

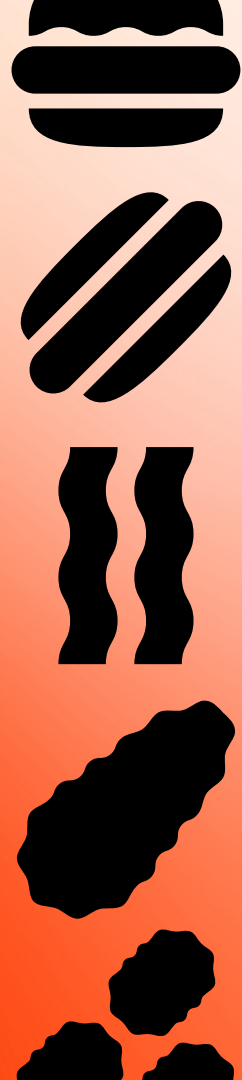


June 2024

Taste of the Industry 2024

Nuggets Category Deep Dive

> Categorical Insights > Consumer Satisfaction
> Competitive Insights > R&D Opportunities



Foreward

While food choices are complex, global food consumption is largely built on the principle that “taste is king.” Since taste is a primary purchase driver, the plant-based foods industry is hyper-focused on achieving taste parity with animal-based foods. However, this pursuit raises a fundamental question: “What is the standard for taste?” and, consequently, “How will we know when we’ve achieved it?”

Enter **NECTAR**, a new initiative bringing an evidence-base to taste.

NECTAR is an initiative from Food System Innovations (FSI), a philanthropic impact platform that funds and creates efforts to accelerate the protein transition toward a more humane and sustainable food system.

NECTAR stands on three operational pillars:

LEARN by conducting large-scale, blind sensory analyses of alternative protein products.

SUPPORT brands and manufacturers in accelerating product development with relevant sensory data.

CELEBRATE great-tasting products and categories by elevating their culinary credibility, expanding their distribution opportunities, and ultimately driving broader consumer adoption.

NECTAR’s inaugural 2024 State of the Industry report is the world’s first and largest public sensory analysis of plant-based meats. The report synthesizes insights from sensory panels with omnivores evaluating 45 plant-based meat products and provides categorical and competitive insights, consumer satisfaction data, and specific R&D opportunities to inform and empower decision-makers across the food value chain.

As you explore this report, we invite you to share your experience with us. Your generous feedback will help NECTAR continue to deliver actionable insights and category-level value to drive large-scale consumer adoption of alternative proteins.

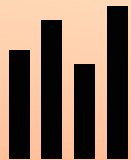
Together, we can achieve our vision of a world where doing good tastes great.



Caroline Cotto
Director, NECTAR
Food System
Innovations

caroline@nectar.org

Survey Overview



Current context

Taste is the primary purchase criteria for all food products in the United States, with nearly nine out of ten Americans saying taste has a high impact on their food purchasing decisions.¹ Over the years, plant-based meat products have faced a considerable taste barrier to broader market adoption. The Food Industry Association has researched consumer attitudes with Kroger's analytics arm 84.51° and the Plant-Based Foods Association. They found that "taste is the most frequently mentioned reason for repeat consumption and the leading barrier to trial of plant-based alternative foods and beverages."²



Our approach

Food System Innovations (FSI) conducted blind sensory panels to get an objective view of how plant-based meat products taste today across five main categories: burgers, hot dogs, bacon, tenders, and nuggets. Using animal-based product benchmarking, the results of this survey provide a perspective into competitive positioning and R&D opportunities to better align the taste profiles of plant-based analogs with their animal-based counterparts.

FSI plans to repeat this survey annually and increase both the number of categories and the number of products within each category tested.

If you have any questions or would like to discuss this research further, please contact **caroline@nectar.org**.

1. International Food Information Council. 2023 Food & Health Survey. 23 May 2023. <https://foodinsight.org/2023-foodhealth-survey/>

2. Food Business News. "Taste remains a problem for many plant-based foods." 14 Sept 2023. <https://www.foodbusinessnews.net/articles/24658-taste-remains-a-problem-for-many-plant-based-foods>.

Nomenclature

| | | |
|------------------------|---|--|
| Plant-based meats | ➤ | Plant-based meats refer to food products created to mimic the taste, texture, and nutritional profile of traditional animal-based meats but made directly from plants. |
| Blended meats | ➤ | Blended products are food items that combine both plant-based and animal-derived ingredients in varying proportions. These products aim to merge the sensory attributes, nutritional benefits, and taste profiles of plant and animal sources. |
| Plant-based leader | ➤ | The product in each category that performed the highest in 'average liking'/overall satisfaction. |
| Plant-based average | ➤ | The averaged overall satisfaction for each product category (i.e. category-level, not product-level, taste performance). |
| Animal-based benchmark | ➤ | Performance of the animal-based product tested provides a benchmark against which to compare all plant-based products, the plant-based leader, and the plant-based average. |

Note: The term 'plant-based' is used throughout this report, however three products tested were 'vegetarian' as they included some animal-derived ingredients (e.g. eggs and/or milk).

Study Design & Methodology

Food System Innovations partnered with Precision Research to conduct hybrid quantitative monadic blind taste tests and qualitative breakout focus groups at Precision's Chicago-based research center between June and August, 2023.

An array of sensory parameters were considered in the sampling process, including:

- ✓ Purchase intent
- ✓ Liking
- ✓ Flavor
- ✓ Texture
- ✓ Appearance
- ✓ Category specific attributes

Plant-based product selection criteria were based on popularity, availability (i.e. distributed in-market at the time of the test), and similarity to analog animal offerings (i.e. veggie burgers made from whole plants were not included, whereas plant-based burgers aiming to mimic the eating experience of animal-based burgers were included).

Conventional animal product selection criteria were based on popularity and availability.

All products tested were evaluated by a representative sample of at least **100 omnivores in a test kitchen** and handled, stored, and prepared according to the manufacturer's instructions without adding salt or seasonings. Various cooking equipment (e.g., skillet, grill, microwave), temperatures, and cook times were used to adhere to manufacturer instructions.

Objectives



Measure consumer satisfaction with plant-based analogs across product categories

- Overall liking and purchase intent for plant-based products
- Spread between the average plant-based product and the leading plant-based product in each category
- Comparison between burgers, hot dogs, bacon, chicken nuggets, and chicken tenders



Evaluate competitive positioning relative to animal-based products

- Overall liking and purchase intent for animal-based products
- Spread between the average plant-based product, plant-based leader, and animal-based product
- Comparison of the gap between plant-based and animal-based products



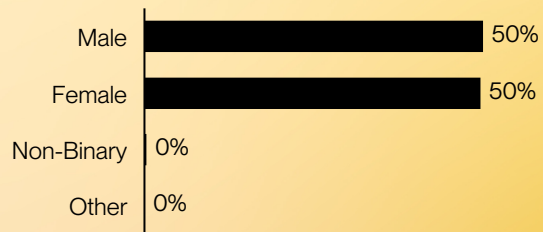
Identify and prioritize R&D opportunities for plant-based analogs

- High-level gaps across flavor, texture, and appearance tied to impact on overall liking
- Prevalence and impact on overall liking for each sensory sub-dimension
- Prioritization of opportunities based on impact on overall liking

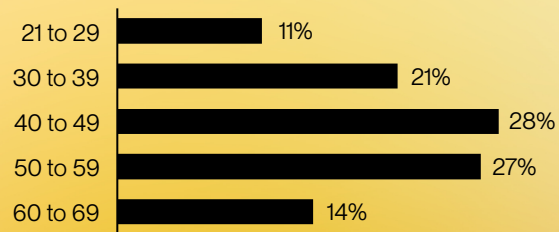
Study Population

Demographic overview of participants — a representative sample of omnivores (N=1,150)

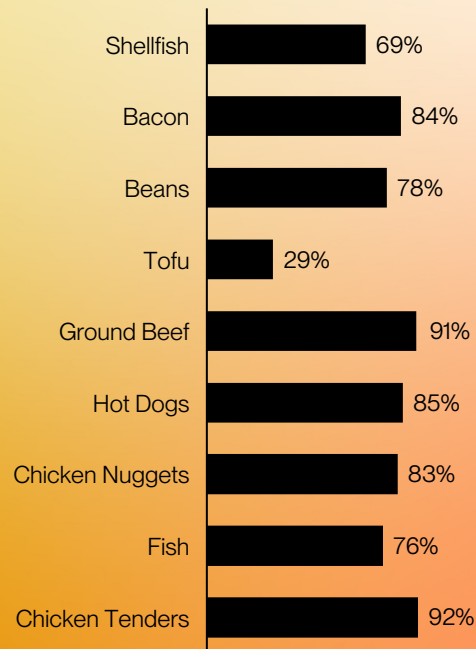
Gender, % of participants



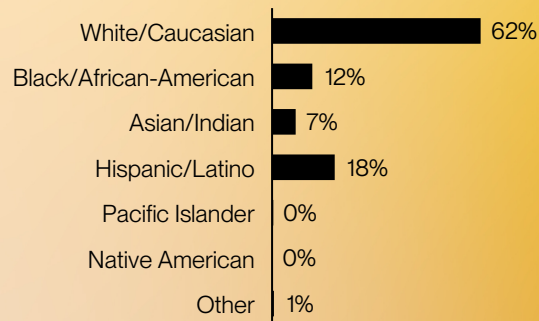
Age, % of participants



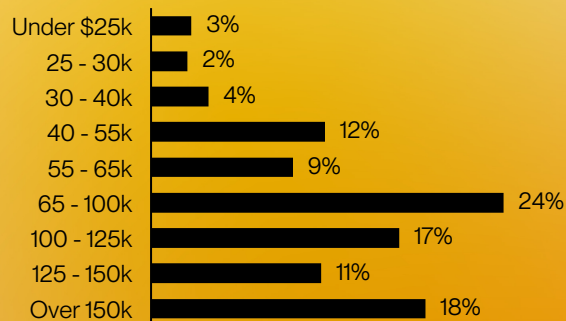
Proteins consumed, % of participants



Ethnicity, % of participants



Income, % of participants



Executive Summary

Consumer Satisfaction

Many consumers are satisfied with the leading plant-based products but are still demanding more from the average plant-based product.

- **Plant-based leaders are liked by a meaningful share of consumers** – 37-53% rated the plant-based leader as 'like very much' or 'like' (excluding hot dogs).
- **There is high variation in liking within and across categories** – there was a wide range in liking within categories, breaded products were generally higher-rated, and hot dogs far underperformed other categories.
- **The blended burger leader achieved significantly higher liking than the leading plant-based burger** – average liking for the blended product was half of a rating higher than the plant-based leader ($p < .1$).

Competitive Positioning

Plant-based leaders are close to, or beyond, taste parity with animal products, but there's a larger gap for the average plant-based product.

- **Leading plant-based products are generally comparable or preferred to the animal** – plant-based nuggets are preferred while bacon, burgers, and tenders are within roughly one 'liking' rating of the animal product (however, hot dogs are still far behind).
- **The average plant-based product is meaningfully behind the animal product** – average liking was 2 rating levels beneath the animal (e.g., 'like very much' -> 'like somewhat').

R&D Opportunities

Plant-based products have clear opportunities to improve.

- **Improvement is feasible** – plant-based leaders were rated 'like very much' or 'like' 2-3x as often as their category average and showed significant outperformance across almost all sensory dimensions.
- **Plant-based products should strive for 'bolder' profiles** – participants demanded bolder profiles (e.g., meatier, saltier, juicier), a common area of relative strength within the category for the plant-based leader.

Key Stakeholders



Food System Innovations

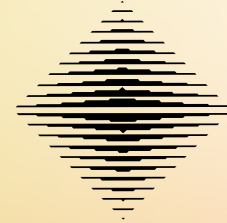
FSI is non-profit organization on a mission to create and fund high-impact efforts to remove animals from industrial food systems.



Palate Insights

Product feedback platform pioneering authentic, affordable, and agile tools exclusively for the sustainable food industry.

Palate helps companies get consumer feedback through pop-up events with their restaurant and grocer partners and chef feedback through their panel of 150+ Executive Chefs.



Precision Research

Precision Research functions as both a marketing research consulting firm and as a data collection company, administering surveys to consumers and industry decision makers.

Its efforts help companies to create and improve products and services based on what the market desires.

Consumer Satisfaction

Executive Summary > Consumer Satisfaction

Plant-based Leader

Plant-based leaders are liked by a meaningful share of consumers.

- **Plant-based leaders are appealing to a significant portion of the market** – 37-50% rated the leader as 'like very much' or 'like' (excl. hot dogs).
- **The leading plant-based chicken tenders are the highest performing meat analog** – 29% rated them 'like very much' (versus 16% or less for other categories).
- **There is whitespace in hot dogs** – only 11% of participants rated the leader 'like very much' or 'like' compared to 37-53% of participants for other product categories.

Plant-based Average

Consumers do not yet 'like' the average plant-based product.

- **Consumers do not yet 'like' the average plant-based product** – average liking across all categories tested ranged from 'neither like nor dislike' to 'dislike'.
- **Breaded products generally outperform unbreaded products** – 35% rated them 'like very much' or 'like' (versus 16% of participants for unbreaded products).

Relationship Between Liking & Purchase Intent

High 'liking' is needed to translate into purchase intent.

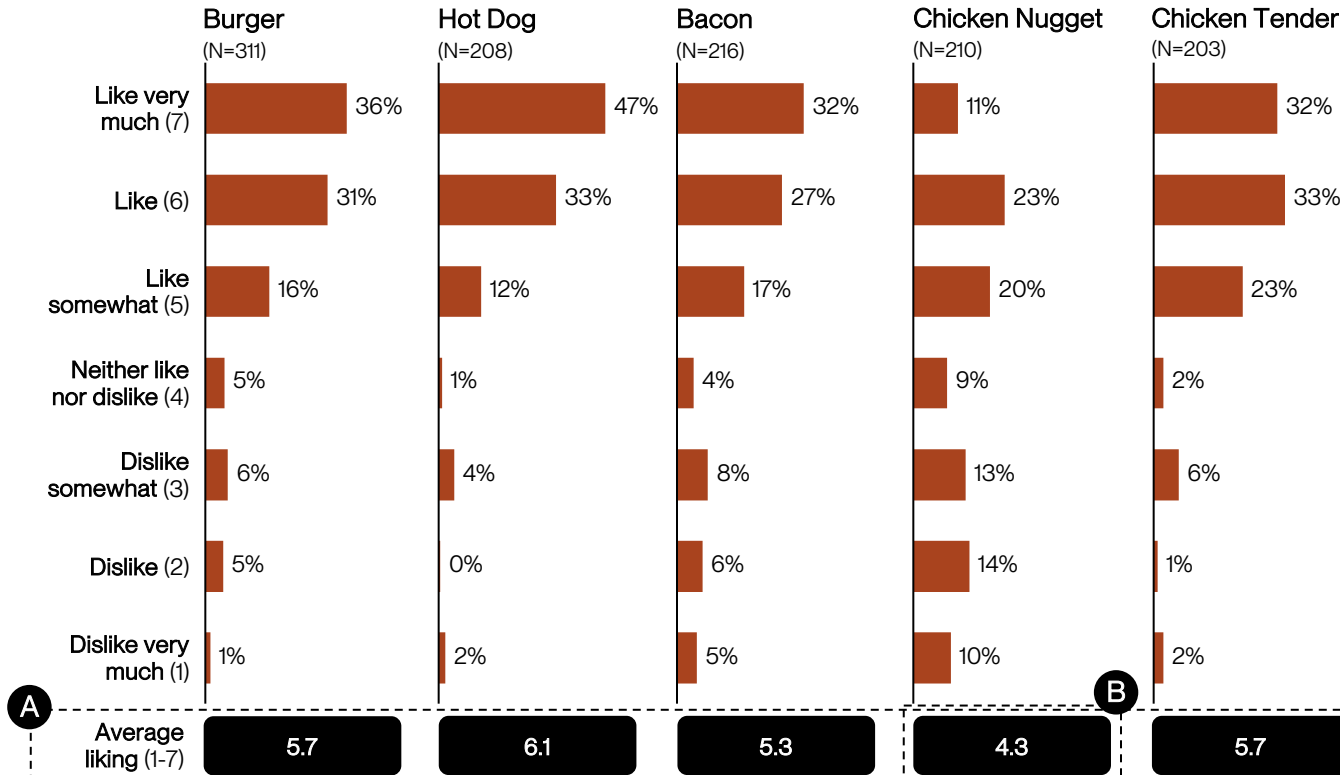
- **Products should strive to be 'liked very much'** – purchase intent dips below 'probably would buy' when ratings fall from 'like very much' to 'like'.
- **Products with moderate liking will not attract customers** – ratings of 'like somewhat' and 'neither like nor dislike' result in neutral to negative purchase intent.

