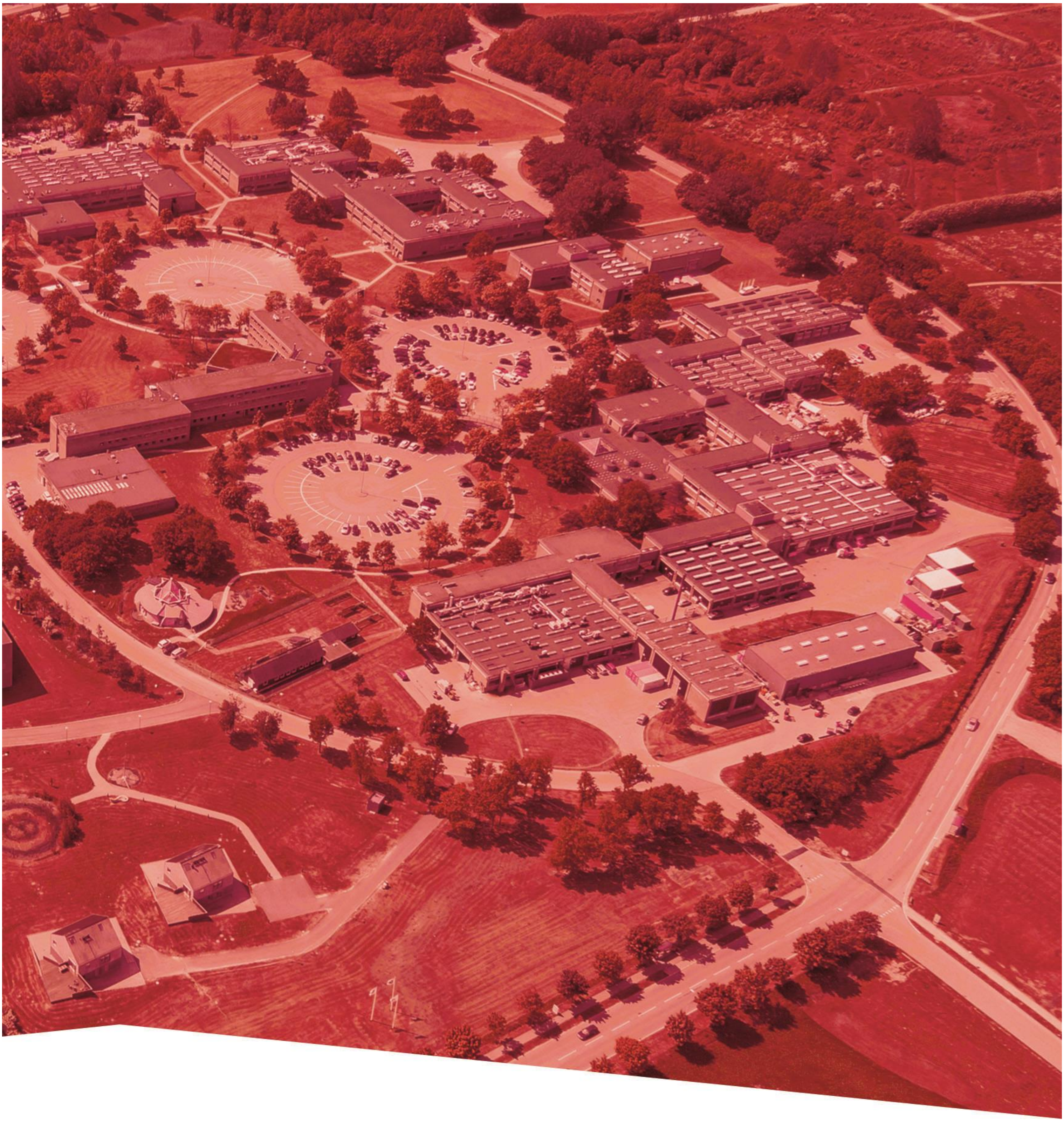

Online consumer survey of raw material choices for new plant-based foods

Food & Bio Cluster Denmark

Danmarks Erhvervsfremmebestyrelse

DANISH TECHNOLOGICAL INSTITUTE

Online consumer survey of raw material choices for new plant-based foods

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1. Executive summary

This report summarizes the findings of an online study focusing on consumers expectations and perception of plant-based products. The study was conducted by the Danish Technological Institute for Food & Bio Cluster Denmark and financed by 'Danmarks Erhvervsfremmebestyrelse'. The study included the responses from 498 convenience sampled consumers who responded to a series of questions related to plant-based foods such as which plant-based products they use, why they choose to include plant-based meals in their diet, their experiences with plant-based products, if there are any ingredients they do not want in a plant-based product and how they foresee the future of plant-based foods. Many interesting insights were brought forward including the following.
Overall, 70 % of the consumers who participated in an online consumer survey conducted by the Danish Technological Institute have experienced plant-based products which did not live up to their expectations. Particularly meat alternatives did not live up to the consumers expectations in terms of taste and texture.
Further, consumers reported, that they want innovative plant-based products rather than substitution products. They demand transparent ingredient lists, and products that are climate friendly, nutritious, produced using minimal processing. Furthermore, in terms of ingredients, the survey showed that consumers want plant-based products free from soy, palm oil and food additives.

2. Purpose

This study was performed to provide consumer insights to food producers in relation to consumers' expectations and perception of plant-based products, focusing on taste, raw materials, and processing. An online survey was performed with 498 convenience sampled consumers.

3. Definition of plant-based products

In this study, a plant-based product was defined as a plant-based alternative to a conventional product of animal origin, such as eggs, meat, and dairy. Meaning that basic products such as fruits and vegetables are not included in the definition.

