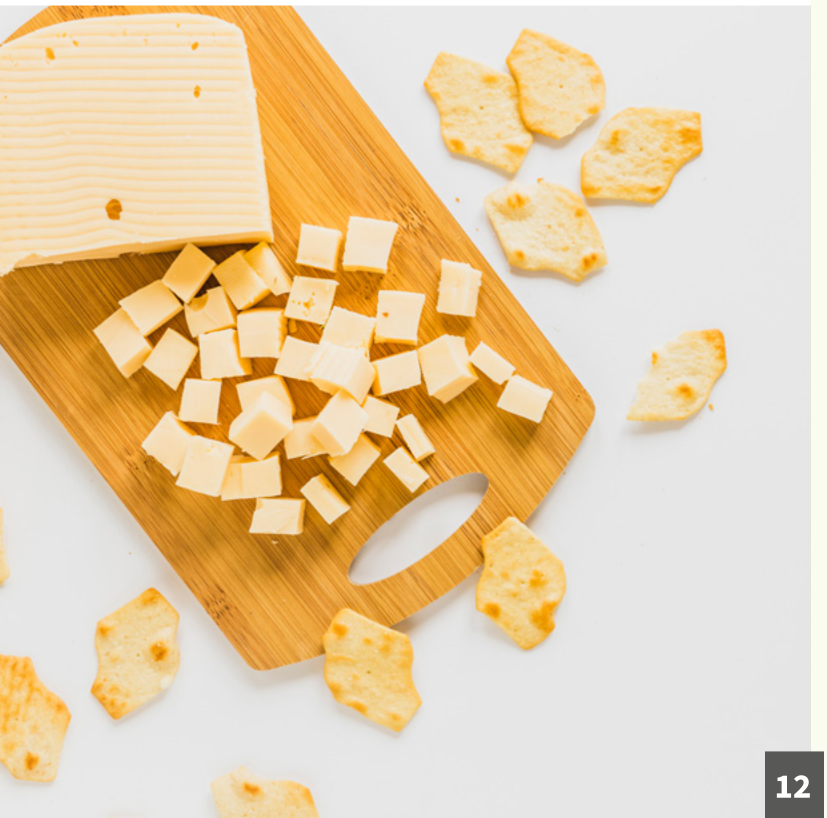
Sensory profile of cheese alternatives



O Odour A Appearance T/F Taste/flavour
TX/MF Texture/Mouthfeel

Intensity ratings:
0 = Not present 1 = Slightly present 2 = Moderately present 3 = Very much present 4 = Extremely present

Adapted from Waehrens, 2023



Plant-based chicken

In plant-based chicken alternatives, the pursuit of a “chicken-like” flavour is paramount, with an ideal intensity rating at 2.8, significantly exceeding the current 2.1. Similarly, “umami” flavour, desired at 2.4, and a “juicy” texture at 2.4 highlight the sensory gap from their current ratings at 1.8 and 1.4, respectively. A “chicken-like” structure, rated ideally at 2.2, suggests the use of texturizing agents to achieve the fibrous consistency characteristic of poultry. Additionally, the ideal 1.2 versus current 1.6 ratings for saltiness show a noticeable gap, with a desired decrease to reflect health-conscious consumer preferences, emphasising the importance of balancing taste with nutritional considerations in developing plant-based chicken products.

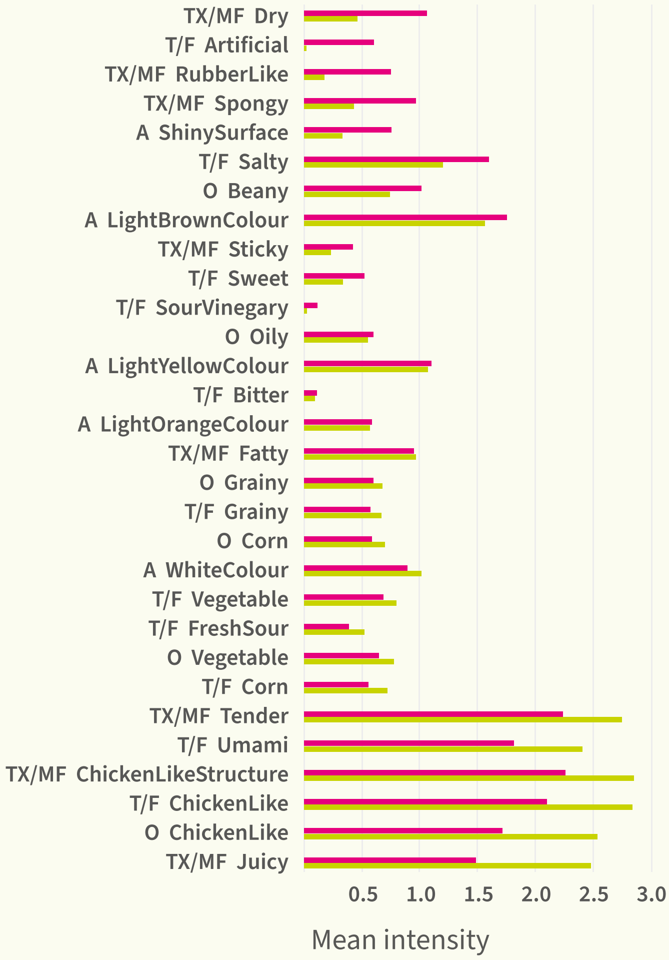
Food development challenge:
Lack of umami and chicken taste