Satisfaction with animal-based products

➤ Takeaways

Liking scores, % of participants

■ Animal-based benchmark



A Consumers generally like animal-based products, but aren't in love with them.

- Excluding chicken nuggets, animal-based products score on average between 'like somewhat' and 'like'.

B There is immediate opportunity to displace animal-based chicken nuggets.

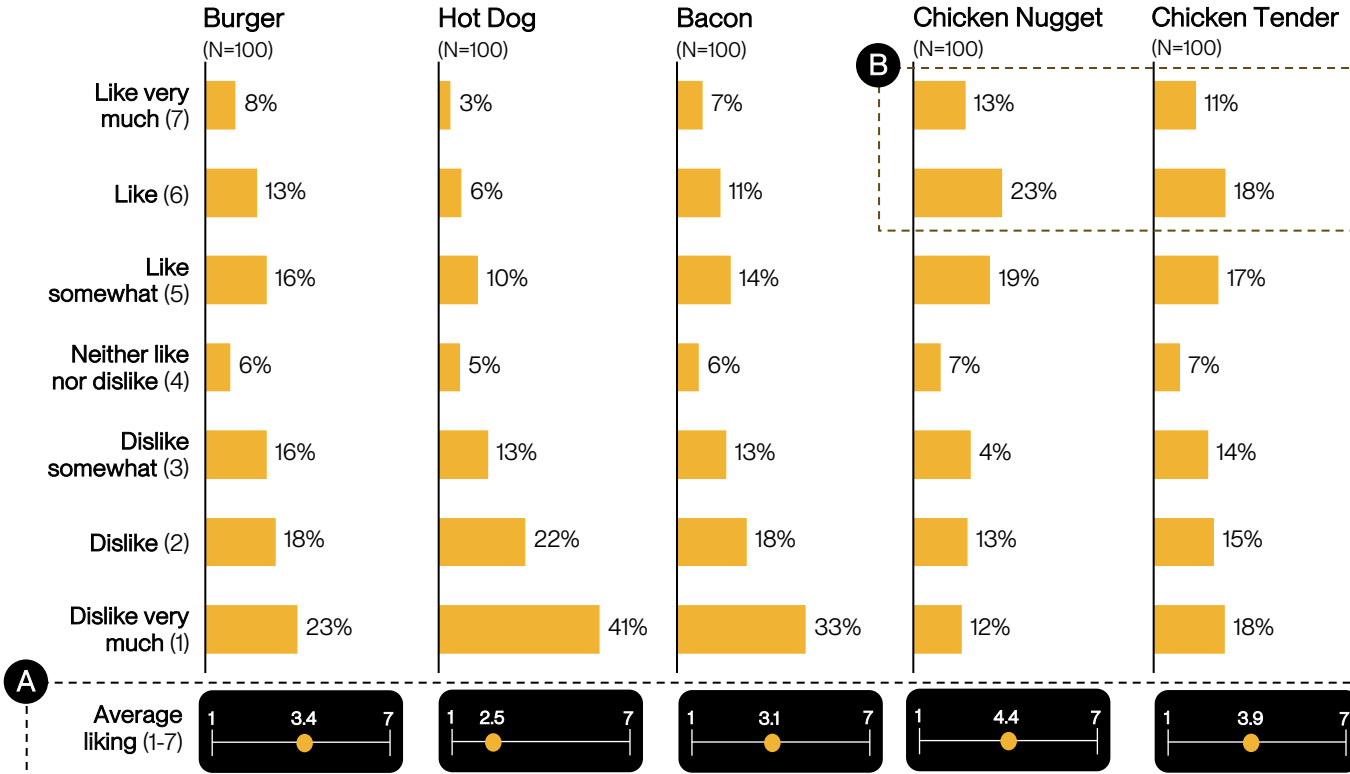
- Consumers are currently indifferent towards the animal-based chicken nugget option giving it an average rating of 'neither like nor dislike'.

Satisfaction with plant-based products

➤ Takeaways

Liking scores, % of participants

Plant-based average¹



A Consumers do not yet 'like' the average plant-based product.

- Average liking by category ranged from 'neither like nor dislike' to 'dislike'.

B Breaded products generally outperform unbreaded products.

- 35% of participants rated breaded products 'like very much' or 'like' compared to just 16% of participants for unbreaded products.

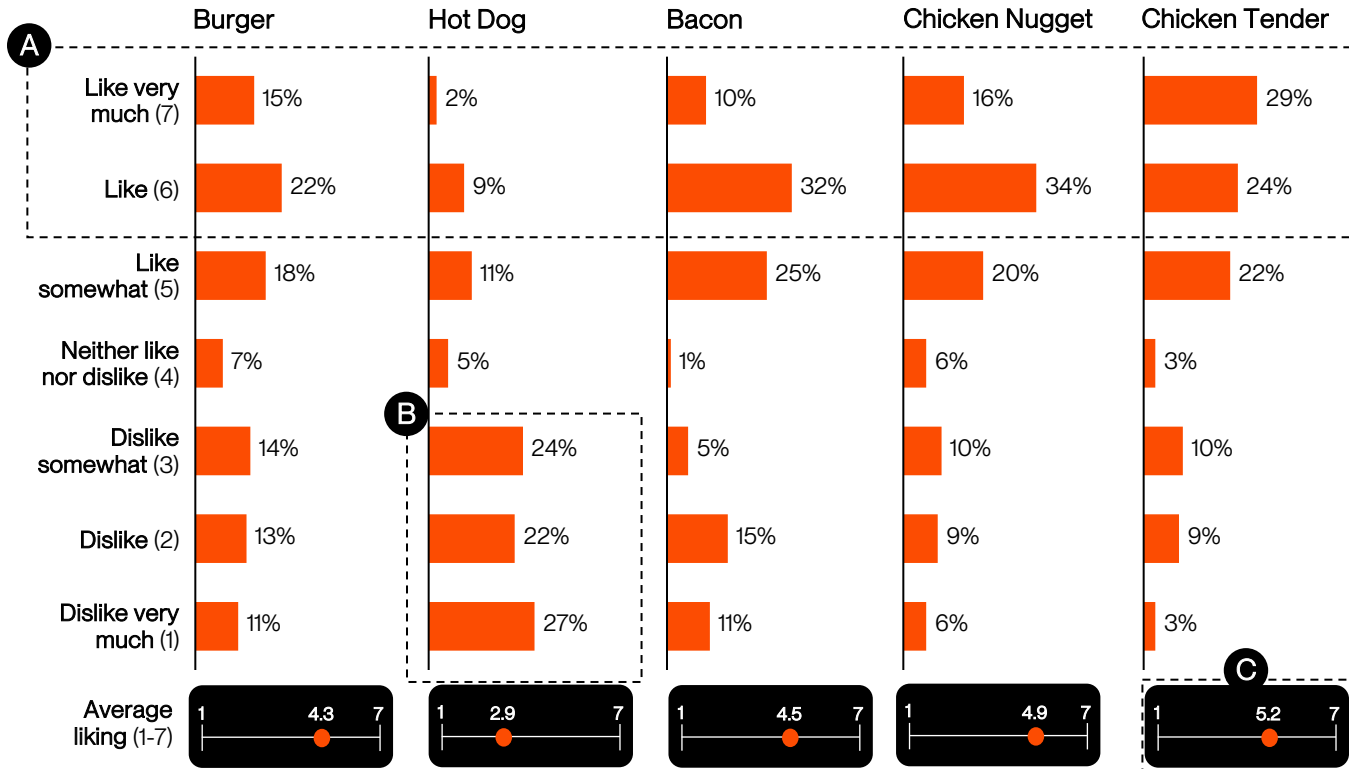
1. Aggregated across 5+ commercially available plant-based brands; includes 3 vegetarian products that contain milk and/or eggs (hot dog, bacon, and chicken nugget)

Satisfaction with leading plant-based products

Takeaways

Liking scores, % of participants (N=212)

Plant-based leader¹



A Plant-based products are appealing to a significant portion of the market.

- 37-53% of participants rated the leader as 'like very much' or 'like' (excl. hot dogs).

B There is whitespace for hot dogs.

- The leader in the category was 75% less likely to be rated 'like very much' or 'like' than other plant-based leaders.

C The leading chicken tender is the most liked product across all plant-based products.

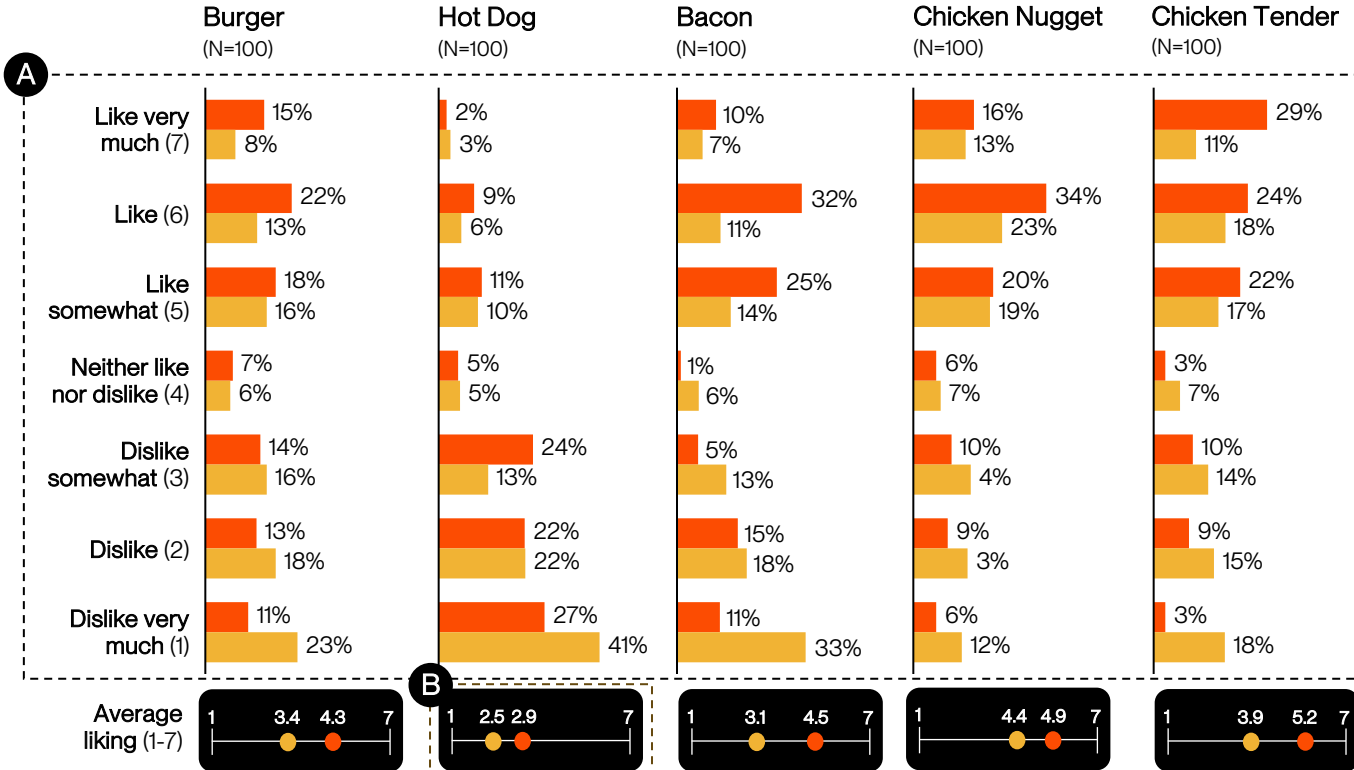
- The leader was rated 'like very much' more than 1.8x as often as other plant-based leaders.

Satisfaction with animal-based products

→ Takeaways

Liking scores, % of participants

Plant-based leader¹
Plant-based average²



A There is wide variation in consumer liking of burgers, bacon, and tenders within each category.

- The leader of each category was rated 'like very much' or 'like' 2-3x as often as its category average.

B There is little variation in plant-based hot dogs.

- There is just 0.4 difference in average liking between the category average and leader.

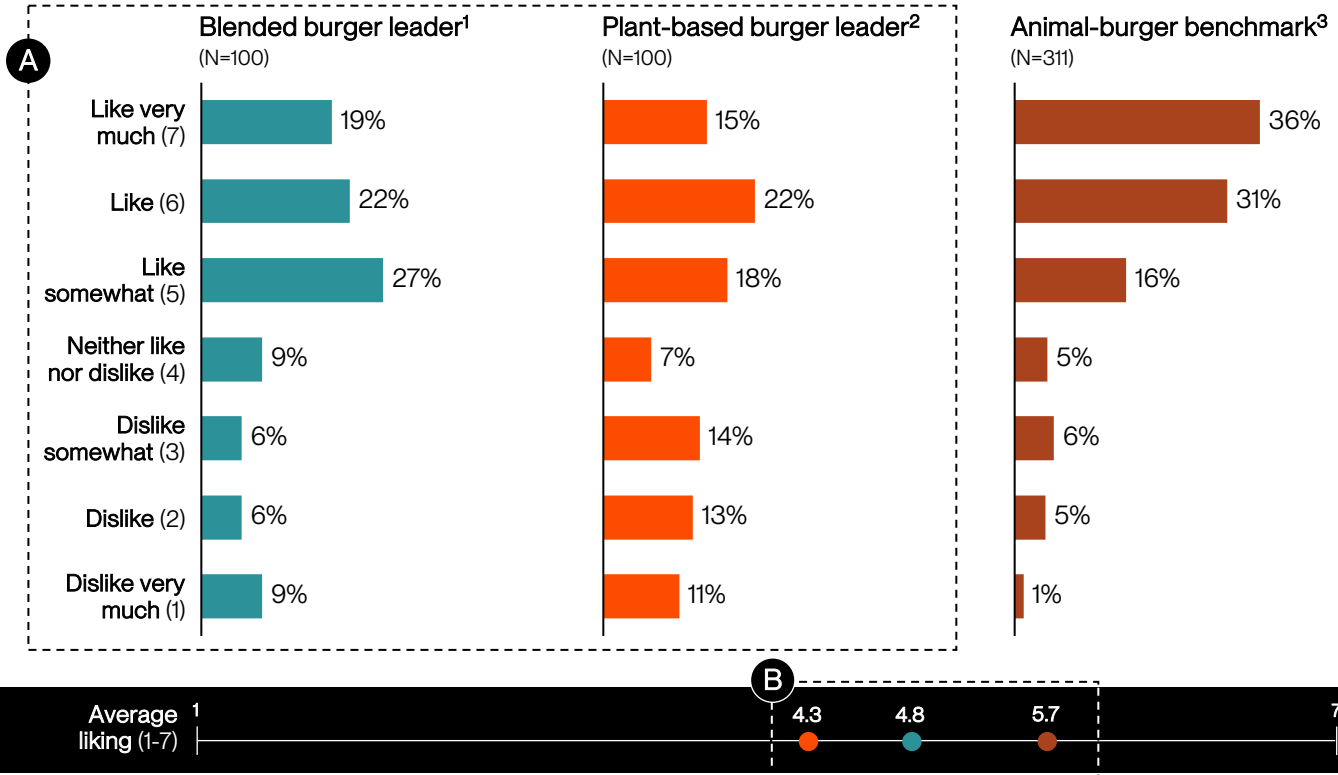
1. Top performing plant-based product amongst 5+ commercially brands in each category

2. Aggregated across 5+ commercially available plant-based brands; Includes 3 vegetarian products that contain milk and/or eggs (hot dog, bacon, and chicken nugget)

Burger Deep Dive: Potential of Plant-based Meats

➤ Takeaways

Liking scores, % of participants



A The blended leader outperformed the plant-based leader.