4. Method

An online consumer survey was conducted to investigate consumer habits in relation to plant-based meals: which plant-based products they use, why they choose to include plant-based meals in their diet, their experiences with plant-based products, if there are any ingredients they do not want in a plant-based product and how they foresee the future of plant-based foods. In the following results section, the questions asked in the questionnaire as well as the responses from the participating consumers will be presented.

The consumer survey was conducted in the spring of 2022 and included 498 participants, 314 females and 179 males. The participants represented different age groups rather evenly between the age groups of 18–70-year-old (figure 1). The participants were convenience sampled and are thus not necessarily representative of the Danish Population.

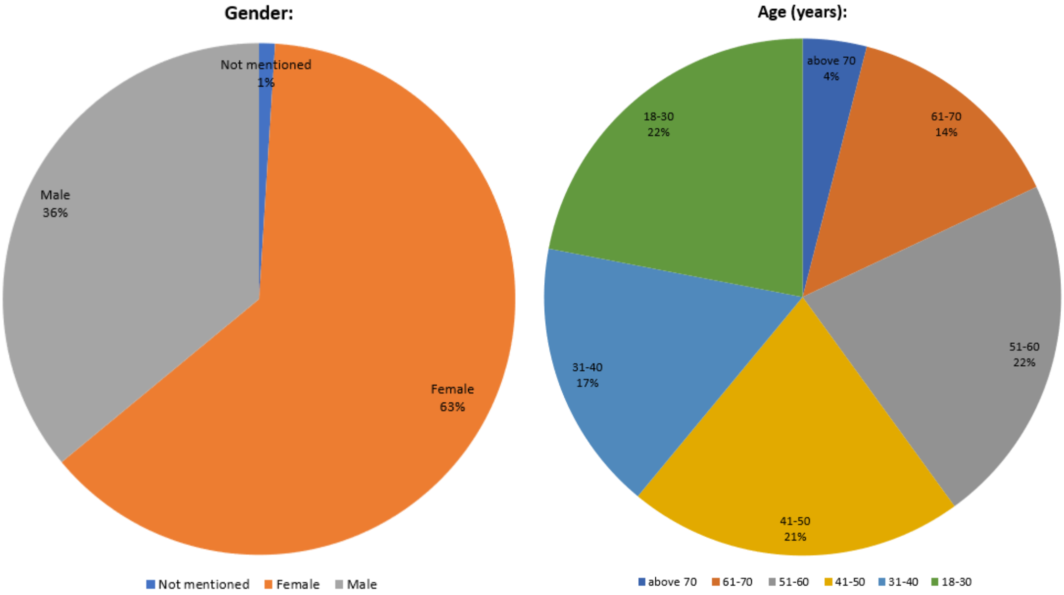

Figure 1: Gender- (L) and age (R) distribution in the online consumer survey in percent.

Further, to substantiate and put perspectives on the insights obtained in the online survey, market insights from Inova Market Insights were included in the report.

5. Results

Participating consumers choose plant-based products due to climate, environmental and health concerns

43 % of the consumers in the survey reported that they eat a fully plant-based evening meal at least once a week (figure 2). Consumers who indicated that they eat a fully plant-based evening meal at least once a month were followingly asked about their motivation to eat plant-based. Here, the consumers responded that their motivation is primarily based on climate and environmental concerns (51 %) followed by health concerns (45 %). The consumers also mentioned flavours, private economy, and animal welfare as driving motivations for eating plant-based meals (figure 3).

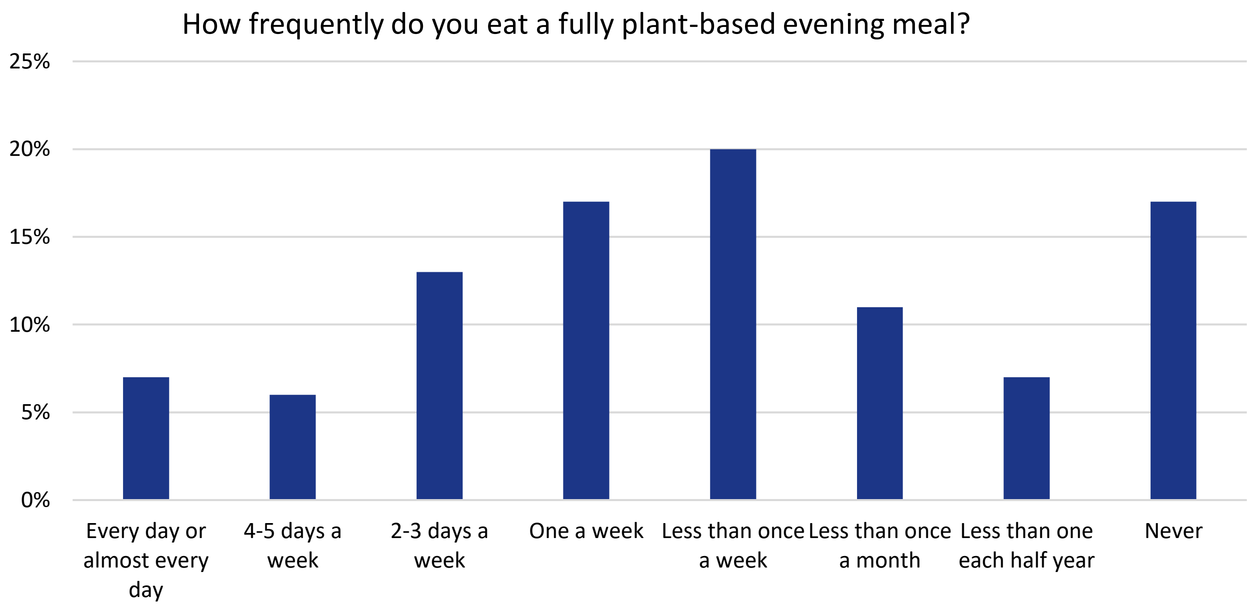

Figure 2: Distribution of consumers frequency of eating a fully plant-based evening meal (in percentages). N=498.