Solution
>> Umami, Chicken flavours

Food development challenge:
Too salty

Solution
>> Salt reduction ingredients

Sensory profile of chicken alternatives



● Ideal perception ● Current availability/perception

O Odour A Appearance T/F Taste/flavour
TX/MF Texture/Mouthfeel

Intensity ratings:
0 = Not present 1 = Slightly present 2 = Moderately present 3 = Very much present 4 = Extremely present

Adapted from Waehrens, 2023

Plant-based beef alternatives

In plant-based beef alternatives, consumers crave a strong "beef-like" flavour, with an ideal rating of 2.3 compared to the current 1.5. They also seek a "juicy" texture and "umami" presence, with ideal scores of 2.5 and 2.4, outpacing current levels. To elevate these attributes, formulators could explore advanced texturization techniques and natural flavour enhancers known for their umami properties. Additionally, "tenderness," scoring an ideal 2.6, may be achieved through protein blending and structural agents that replicate the mouthfeel of beef. It is also observed that consumers find the plant-based beef products too salty with current vs. ideal rates of 1.7 and 1.3, indicating the need to reduce the salt level. With these sensory enhancements, plant-based beef options can more closely match the rich, savoury profile consumers associate with traditional beef, solidifying their place in a rapidly evolving market.

Food development challenge:
Improper texture

Solution
>> Seaweed, Teff

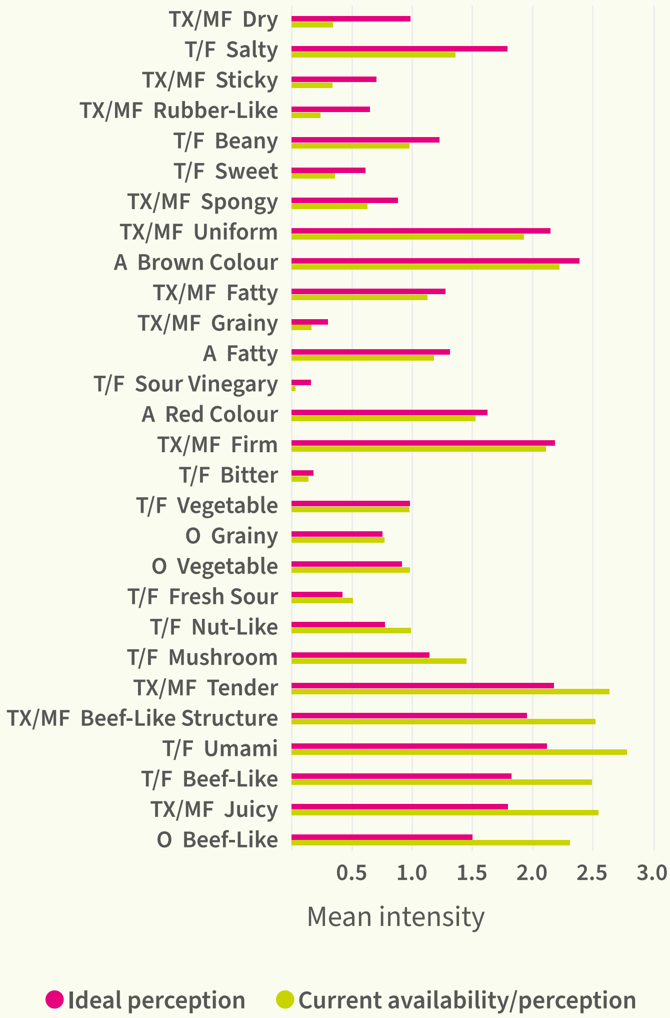
Food development challenge:
Lack umami and beef taste

Solution
>> Umami, Roast beef flavours

Food development challenge:
Too salty

Solution
>> Salt reduction ingredients

Sensory profile of beef alternatives



O Odour A Appearance T/F Taste/flavour
TX/MF Texture/Mouthfeel

Intensity ratings:
0 = Not present 1 = Slightly present 2 = Moderately present 3 = Very much present 4 = Extremely present

Adapted from Waehrens, 2023

4. Strategic pathways in the plant-based market

In the rapidly evolving European plant-based market, capturing emerging opportunities is crucial for anyone in the industry. This chapter outlines strategic approaches designed to leverage these opportunities, enabling producers to align with and anticipate the changing preferences and expectations of consumers across Europe. We will explore enhancements in plant-based dairy and meat alternatives, innovative approaches in sweets and snacks, and effective use of social media for consumer engagement and education.