- The blended leader achieved significantly higher liking than the leading plant-based product, despite limited R&D for the category ($p < 0.1$).

B Blended products are still closer in liking to plant-based products than animal-based products.

- The gap in mean liking to the animal product is 0.9pts (versus 0.5pts to the plant-based leader).

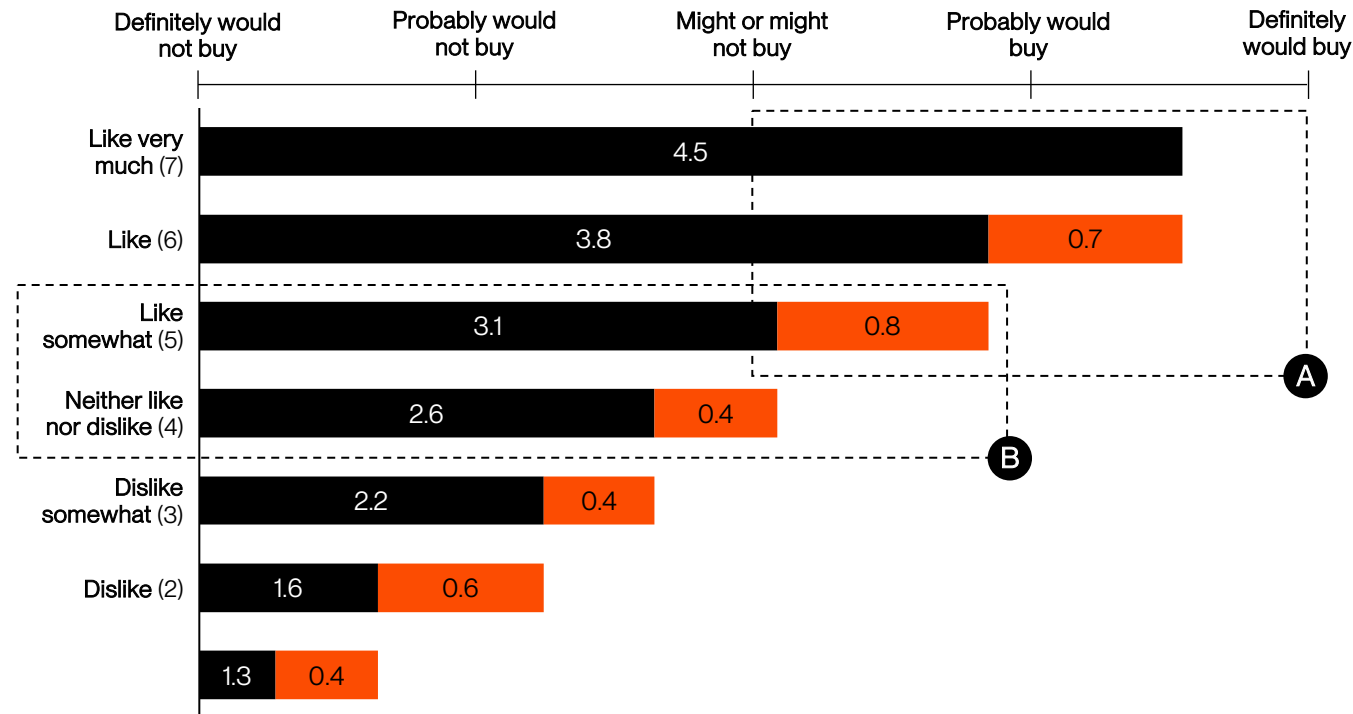
1. Aggregated across 5+ commercially available plant-based brands; includes 3 vegetarian products that contain milk and/or eggs (hot dog, bacon, and chicken nugget)

Translation from 'liking' to 'purchase intent'

→ Takeaways

Liking scores and average drop in purchase intent¹, Mean

■ Mean liking
■ Mean drop in purchase intent



A Products require high levels of liking to achieve strong purchase intent.

- “Like very much” does not equate to “definitely would buy” and purchase intent drops off very quickly between “like very much” and “like somewhat”.

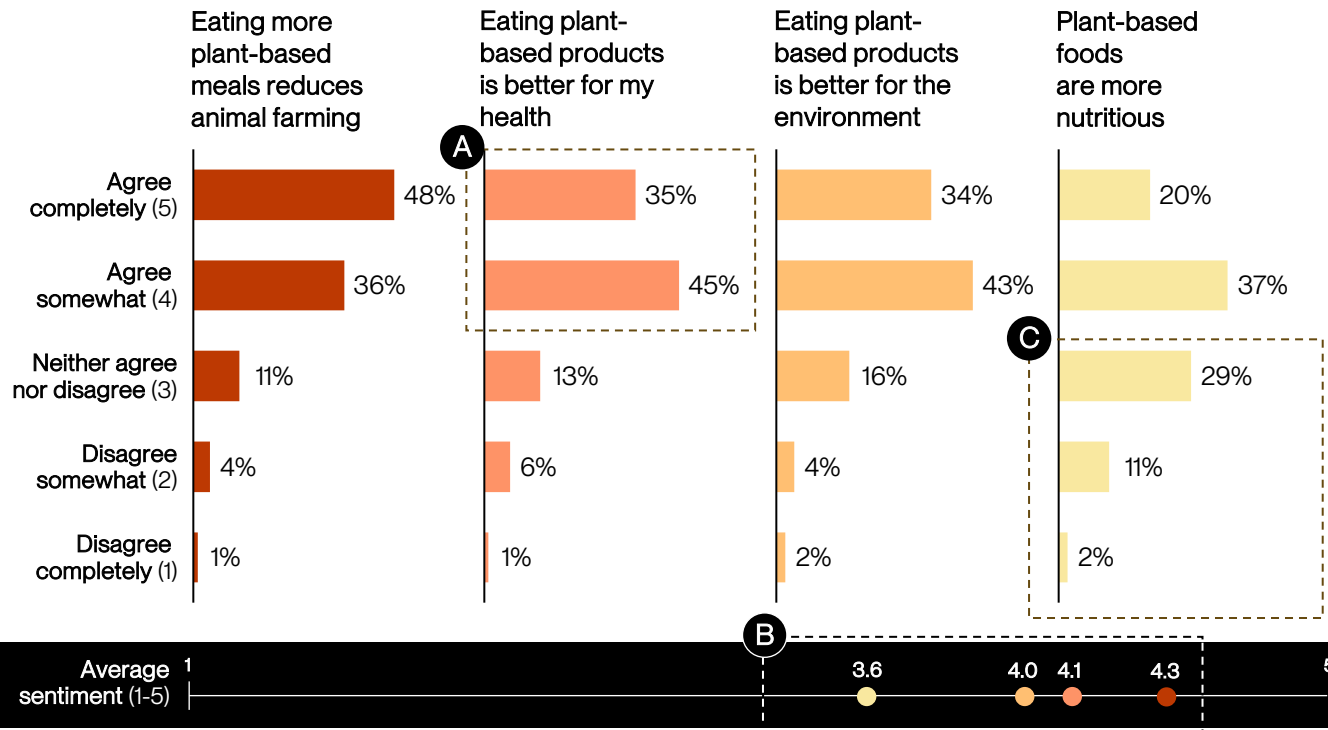
B Products with moderate liking will not attract customers.

- “Like somewhat” and “neither like nor dislike” result in neutral to negative purchase intent.

Benefits of plant-based products

→ Takeaways

Please tell us how much you agree or disagree with each of the following statements, % of participants



A Most consumers consider plant-based products to be healthy.

- 80% of participants 'agree completely' or 'agree somewhat' that plant-based products are better for their health.

B Consumers generally recognize the benefits of plant-based products.

- Average agreement was above 'neither agree nor disagree' for all statements.

C Nutrition is a less recognized as a benefit.

- 42% rated their agreement as below 'agree somewhat' when asked if they considered plant-based products more nutritious.

Top Performing Brands

Brands within 1pt in average liking of the animal product and rated at least 'like somewhat'

|  Burger |  Bacon |  Chicken Nugget |  Chicken Tender |
|---|--|---|---|
|  ² |  ³ | <p>IMPOSSIBLE™</p> <p>Morning Star FARMS®</p> <p>Quorn</p> <p>rebellyous foods</p> <p>SIMULATE®</p> <p><i>Listed alphabetically</i></p> | <p>IMPOSSIBLE™</p> |

1. Not all products in market were tested; this study has a limited sample size and only included products available during testing (June-August, 2023)

2. BOTH is a blended product that uses both animal- and plant-based ingredients

3. Since conducting this survey, Hooray Foods has ceased operations

Competitive Positioning

Executive Summary

Competitive positioning

Plant-based Leader

The leading plant-based products are approaching or have exceeded parity with animal products.

- **The leading plant-based nuggets are clearly preferred to the animal** – 50% rated the plant leader 'like very much' or 'like' (versus just 33% for the animal nugget).
- **Leading plant-based bacon and tenders are closing in on the animal product** – average liking was within just one rating of the animal for these categories.
- **Animal hot dogs are still far ahead of plant-based hot dogs** – 80% rated the animal hot dog 'like very much' or 'like' (versus just 11% for the plant-based leader).

Plant-based Average

Animal-based products are still generally preferred over the average plant-based product (excluding nuggets).

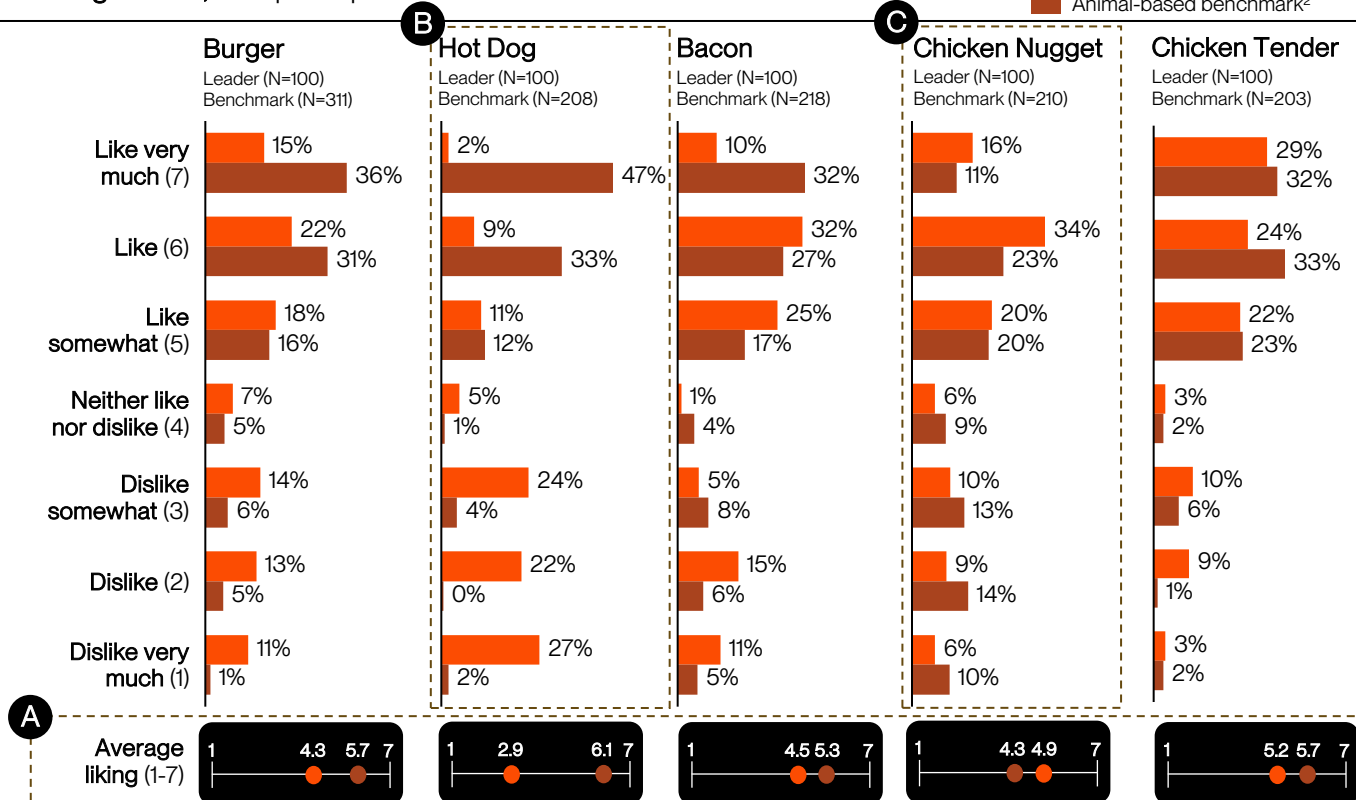
- **Plant-based nuggets are at parity with animal nuggets** – the distribution of liking scores for the average plant-based nugget was extremely similar to the animal nugget.
- **The average plant-based burger, bacon, or tender has a meaningful gap in liking to the animal product** – average liking for these plant-based products was two ratings beneath the animal product (e.g., 'like very much' -> 'like somewhat').

Delta in satisfaction within plant-based leader

→ Takeaways

Liking scores, % of participants

Plant-based leader¹
Animal-based benchmark²



A The best plant-based products are approaching parity with animal products.

- Tenders and bacon are within 1 liking score of the animal product
- Burgers have an average liking 1.5pts beneath the animal burger.

B The largest gap in the market is hot dogs.

- The best plant-based hot dog underperformed by over 3 rating points on average compared to animal hot dogs.

C Plant-based chicken nuggets are better than animal nuggets and can still improve further.