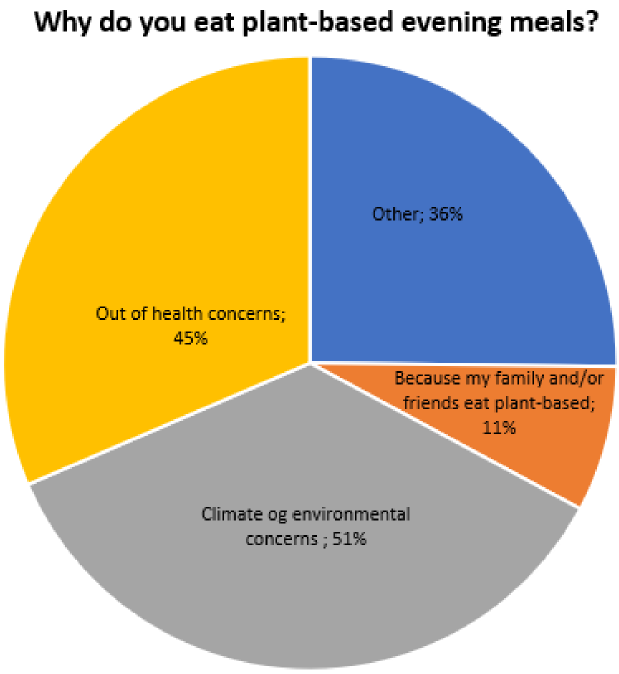

Figure 3: Consumers motivation for eating plant-based evening meals (in percentages). N=376.

The most consumed plant-based products by the consumers were plant-based meat, milk, and butter alternatives, followed by convenience products as seen in figure 4.

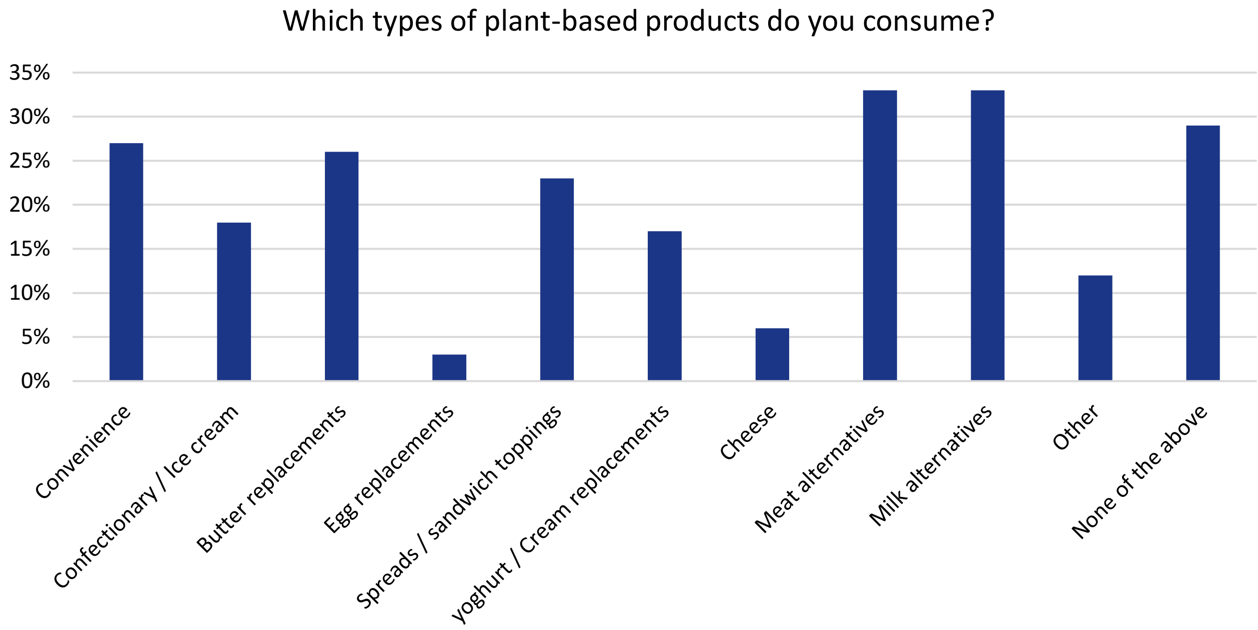

Figure 4: Distribution of plant-based products consumed by consumers. N=498.

47 % of the participating consumers would like to eat a more plant-based diet

Forty-seven percent of the participating consumers reported that they would like to eat a more plant-based diet (figure 5). Thirty-five percentage of these consumers followingly reported, that the main reason they do not, is due to unsatisfactory quality of the plant-based products available on the market. The consumers also mention high prices, limited selection, or unsatisfactory taste as reasons for not eating a more plant-based diet. Other reasons that the consumers commented in the option 'other' were lack of inspiration or knowledge to cook nice plant-based evening meals or that it seems time consuming to gain the knowledge to cook such meals. Nearly 20 % of consumers in the survey who want to eat more plant-based mention that they do not eat as plant-based as they want due to eating habits of their social circles (figure 6).