4.1. Reimagining categories with creative crossover concepts

Opportunity: Consumer demand for plant-based dairy and meat products continues to grow robustly, particularly in countries like Denmark and Spain where the uptake of plant-based milk and meat substitutes is notably high. Additionally, there is an emergent consumer interest in plant-based sweets and snacks, which signifies a broader acceptance and desire for diverse plant-based offerings.

Strategic recommendation: Enhance your portfolio by creating innovative crossover products that blur the lines between traditional categories. One approach is to develop snack-form dairy and meat alternatives; for instance, introducing plant-based cheese bites or vegan salami chips that cater to on-the-go consumption. For those already in the sweets and snacks categories, you can formulate plant-based versions of popular local snacks, infusing them with health-boosting ingredients like antioxidants or spices. These products could combine the convenience of snacking with the nutritional benefits and ethical appeal of plant-based ingredients.

4.2 Sensory symphony with premium ingredients and expertise

Opportunity: As consumers become more sophisticated in their dietary choices, the importance of sensory attributes such as taste, texture, and appearance in plant-based foods cannot be overstated. There is a clear preference for products that do not compromise on these aspects compared to their animal-based counterparts.

Strategic recommendation: Focus on sourcing high-quality, innovative ingredients that can enhance the sensory profile of plant-based foods. Ingredients that can mimic the umami of meat or the creaminess of dairy products are particularly valuable. Prioritising research to find the right blends and formulations can significantly elevate the consumer experience, thereby increasing acceptance and preference for plant-based options. **1-2-Taste is committed to assisting your product development efforts, providing support and facilitating connections with our expert service partners to help you innovate and succeed in the plant-based market.**

4.3 Leveraging social media for consumer engagement and education

Opportunity: Social media significantly influences consumer buying behaviours, with a growing demand for reliable and transparent information. Today's consumers are more discerning and demand proof of health and sustainability claims, valuing transparency in ingredient sourcing and product manufacturing.

Strategic recommendation: Utilise social media platforms beyond traditional marketing, but as tools for education and engagement by showcasing the authenticity and transparency of your products. Employ clear, communicative strategies that highlight certifications, ingredient traceability, and the sustainable practices involved in product development. This approach builds trust and also educates the consumer base about the tangible benefits of choosing your plant-based products over others.

5. Conclusion

Europe's growing enthusiasm for plant-based diets signifies a deep-seated shift in consumer preferences, driven by health, environmental, and ethical motivations. The analysed market data highlight a robust interest in these alternatives, showcasing a rich landscape for industry growth and innovation.

The challenge lies in aligning plant-based options with consumer taste expectations and broadening their understanding of these products' benefits. Brands should concentrate on refining the flavour and texture profiles of plant-based foods to ensure they are as enjoyable as their traditional counterparts. At the same time, a strategic approach to digital marketing can effectively educate consumers, helping them appreciate the positive impacts of plant-based eating.

Embracing innovation will be key to capitalising on this trend. By staying attuned to the evolving preferences of consumers and continuously enhancing products, businesses can position themselves as winners in Europe's dynamic plant-based market.

Contact us

1-2-Taste BV

www.12Taste.com
+31 85 0027748
sales-eu@12taste.com

Plus Ultra II
Bronland 10 P,
6708 WH Wageningen
The Netherlands

References

Chapter 2 content and graphs are are based on and adapted from reference 2. Chapter 3 content and graphs are are based on and adapted from reference 3.

1. Ajzen, Icek. "The Theory of Planned Behavior." Organizational Behavior and Human Decision Processes 50, no. 2 (1991): 179-211. https://doi.org/10.1016/0749-5978(91)90020-T.

2. Smart Protein. "Evolving Appetites: An In-Depth Look at European Attitudes Towards Plant-Based Eating." November 2023. https://smartproteinproject.eu/european-attitudes-towards-plant-based-eating/.

3. Waehrens, SS, Faber, I., Gunn, L., Buldo, P., Frøst, M. Bom, and Perez-Cueto, FJA. "Consumers' Sensory-Based Cognitions of Currently Available and Ideal Plant-Based Food Alternatives: A Survey in Western, Central and Northern Europe." Food Quality and Preference 108 (2023): 104875. https://www.sciencedirect.com/science/article/pii/S0950329323000691.