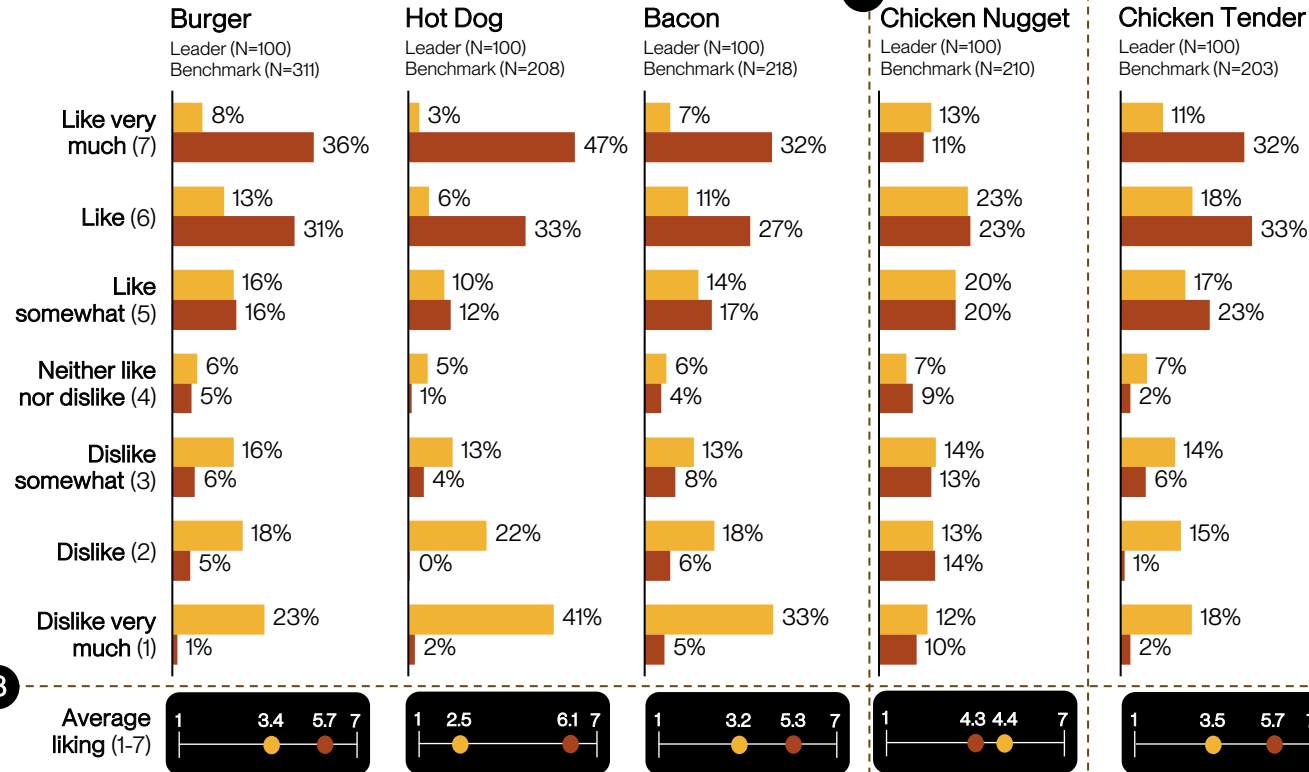
- Purchase intent increases dramatically from a rating of 'like' to 'like very much'.

Delta in satisfaction within plant-based leader

→ Takeaways

Liking scores, % of participants

Plant-based average¹
Animal-based benchmark²



A Plant-based nuggets are at parity with animal nuggets.

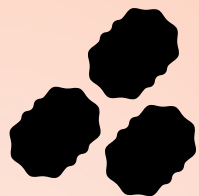
- The distribution of liking scores for the average plant-based nugget was extremely similar to the animal nugget.
- Average liking was higher for plant-based nuggets.

B Plant-based products (excluding nuggets) have a meaningful gap in liking to the animal product.

- Liking for the average plant-based tender, bacon, and burger was 2 ratings beneath the animal product (e.g., 'like' -> 'neither like nor dislike').
- Liking for the average plant-based hot dog was 3.5 ratings lower (e.g. 'like' -> between 'dislike' and 'dislike somewhat').

1. Aggregated across 5+ commercially available plant-based brands; includes 3 vegetarian products that contain milk and/or eggs (hot dog, bacon, and chicken nugget)
2. Animal-based product available in retail

Category-Specific Deep Dive



Nuggets

Nuggets Executive summary of R&D opportunities



Priority Attributes

Plant-based nuggets should focus on flavor for further improvement.

- **Flavor is most central to overall liking** – a rating of 'like very much' was associated with higher general liking than for texture, appearance, or breaded flavor.
- **Plant-based should improve to ensure they outperform all animal nuggets** – while plant-based nuggets were more 'liked' on all key sensory traits, other animal nuggets might achieve greater 'liking' than the benchmark used in this study.

Top Sensory Opportunities











Plant-based can achieve clear superiority with focused R&D.

- **Meatiness and consistency should be prioritized for product development** – more than 40% of participants found the nuggets to be 'not meaty' or 'too mushy/rubbery/chewy', leading to a 2pt drop in average liking on average (e.g., 'like very much' -> 'like somewhat').
- **Declines in meatiness were most strongly associated with a lack of juiciness, saltiness, and mildness (vs spiciness)** – these attributes were tied to the largest average drops (0.55-0.65pts) and occurred frequently (25-60% of the time).
- **Mild flavor or low crispiness nuggets were frequent but lower impact complaints** – ratings of 'too mild' or 'not crispy' occurred >50% of the time and led to a 1.2-1.3pt average drop in 'general liking'.

Nuggets Tested



Chicken nuggets from 9 commercially available plant-based brands were prepared according to manufacturer instructions and compared against animal nuggets.

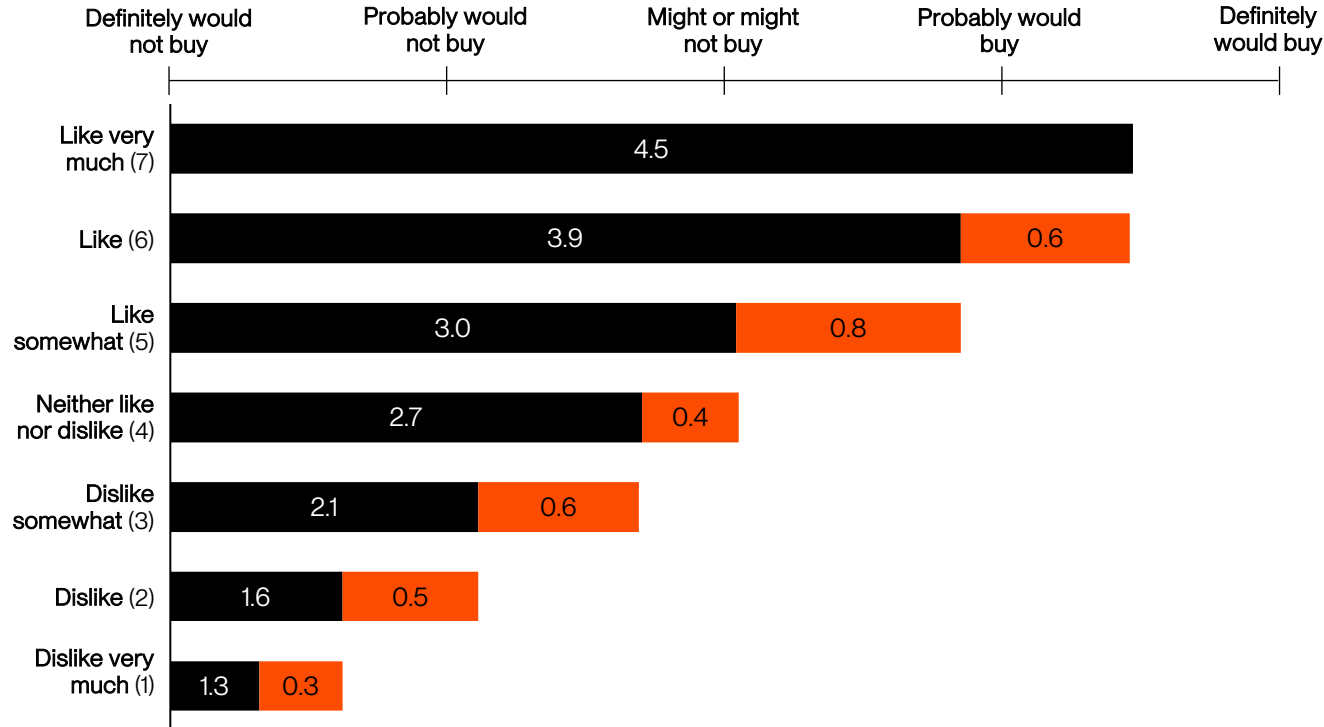
| | | | | |
|---|---|--|---|--|
| Product 404  | Product 413  | Product 431  | Product 449  | Product 457  |
| Product 464  | Product 470  | Product 482  | Product 499  | Product 492 Animal-based nugget  |

Nuggets: Translation from 'liking' to 'purchase intent'



Liking scores and average drop in purchase intent¹, Mean

Mean purchase intent²
Mean drop in purchase intent



Products should strive for ratings of 'like very much' or 'like'.

- Purchase intent (PI) falls very quickly when moving from 'Like very much' to 'Like somewhat'.

Ratings of 'like somewhat', 'neither like nor dislike', and 'dislike somewhat' have a strong association.

- All 3 tie to a purchase intent between and 'Probably would not buy' and 'Might or might not buy'.

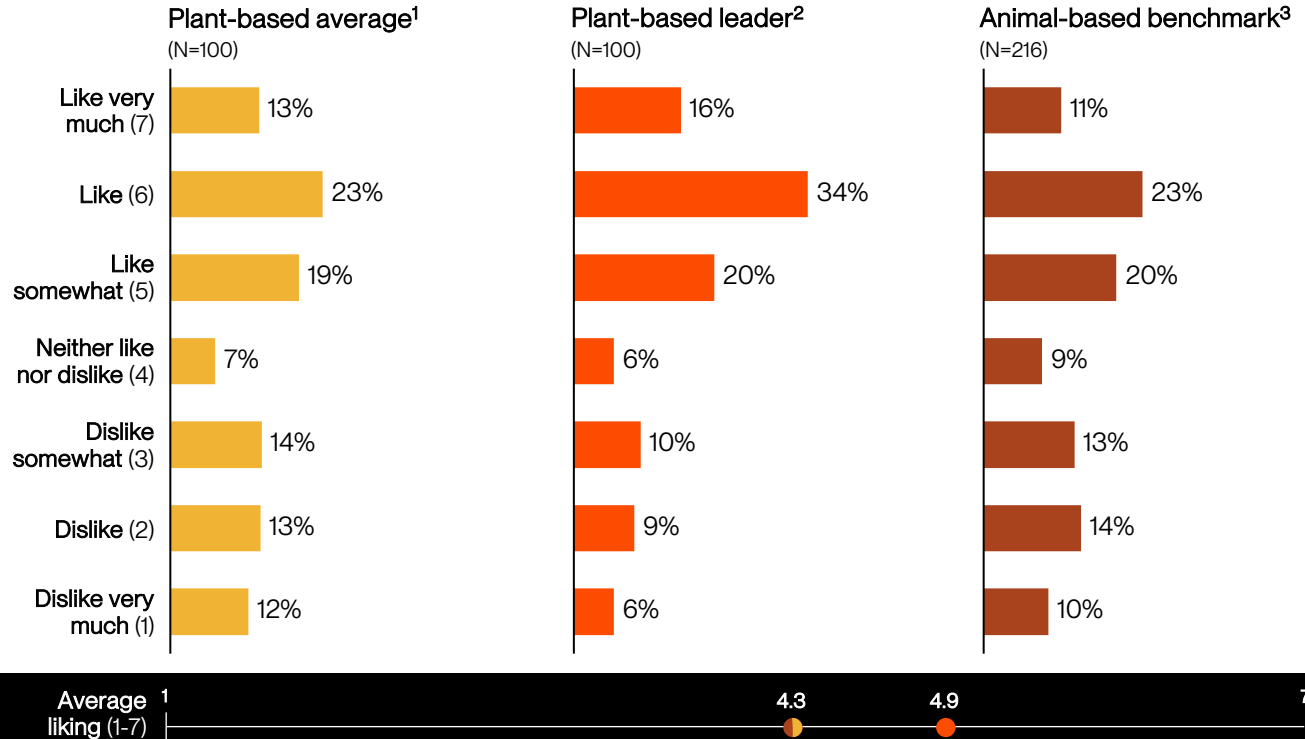
¹ Aggregated across 1,512 responses

² Calculated as the average purchase intent for all responses across all products (plant and animal-based) at each level of 'liking'

Nuggets: Satisfaction



Liking scores, % of participants



The average plant-based nugget has achieved parity with animal chicken nuggets.

- The distribution of 'liking' responses is very similar and both categories have the same average 'liking'.

The plant-based leader clearly outperforms the animal chicken nugget.

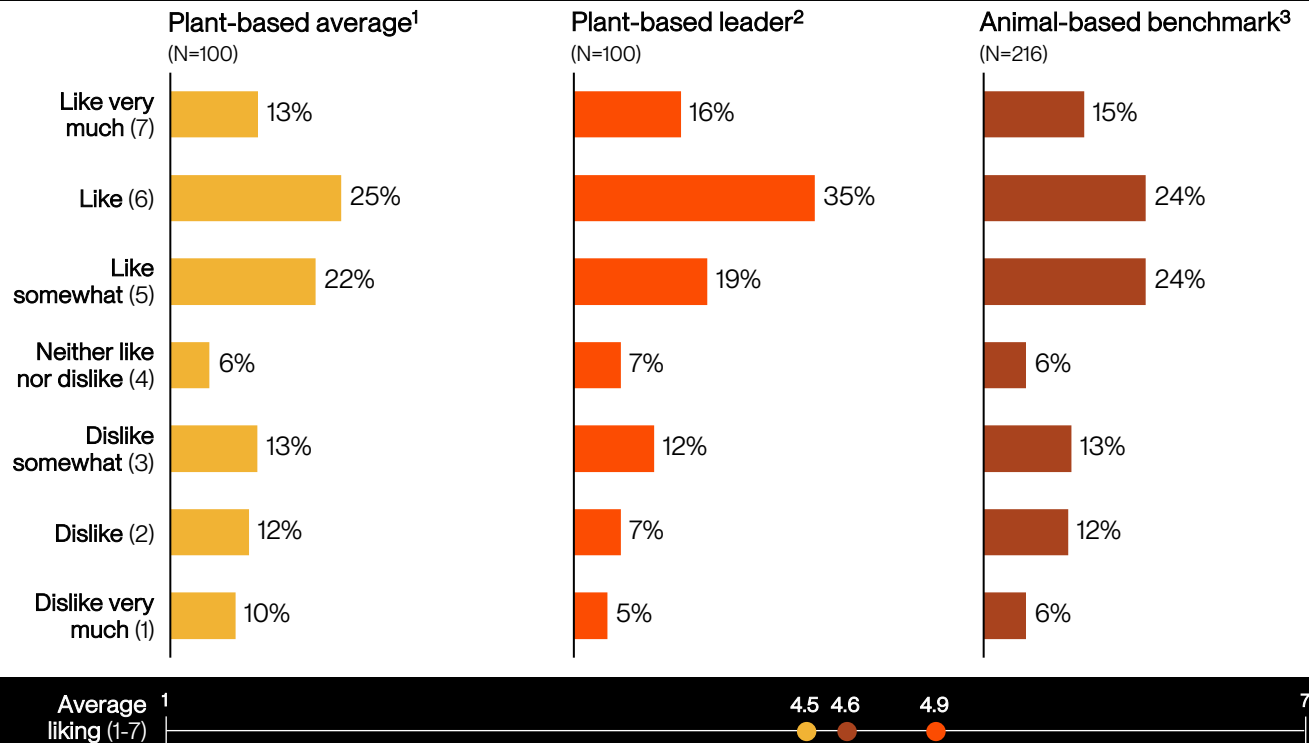
- The plant-based leader achieved was rated 'like very much' or 'like' about 50% more often.