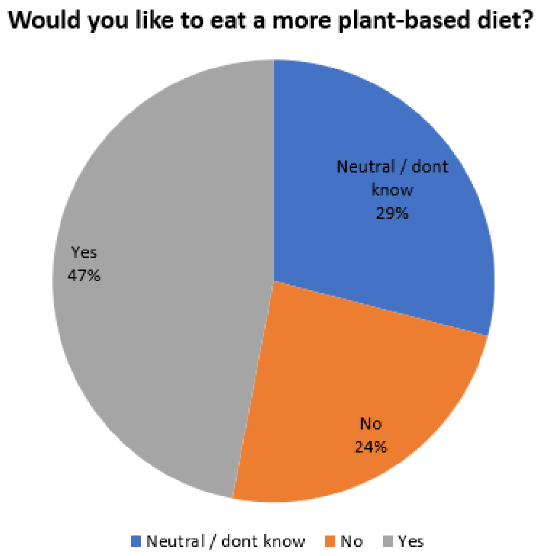

Figure 5: Distribution of consumers from the consumer survey who want to eat more plant-based in percentage, N=498.

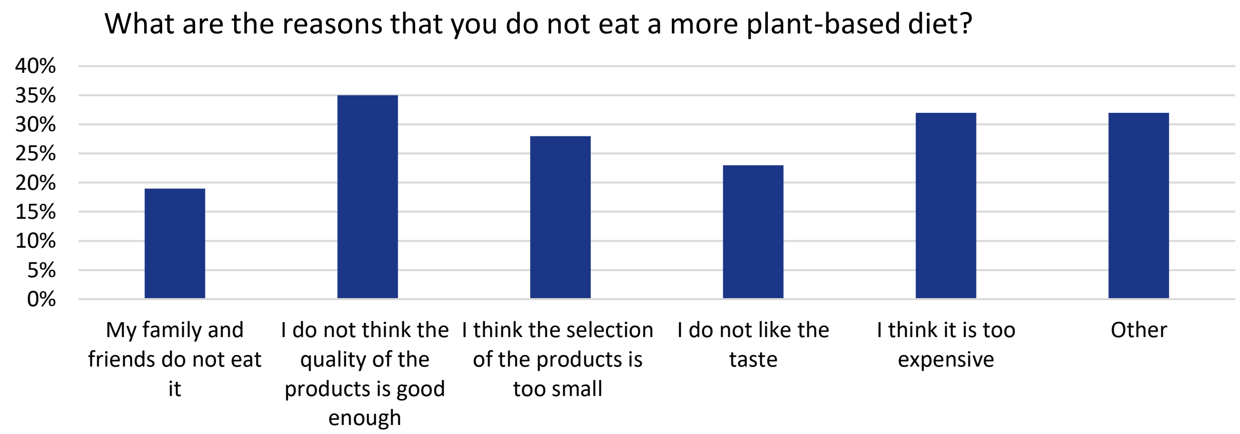

Figure 6: Reasons for not eating a more plant-based diet in percentage, N=235.

70 % of the participating consumers have experienced plant-based products that did not live up to their expectations – primarily due to taste and texture

All consumers in the survey were asked if they had encountered plant-based products that did not live up to their expectations. This was the case for about 70 % of the participating consumers (figure 7). Especially meat alternatives did not live up to the participating consumers expectations, as 72 % of the participating consumers reported that this product category did not meet their expectations, followed by plant-based cheese products and plant-based cold-cuts and spreads, which were mentioned by 35 % and 29 % of the participating consumers, respectively (figure 8).

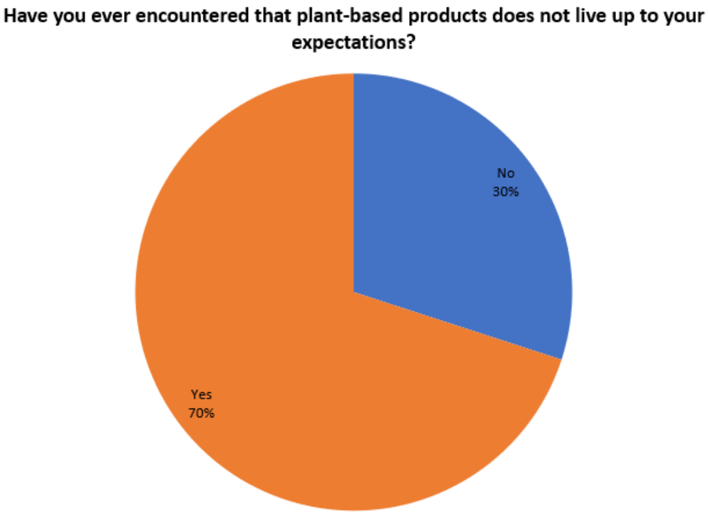

Figure 7: Distribution of consumers from the online survey who have encountered plant-based products that did not live up to their expectations, in percentage, N=498.