1. Aggregated across 9 commercially plant-based available nugget brands
2. Top performing plant-based product amongst all 6 nuggets tested
3. Animal-based nugget available in retail

Nuggets: Flavor



Liking scores, % of participants



There is little differentiation on flavor in nuggets.

- All three categories were only separated by average 'liking' rating of 0.4pts.

Flavor is less likely to be disliked than texture.

- All three categories were relatively disliked less than they were on texture.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

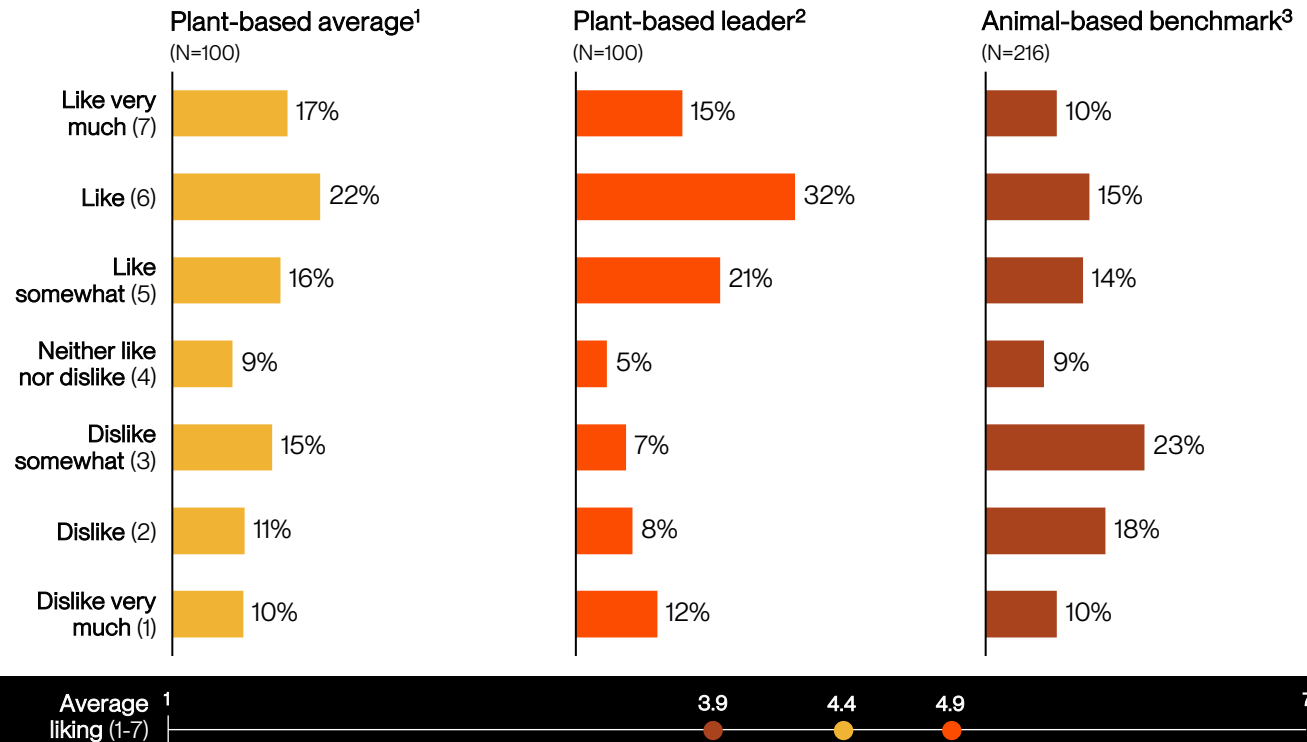
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Texture



Liking scores, % of participants



Plant-based nuggets differentiate themselves against animal nuggets on texture.

- Both the plant-based leader and average were rated significantly higher than the animal product.

Texture is the key weakness for the animal nugget.

- More than 50% of participants disliked the texture to some degree, 1.7x more than on flavor and 1.4x more than on appearance.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

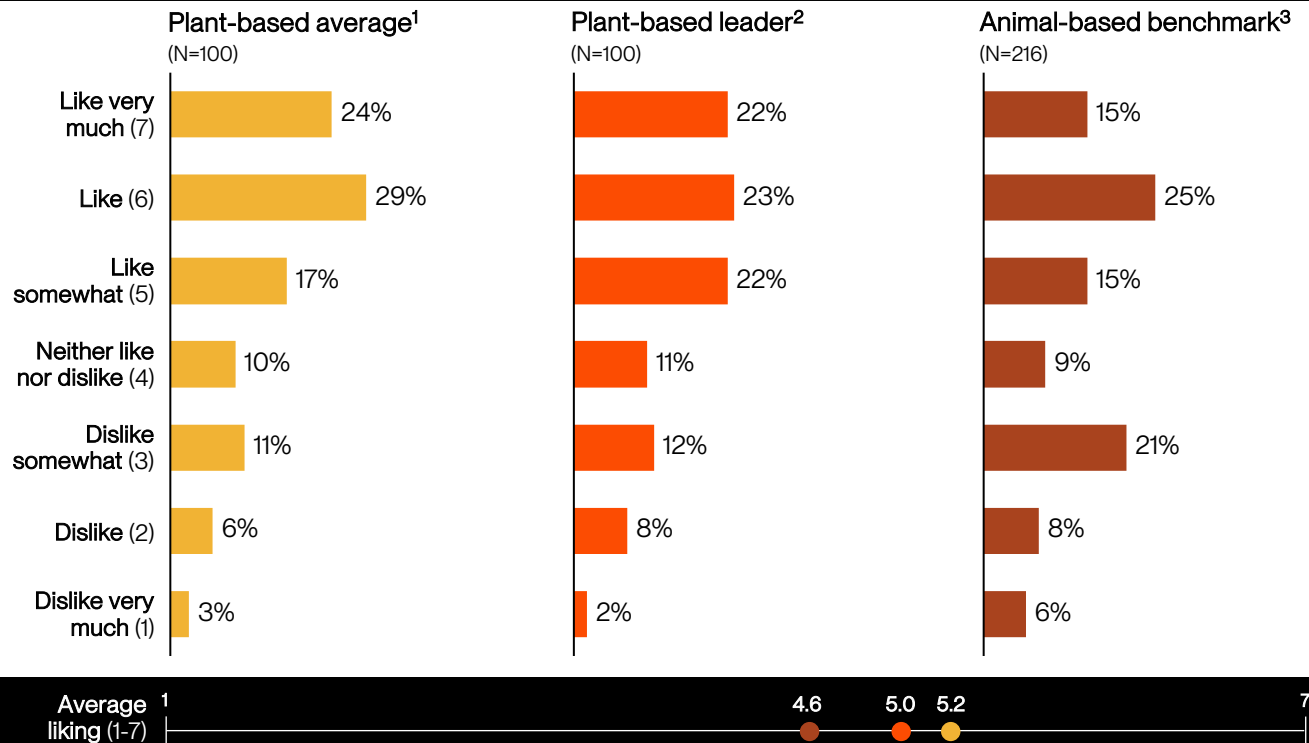
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Appearance



Liking scores, % of participants



Plant-based nuggets differentiate themselves against animal nuggets on appearance.

- Both the plant-based leader and average were rated significantly higher than the animal nugget.

The leading plant-based nugget has a relative weakness in appearance.

- It had a lower average liking than the average plant-based nugget despite outperforming on flavor and texture.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

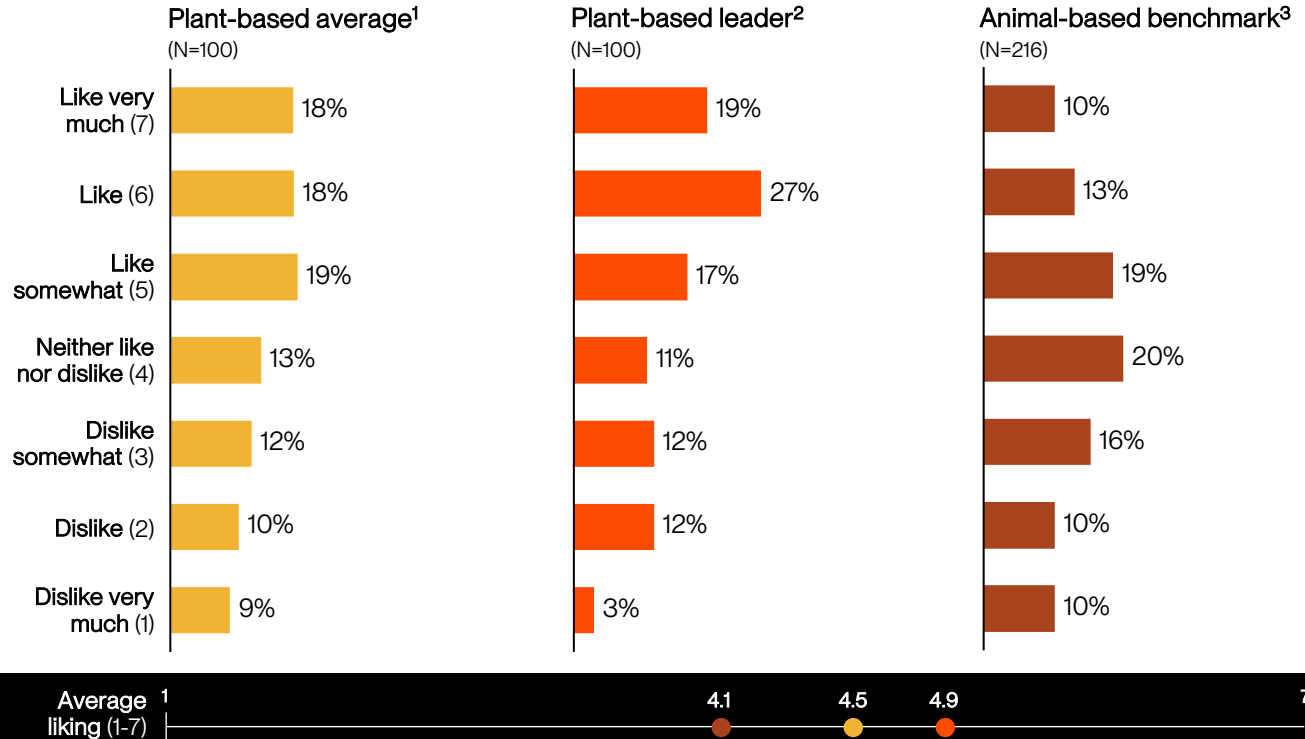
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Breeding flavor



Liking scores, % of participants



Plant-based nuggets differentiate themselves against animal nuggets on appearance.

- Both the plant-based leader and average were rated significantly than the animal product.

Plant-based brands can differentiate amongst each other on breeding flavor.

- Participants demonstrated a wide range of 'liking' ratings on breeding flavor for all categories, indicating the potential for different groups of consumer preference on breeding flavor.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

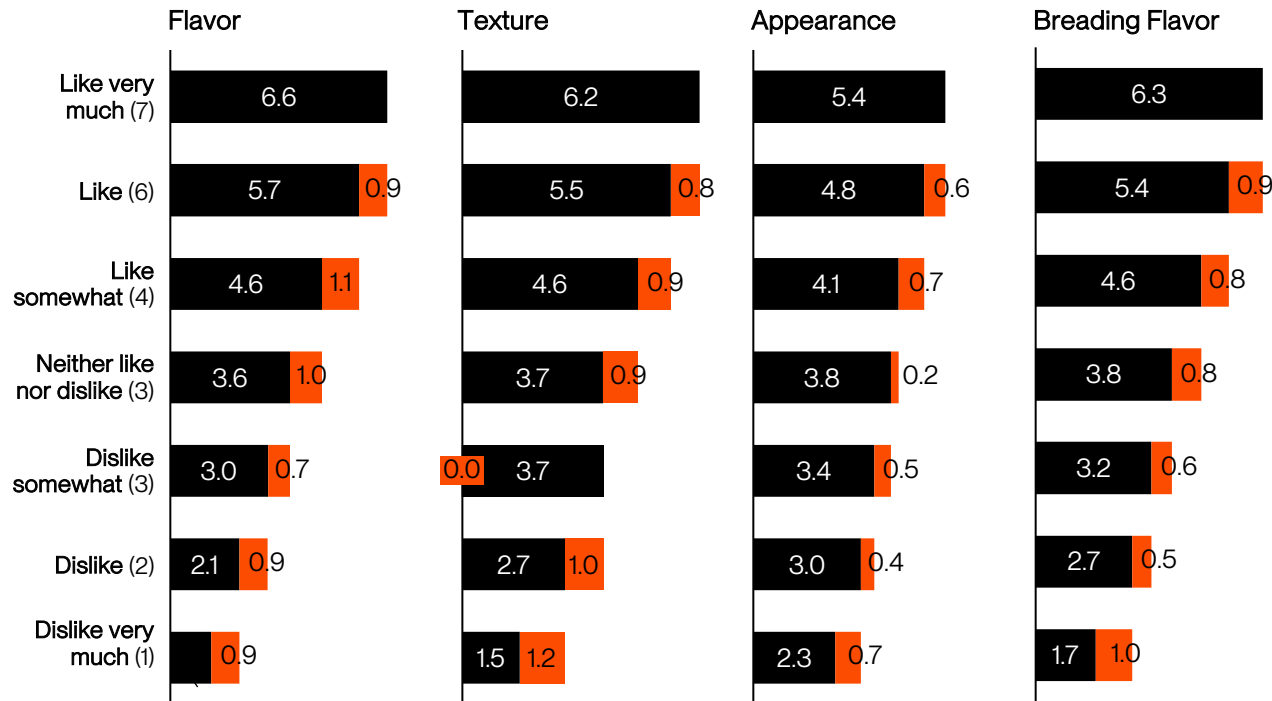
Nuggets: Importance of key sensory traits to overall satisfaction

Takeaways



Liking scores and average drop in liking¹, Mean

Mean liking²
Mean drop



Flavor is most critical to overall liking.

- A rating of 'like very much' was associated with higher general liking than for texture, appearance, or breeding flavor.

Appearance has smallest impact on overall liking.

- The range of general liking ratings for appearance is tighter than for flavor or texture.

1. Aggregated across 1,557 responses

2. Calculated as the average overall satisfaction for all responses across all products (plant and animal-based) at each level of "liking" for the sensory trait

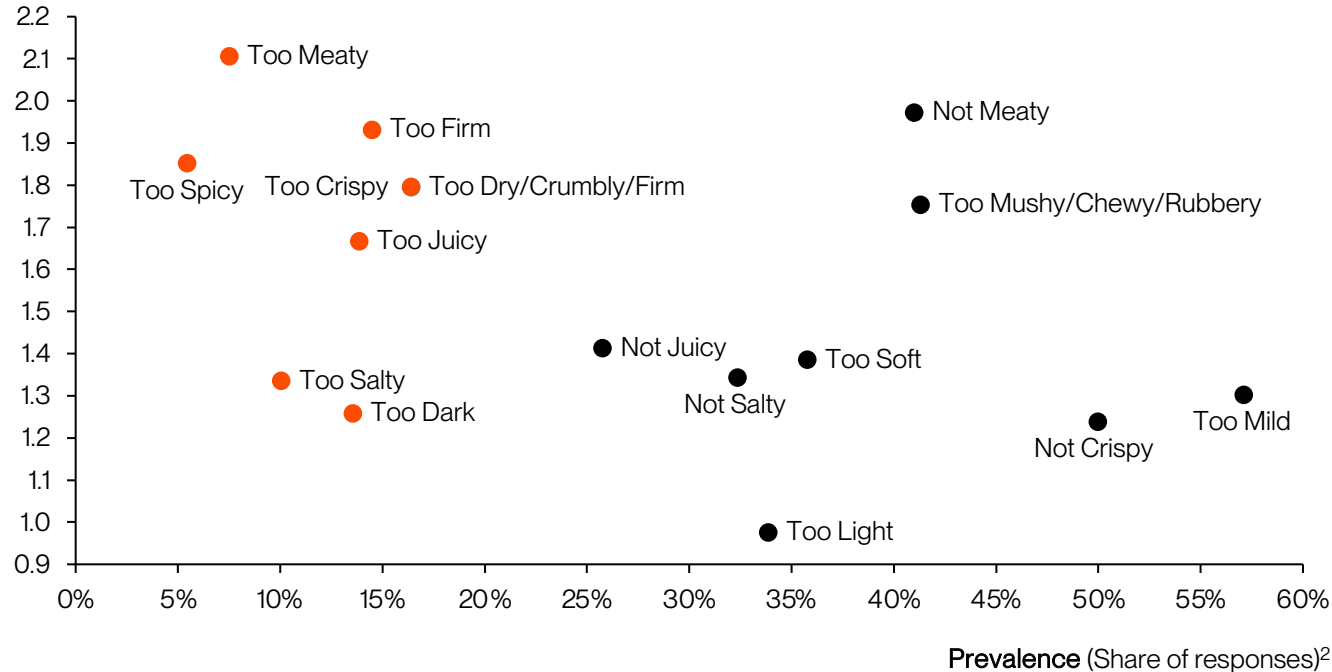
Nuggets: Impact of key sensory traits on liking



Penalty analysis, Mean drop and share of responses

- Above "Just About Right"
- Below "Just About Right"

Impact on liking (Mean drop)¹



Meatiness and consistency should be prioritized for product development.

- >40% of participants found the nuggets to be 'not meaty' or 'too mushy/rubbery/chewy', leading to between a 1.8-2pt average drop in 'general liking'.

Mild flavor or low crispiness were frequent but lower impact complaints

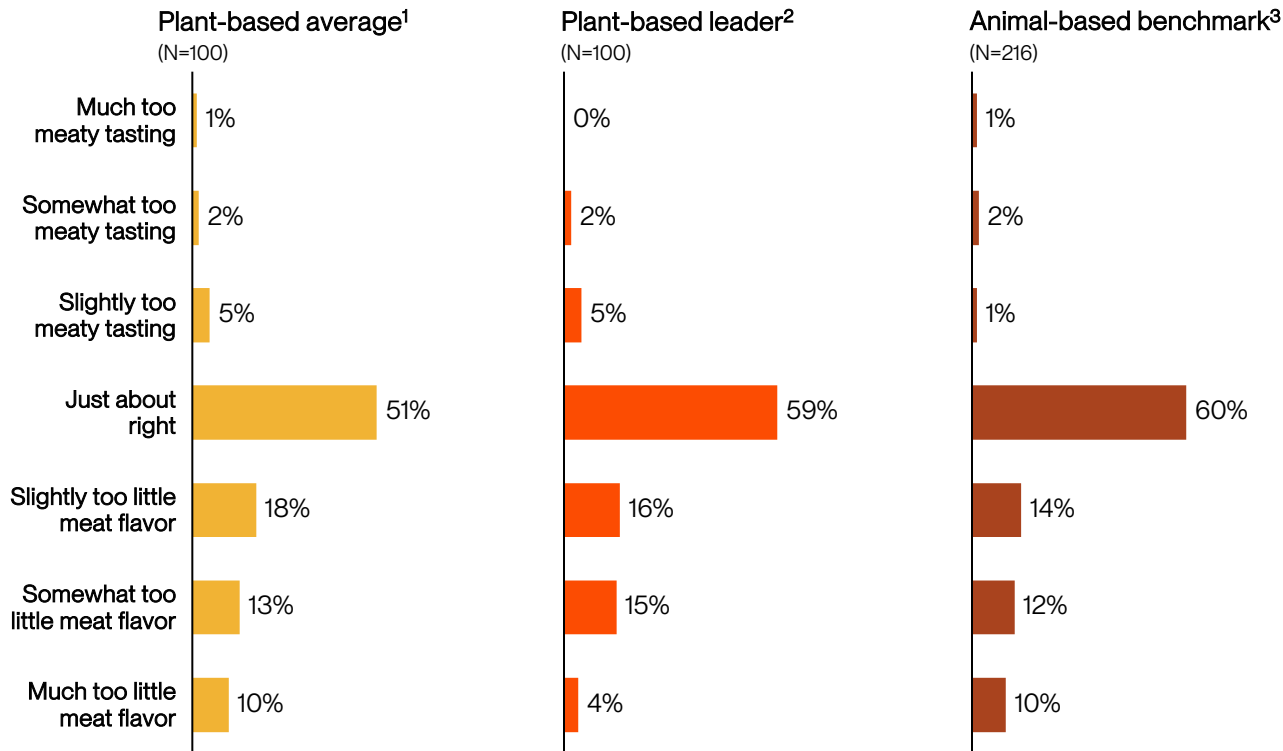
- Ratings of 'too mild' or 'not crispy' occurred >50% of the time and led to a 1.2-1.3pt average drop in 'general liking'.

¹ Calculated as the average drop in overall liking for products with the associated response
² Share of responses for all products (animal and plant) in each direction for each trait, across 1,557 responses

Nuggets: Meatiness



How would you rate the meatiness?, % of participants



Plant-based nuggets were far closer to achieving parity on meatiness than other categories.

- Just 10% more participants rated the animal nugget JAR than the plant-based average versus.

All nuggets should seek to achieve a meatier profile.

- 35-41% of participants rated the nuggets 'not meaty' enough to some degree versus just 4-8% who found them 'too meaty'.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

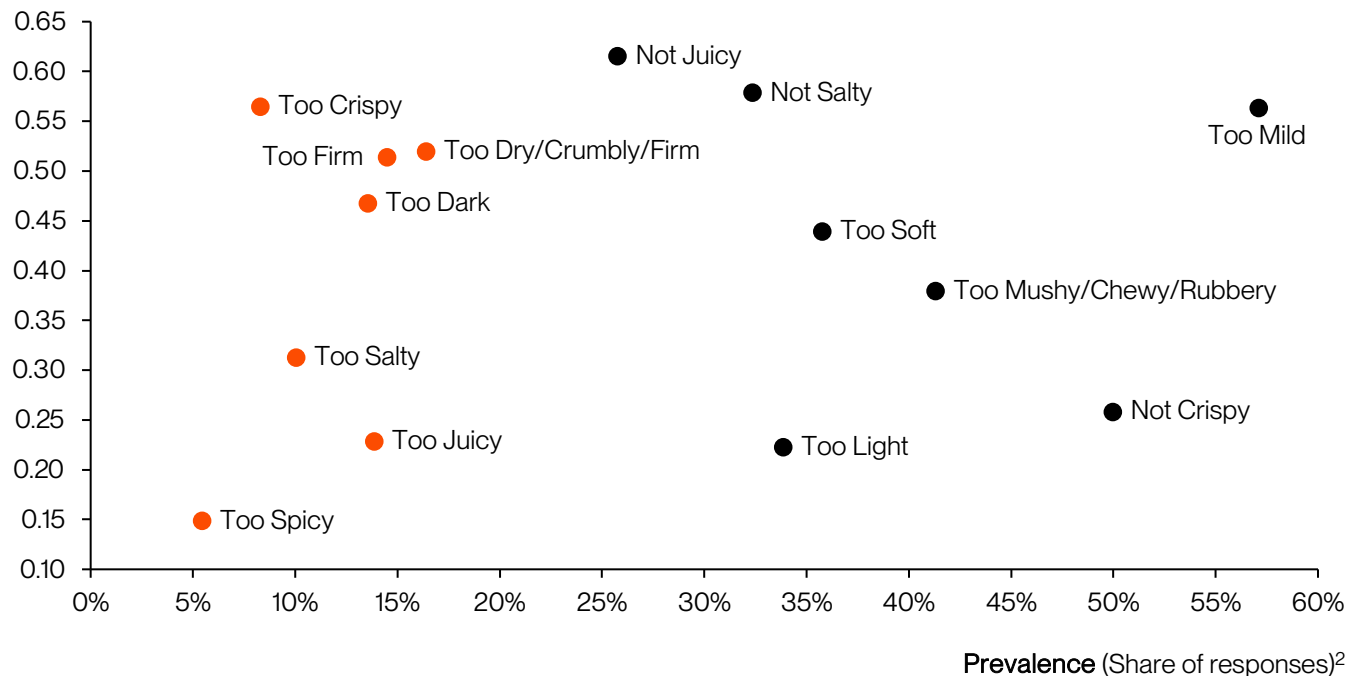
Nuggets: Impact of key sensory traits on meatiness



Penalty analysis, Mean drop and share of responses

- Above "Just About Right"
- Below "Just About Right"

Impact on liking (Mean drop)¹



Declines in meatiness were most strongly associated with a lack of juiciness, crispiness, and saltiness

- These attributes were tied to the largest average (0.55-0.65pts) and occurred frequently (25-60% of the time).

Low flavor intensity (mildness rather than spiciness) was the top opportunity

- Mildness was highly prevalent and associated with large declines in meatiness while being overly spicy had a limited impact on meatiness.

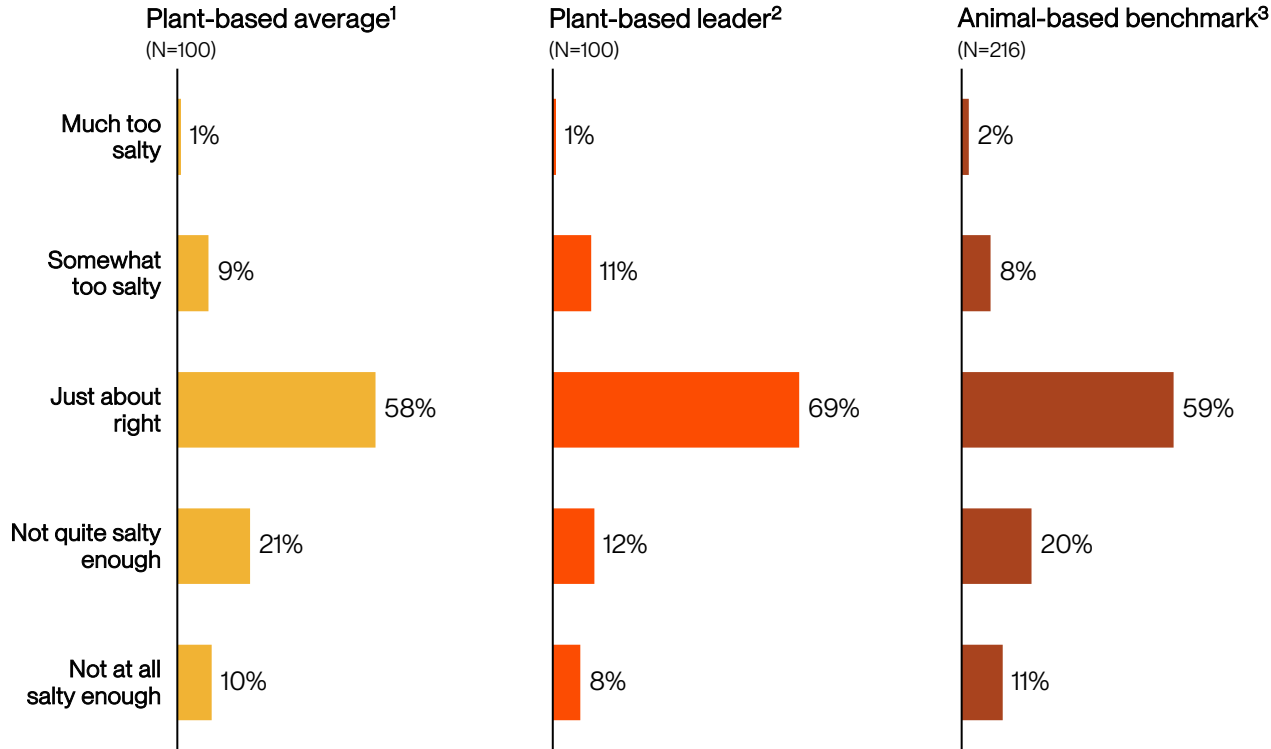
¹ Calculated as the average drop in overall liking for products with the associated response

² Share of responses for all products (animal and plant) in each direction for each trait, across 1,557 responses

Nuggets: Saltiness



How would you rate the saltiness?, % of participants



The plant-based leader differentiated itself on saltiness.

- 11% more participants rated the saltiness of the plant-based 'just about right' versus the plant-based average or animal nuggets.

The average plant-based nugget should be saltier.

- 3x more participants found them to be 'not salty enough' versus 'too salty'.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

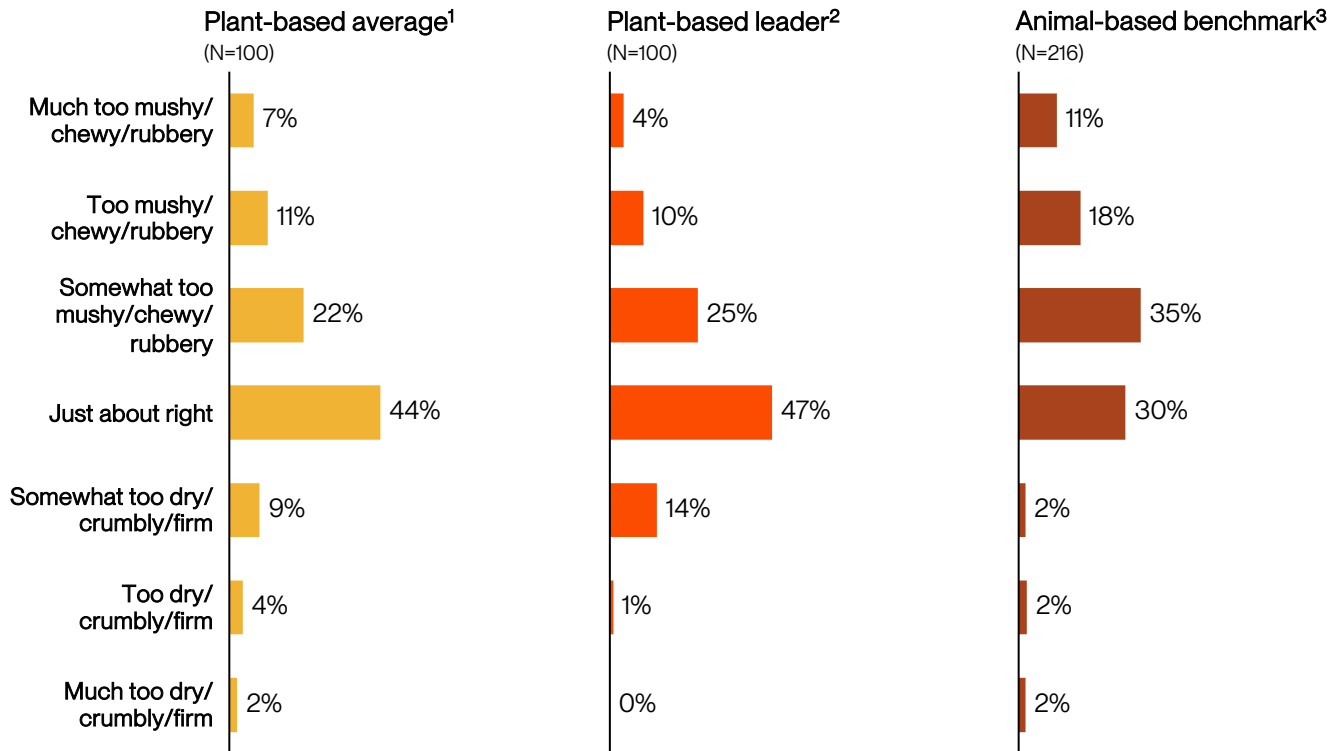
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Consistency



How would you describe the texture overall?, % of participants



All nuggets leaned towards being mushy/chewy/rubbery.