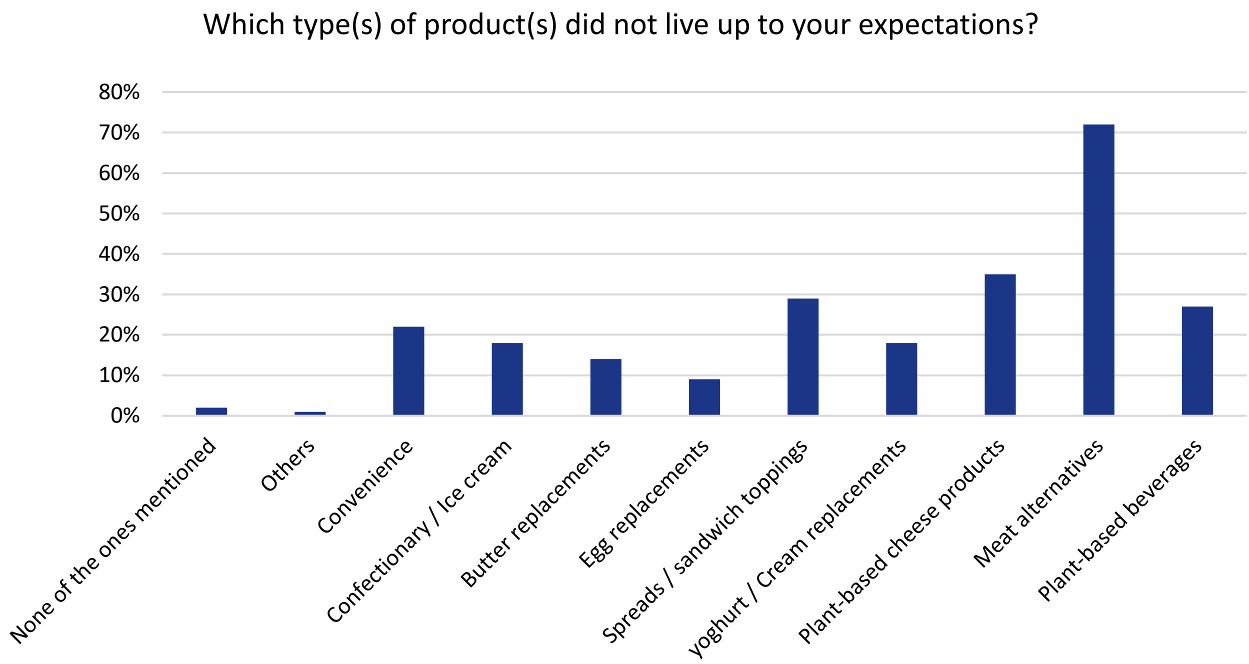

Figure 8 Consumer responses towards which plant-based products that did not live up to their expectations in percentage. The consumers had the option to select multiple products, N=347.

The primary parameters for consumers disappointment in plant-based products were taste and texture, and this was consistent throughout a variety of plant-based products (figure 9). As is shown in figure 9, price, aroma and appearance are causing disappointment to a lesser degree. Hence, there is great potential to improve taste and texture in plant-based products to increase consumer usage. When asked about the taste of the products, between 50 % and 81 % of consumers in the survey responded that they found the plant-based products to be “too tasteless” among the different plant-based product categories. This was also the result for plant-based cold-cuts and spreads which is depicted as an example in figure 10.

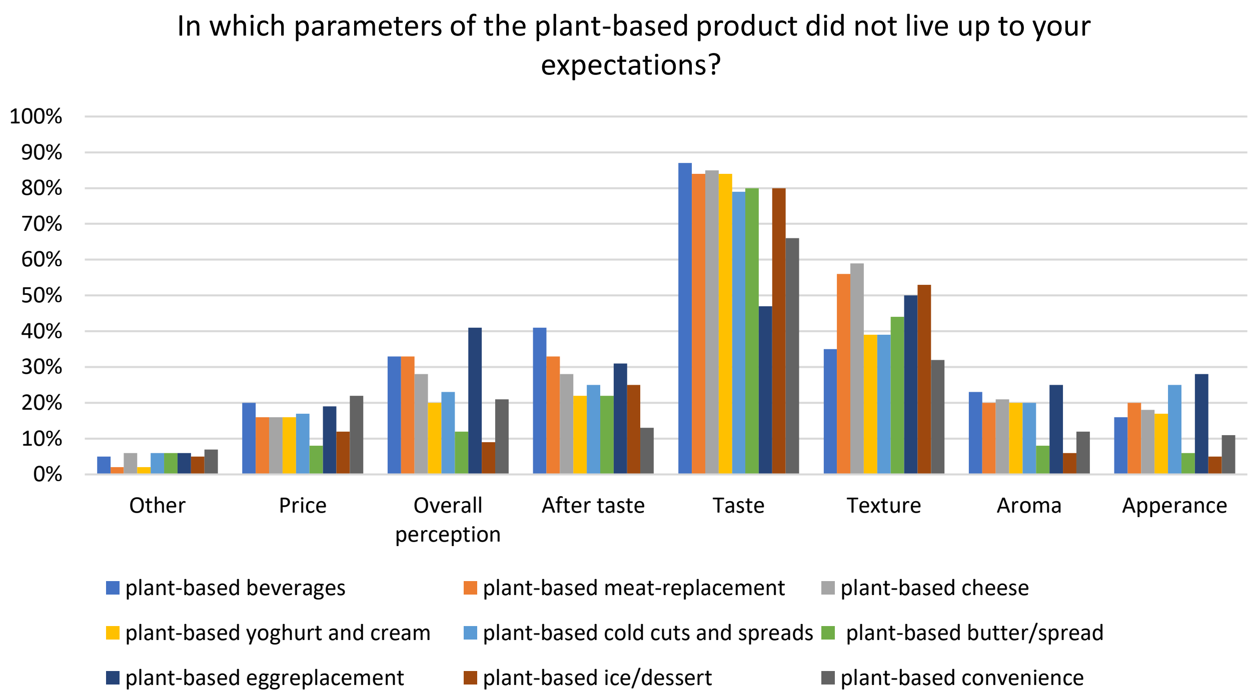

Figure 9: Consumer indications of parameters in plant-based products that did not live up to their expectations in percentage. Consumers had the option to choose multiple parameters.