- Participants were far more likely to find the nuggets to be mushy/chewy/rubbery than they were to find them dry/crumbly/firm.

Plant-based nuggets are outperforming on consistency.

- 44-47% found them 'just about right' versus only 30% for animal nuggets.

Plant-based nuggets have an opportunity to further differentiate on consistency.

- Just 30% of participants rated the animal nuggets 'just about right'.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

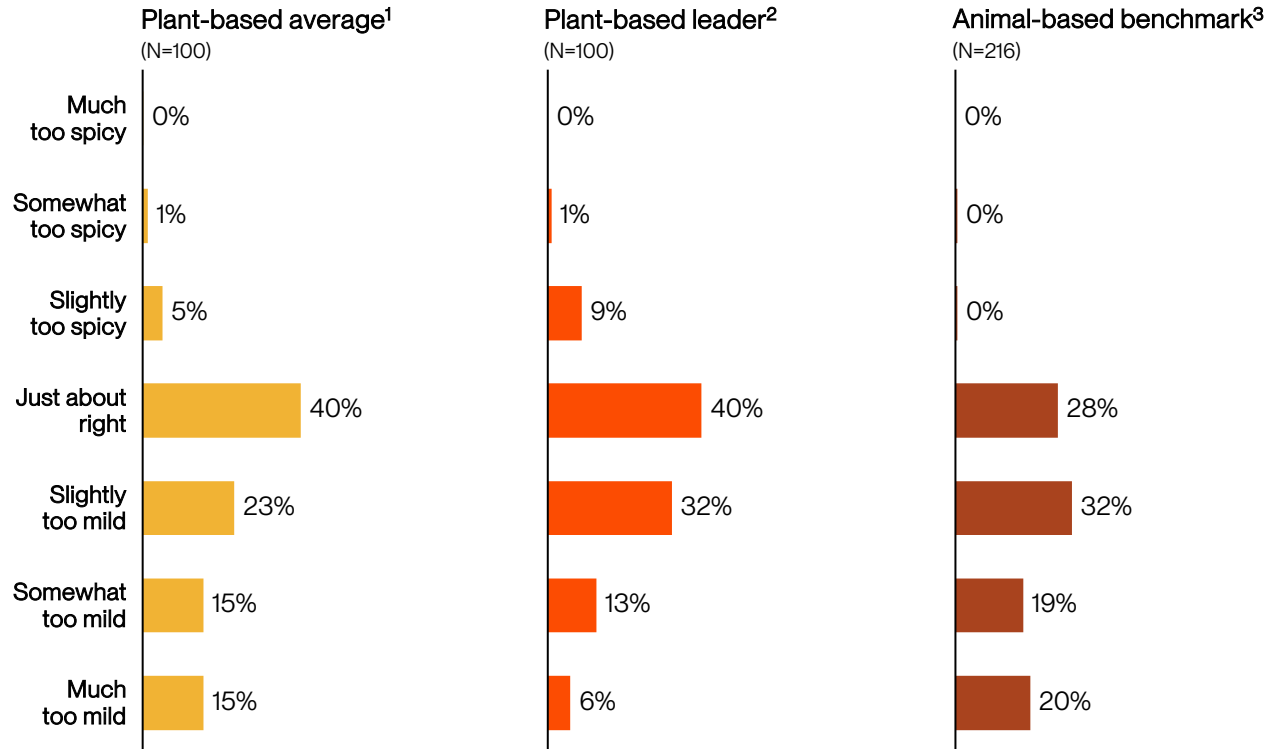
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Spiciness



How would you describe the spiciness?, % of participants



Nuggets were universally considered too mild.

- The animal nugget, plant-based leader and average were far more likely to be rated too mild than too spicy.

Spiciness was a clear weakness for the animal nuggets.

- Just 28% rated the spiciness as 'just about right'.

A significant portion of the market is looking for a spicier nugget.

- 50-70% of participants found the nuggets 'too mild'.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

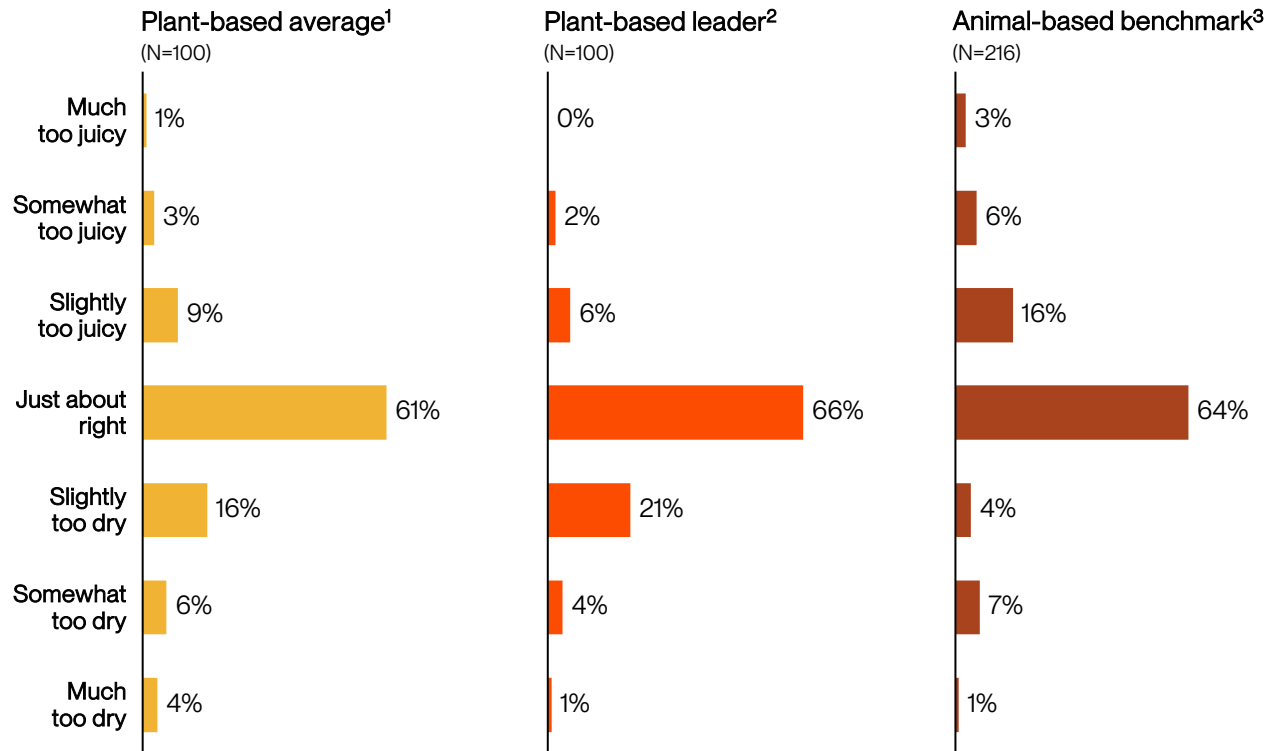
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Juiciness



How would you describe the juiciness?, % of participants



Animal and plant-based nuggets achieved similar overall performance on juiciness.

- All categories achieved 'just about right' scores by 61-66% from participants.

The plant-based nuggets should seek to increase juiciness.

- 2-3x more participants found them 'too dry' than 'too juicy'.

The animal-based nuggets are considered too juicy.

- 2x more participants found them 'too juicy' than 'too dry'.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

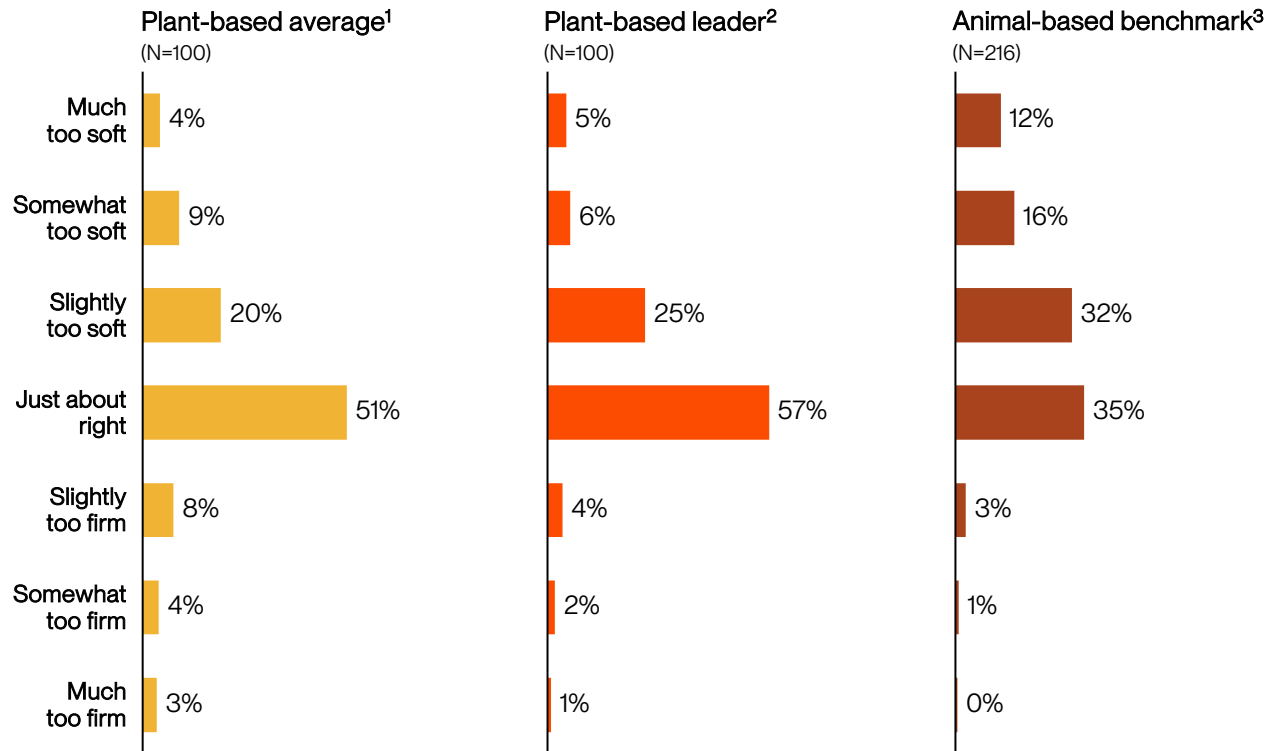
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Firmness



How would you describe the firmness?, % of participants



Plant-based nuggets have an opportunity to outperform animal nuggets on firmness.

- Just 35% of participants found the animal product to be 'just about right' with a strong lean towards being 'too soft'.

The plant-based leader should reduce its firmness.

- Participants were 2x as likely to find the nugget 'too soft' than they were to find it 'too firm'.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

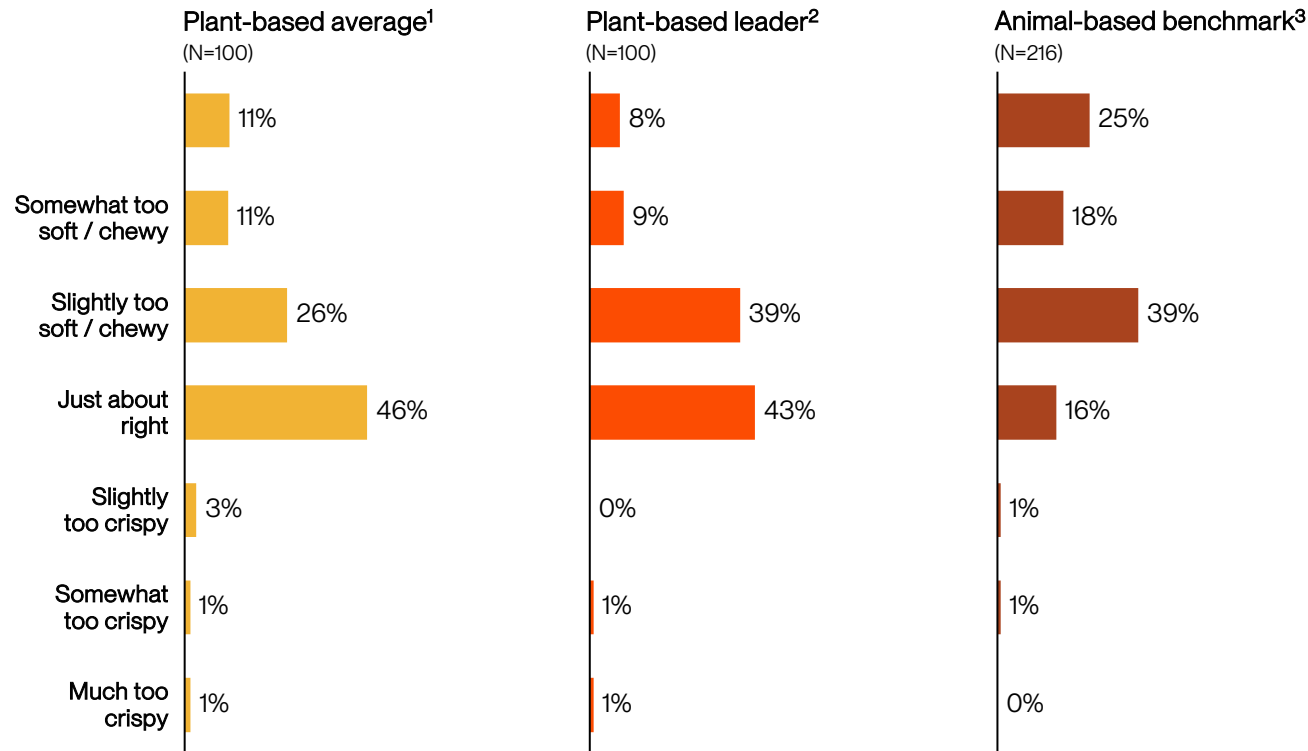
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Crispiness



How would you describe the crispiness?, % of participants



Nuggets were universally considered too soft / chewy.

- The animal nugget, plant-based leader and average were far more likely to be rated too soft / chewy rather than too crispy.

Plant-based nuggets are outperforming on crispiness.

- 46% found them 'just about right' versus only 16% for animal nuggets.

Crispiness was a clear weakness for the animal nuggets.