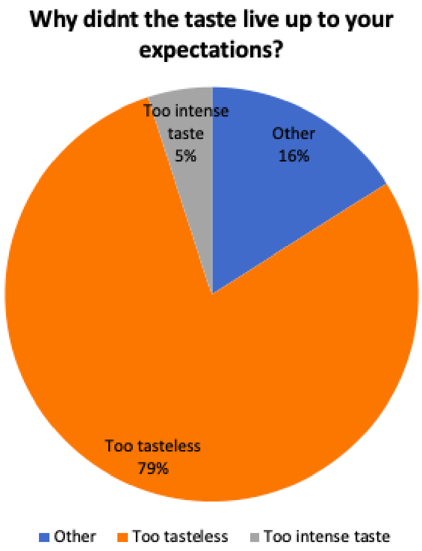

Figure 10: Consumer indications of why the taste of plant-based cold-cuts and spreads did not live up to their expectations in percentage. Results for other products showed the same tendencies, N=82.

Participating consumers did not want soy, palm oil and food additives in their plant-based products

Consumers who participated in the survey were also asked an open-ended question regarding which ingredients they did not want in their plant-based products. Many different responses were received, but the top three of the mentioned unwanted ingredients were soy and palm oil which were mentioned by 20 % of the consumers and food additives in general which were mentioned by 10 % of consumers. 10 % of consumers also mentioned cilantro as an unwanted ingredient, however this appears to be related to personal flavour disliking, whereas soy, palm oil and food additives were mentioned as problematic in relation to climate friendliness, sustainability, and a demand for “cleaner” food products.

We compared these consumer findings with the ingredients used in actual food launches from 2017 until 2021 international. According to the market data retrieved from the Innova Market Insights database on food product launches in this period, soy, pea, and wheat as protein sources in plant-based meat replacement products have been steadily increasing (figure 11). The consumers demand for soy free plant-based products thus does not appear to influence the number of product launches containing soy, however it appears that pea and wheat as protein sources are gaining more popularity in the newer plant-based products.

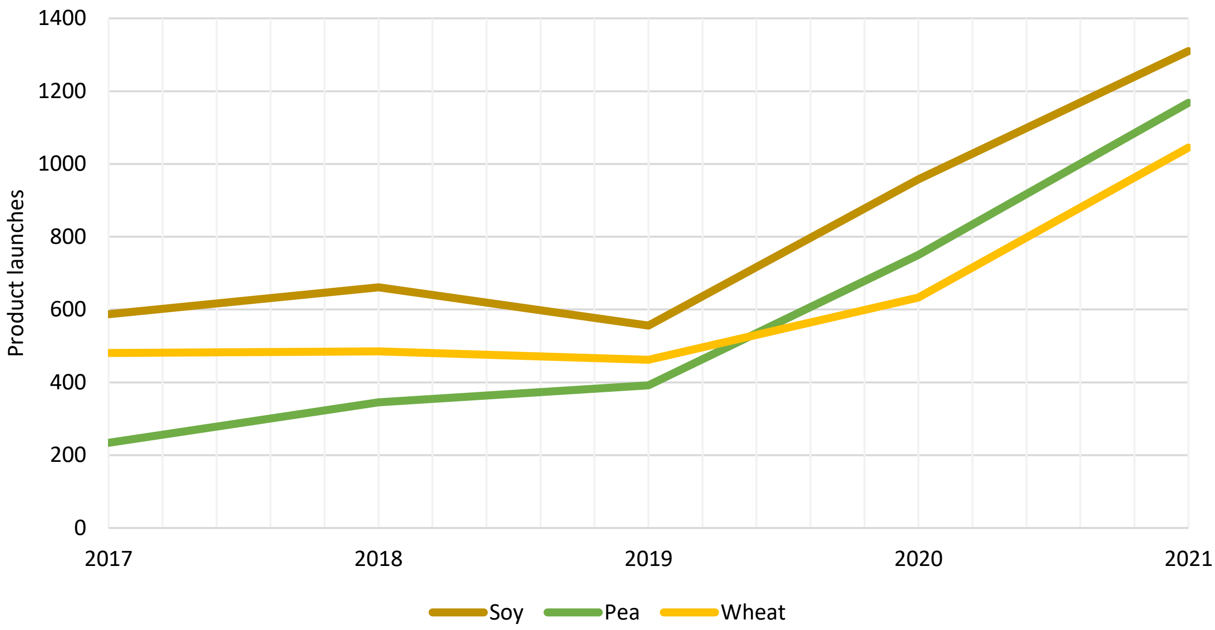

Figure 11: Product launches containing soy, pea, or wheat international in the period from 2017-2021. Data from Innova Market Insight.

In terms of palm oil, the use of palm oil in plant-based confectionary international has fluctuated between 12 % and 14 % in the past years. However, in 2022 there seems to be a drop to around 9 %. It should be noted that there is still time for this data to change, since 2022 is not completed, but this far it could appear that the market use of palm oil follows the consumer demands similar to the ones found in this online survey (figure 12).

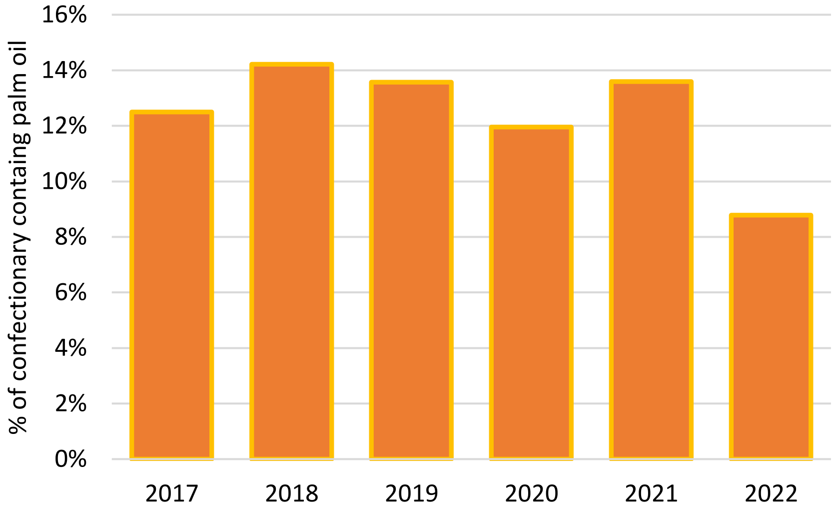

Figure 12: Plant-based confectionary containing palm oil international in percentage from 2017-2022. Data from Innova Market Insight.

Known ingredients, origin and proteins were most important for consumers

In the online survey, the participating consumers were also asked to rank the parameters in terms of what was most important for them, when choosing a plant-based product in the supermarket. The options they were asked to rate were short list of ingredients, fat content, protein content, amount of calories, ingredients I know and finally the country of origin of the ingredients.

Known ingredients and origin of ingredients were the parameters which were ranked as the most important by most of the participating consumers with respectively 27 % and 24 %. Ranked second most important for most consumers was protein content with 21 % (figure 13).

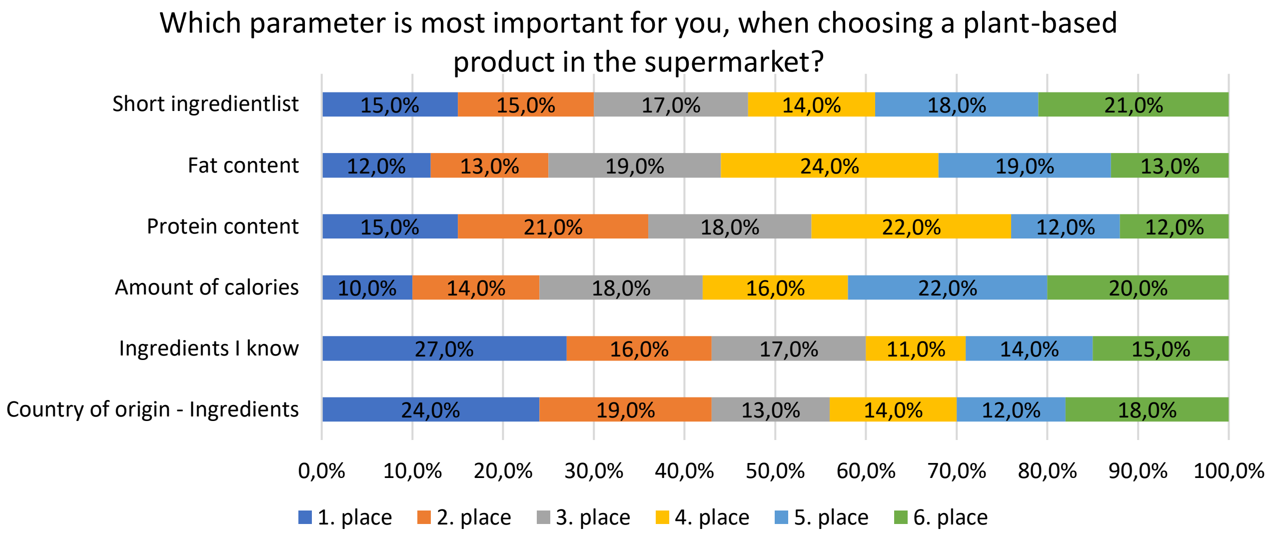

Figure 13 Consumers ranking of most important parameters when choosing a plant-based product in the supermarket in percentage, N=498.

The participating consumers had the option to further elaborate on their demands for plant-based products. Here a trend for more climate friendly products with locally produced raw materials was evident. Furthermore, the consumers demanded transparent ingredient lists and "natural" raw materials, and it was mentioned that they wanted plant-based products that are less processed. This demand is already being increasingly met by the market international, where "natural" claims on food products have been increasing steadily over the past years (figure 14).
Another tendency mentioned by the consumers was a demand for "healthier" plant-based products, especially in relation to nutrition. Consumers demanded more nutritional and healthier plant-based products with higher protein content. As of today, there is a tendency of lower protein content in plant-based meat alternatives international versus conventional meat products (figure 15).