- Just 16% rated the crispiness as 'just about right', a lower share than on any other sensory attribute.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

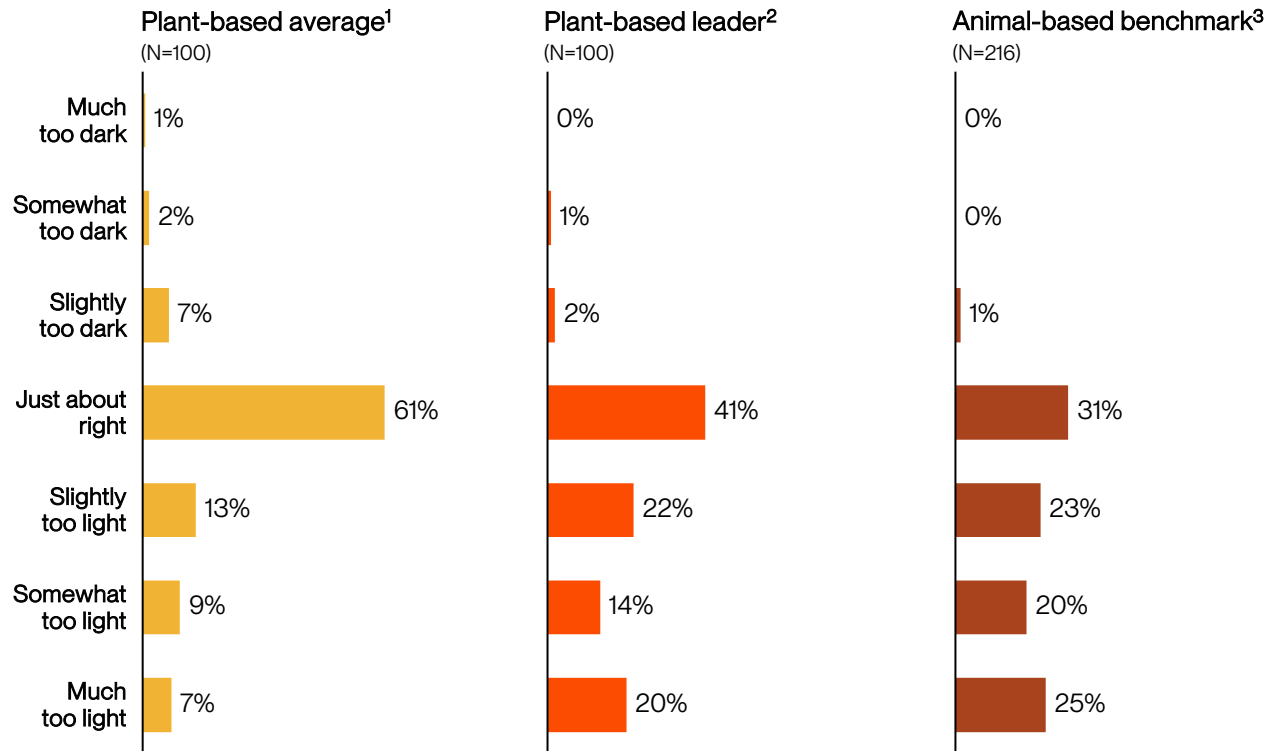
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Color



How would you describe the color?, % of participants



The plant-based leader and animal nugget should be darker.

- Just 31-41% found the color to be 'just about right' while 56-68% wanted the color to be darker.

The average plant-based nugget is outperforming on color.

- 61% of participants found the color to 'just about right' versus 41% for the plant leader and 31% for the animal nugget.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

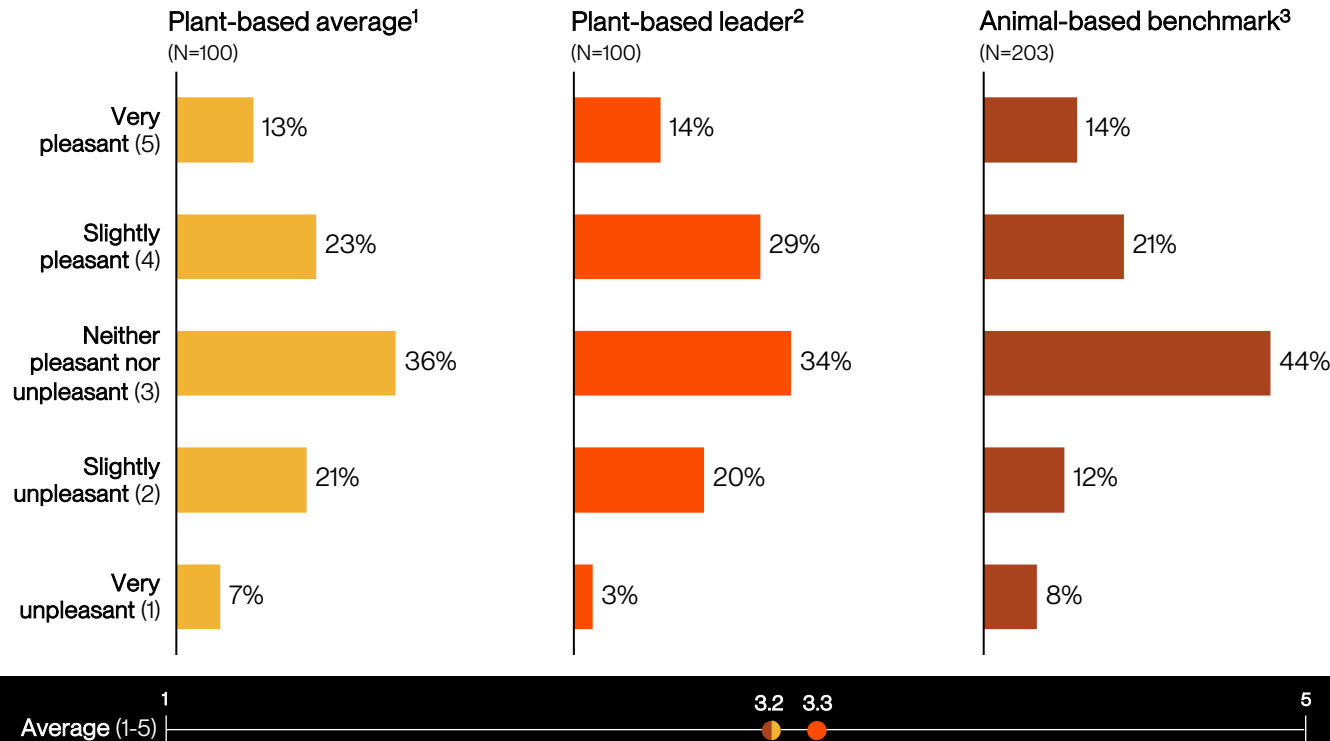
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Aftertaste



How would you describe the aftertaste?, % of participants



All nuggets performed similarly on aftertaste pleasantness.

- The distribution of responses on pleasantness was very similar across categories.

Participants were split on their impression of the aftertaste across categories.

- 25-43% found it pleasant while 20-28% found it unpleasant.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

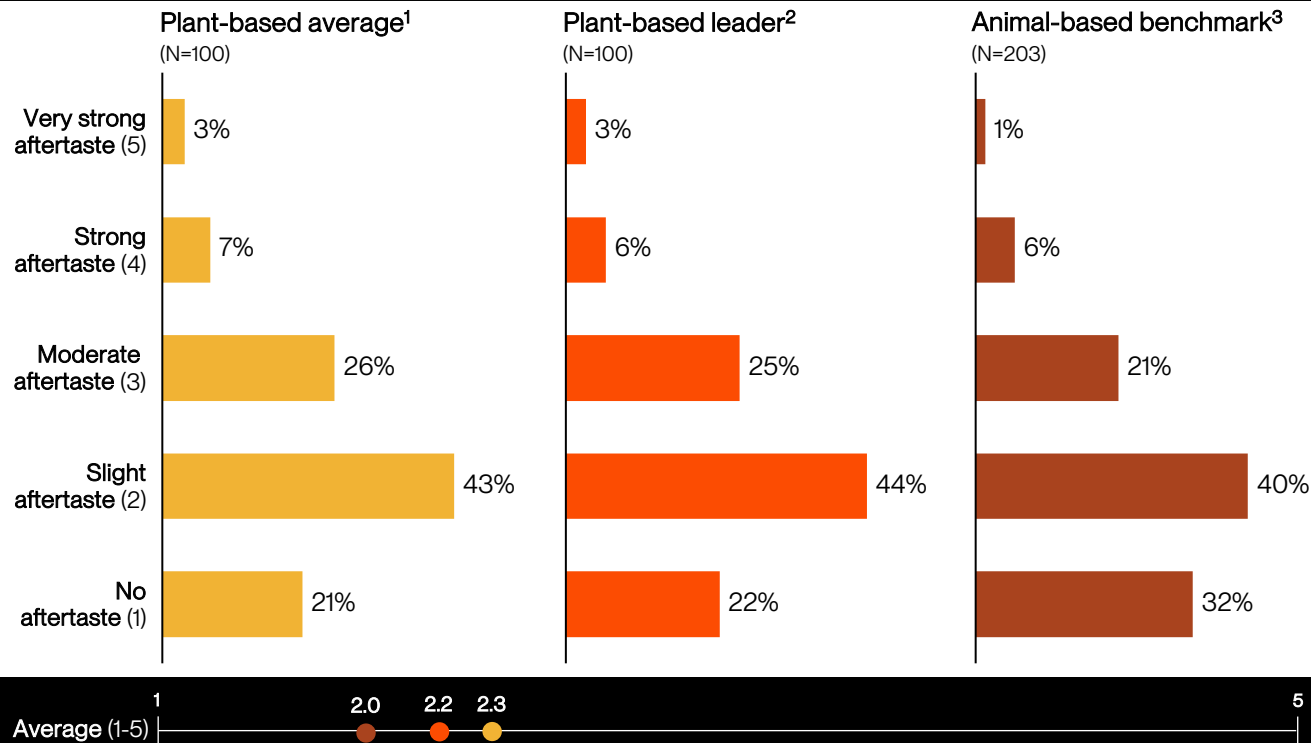
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Aftertaste



How would you describe the strength of the aftertaste?, % of participants



All nuggets performed similarly on aftertaste strength.

- The distribution of responses on pleasantness was very similar across categories.

All nuggets were considered to have a generally weaker aftertaste.

- 66-72% of participants rated the nuggets as having a 'slight aftertaste' or 'no aftertaste'.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

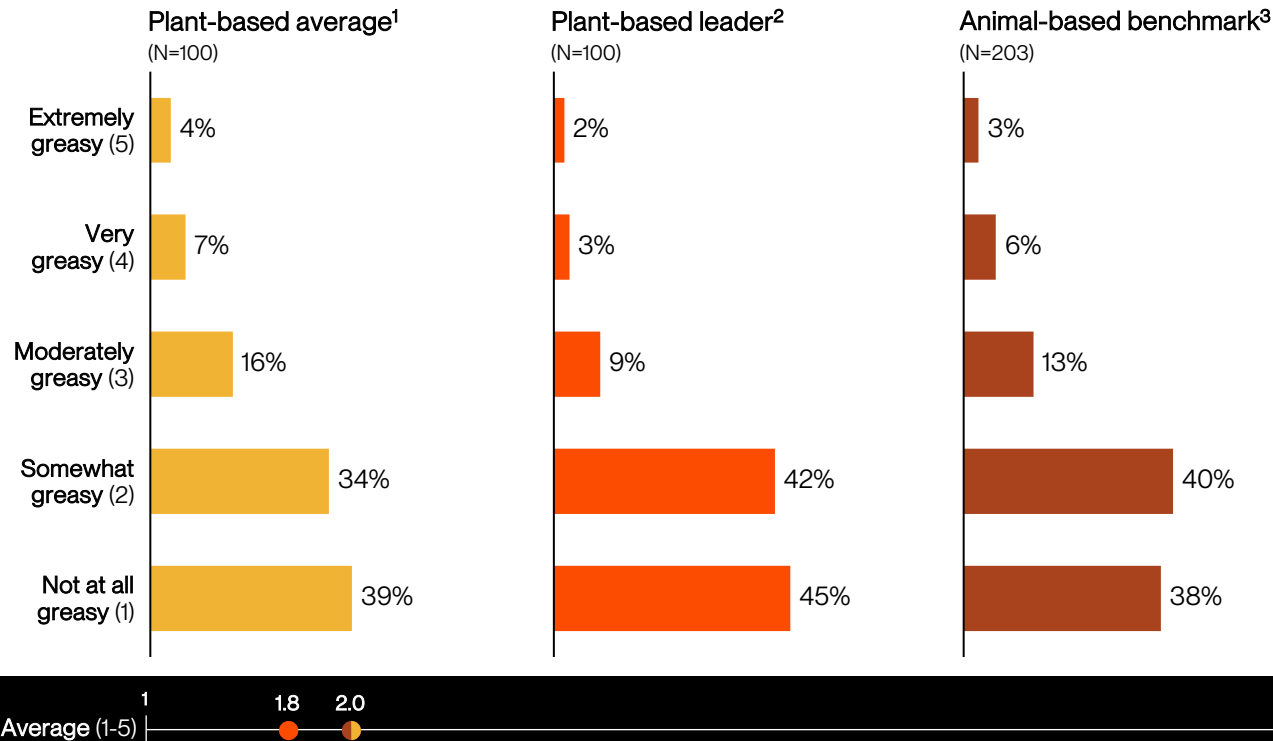
2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Nuggets: Greasiness



How would you describe the overall greasiness?, % of participants



All nuggets performed similarly on greasiness.

- The distribution of responses on greasiness was very similar across categories.

All nuggets were considered to have a generally low greasiness.

- 73-87% of participants rated the nuggets as 'somewhat greasy' or 'not at all greasy'.

1. Aggregated across 5 commercially available plant-based nugget brands plus one vegetarian nugget brand

2. Top performing plant-based product amongst all 6 nuggets tested

3. Animal-based nugget available in retail

Conclusions

Making Sense of the Present

Alternative protein products are in their infancy.

- **Despite the challenging cultural and media narratives about plant-based meat, we remain optimistic about the category's taste potential** – While this report concludes that the category averages of plant-based meat products in distribution do not consistently meet consumer expectations for taste, our story is one of promise as there are some category leaders with great-tasting products. We this data inspires product innovators to continue reaching new heights, identifies clear calls to action for stakeholders across the alternative protein value chain, and excites consumers with the knowledge that delicious products do exist even if they haven't yet achieved taste parity with animal-based products.

Taking Action for the Future

Actionable recommendations for a diversity of stakeholders.

- **Brands and manufacturers** – Use these insights for pre-competitive insights product improvement and new product development. Email NECTAR Director Caroline Cotto (caroline@nectar.org) about inclusion in future sensory panels.
- **Retailers and food service providers** – Use this sensory-data to make informed decisions for your retail sets and menu offerings. We'll be hosting an ongoing series of webinars at [Nectar.org](https://nectar.org).
- **Academics and researchers** – Collaborate with NECTAR on new research projects that answer category level questions utilizing our novel datasets.
- **Philanthropies and funders** – Reach out to discuss ways NECTAR can scale impact with additional support and to explore future projects of interest.
- **All eaters** – Sign up on [Nectar.org](https://nectar.org) to lend your tastebuds to upcoming NECTAR sensory panels and share what you've learned about great tasting plant-based products with the people in your life.



nectar.org

Disclaimer: The information in this report is proprietary to Food System Innovations and cannot be used, reproduced, or distributed without prior written consent.