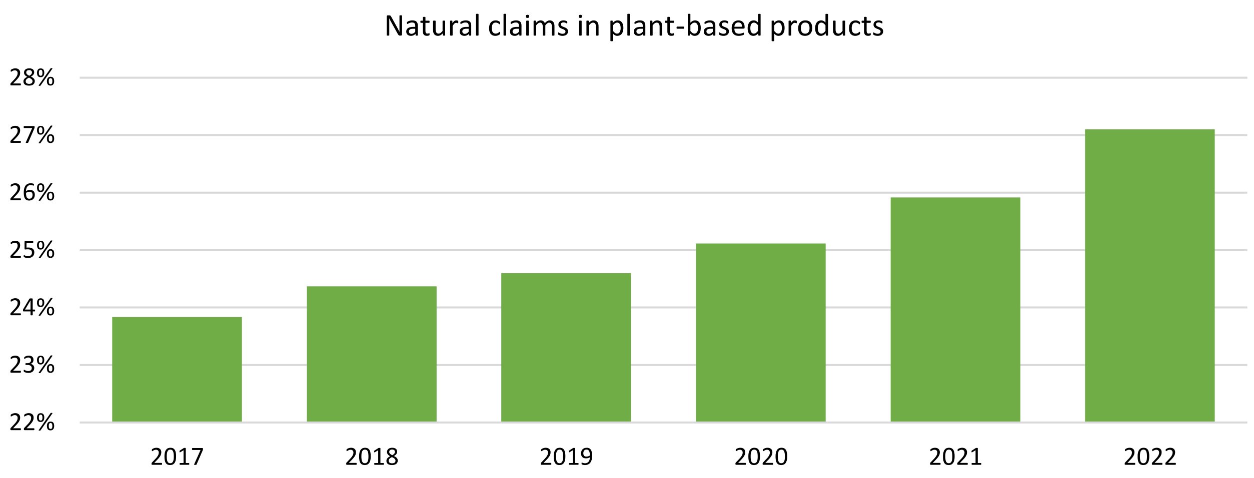

Figure 14 Change in "natural" claims in plant-based food products international in percentage from 2017-2022. Data from Innova Market Insight.

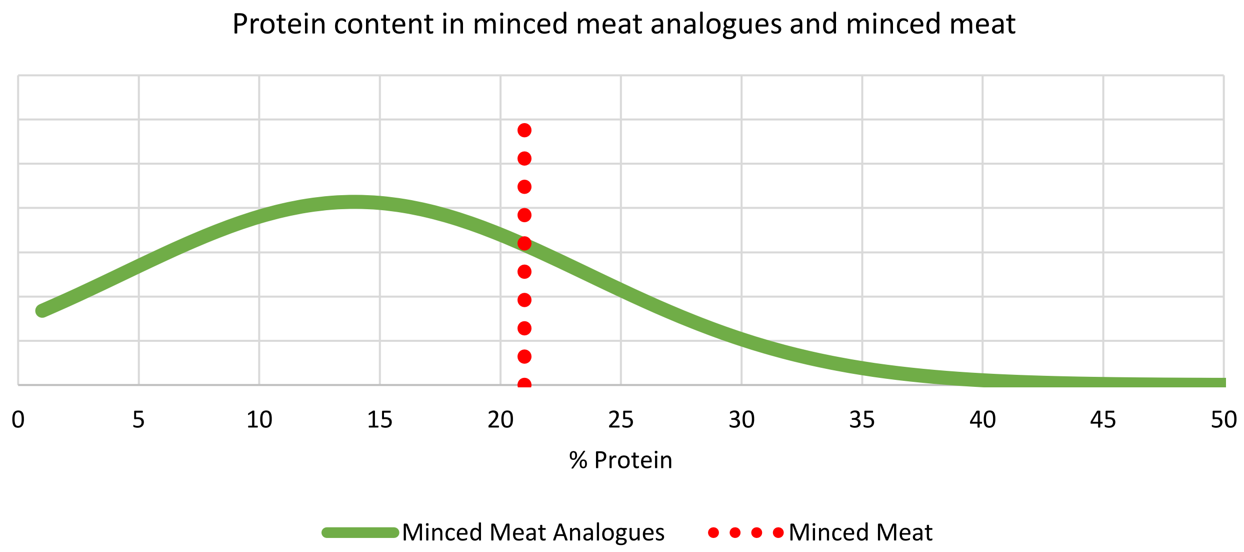

Figure 15 Protein content in percentage in minced meat analogues versus minced meat international. Data from Innova Market Insight.

The future of plant-based products according to the consumers

The consumers in the survey were asked to elaborate on their thoughts and wants for the future of plant-based products. Here, four tendencies were found:

1. Consumers want more flavour, taste, and better texture
2. Consumers want more products produced from "pure" ingredients and less processed products
3. Consumers want more nutritional better and healthier products
4. Consumers want innovative products rather than substitute products

The tendency that consumers want more innovative products can be related to the fact that 43 % of the participating consumers in the survey already eat a fully plant-based meal at least once a week. However, about 20 % of the consumers are interested in direct plant-based meat substitutes (figure 16). Almost 90 % of the consumers wanted products that can replace meat without it being a direct meat analogue.

Figure 16 Consumer indication of their attitude towards plant-based products in percentage. The consumers could answer more than one option, N=498.

6. Next steps for the plant-based food industry

Based on the results from the survey, consumers call for new innovative product types in the plant-based category. Aspects such as choice of ingredients and their origin needs to be explored, as well as climate footprint and the nutritional content and quality of the plant-based products.
There is a continuous need to focus on taste and texture improvements in all plant-based products, especially with focus on creating a more intense taste and flavour profiles for the products.
Consumers are interested in better plant-based meat substitution products but even more so in new innovative products, so how do we create "the new falafel", "semi-skimmed milk" or a new plant-based "pulled pork" product, that stands on its own without being a mock product, and that the Danes will integrate in their eating habits?

7. Conclusion

The consumers who participated in the study demand higher quality of plant-based products in relation to taste and texture, but also regarding a more ethical profile of the products. Here, sustainability, nutrition and transparency in the ingredient lists are on high demand. There is a need to go in new directions to produce innovative plant-based products that stand on their own but also to further develop and improve plant-based meat alternatives and other substitution products regarding taste and texture.

This report describes the results from an online consumer study with 489 convenience sampled consumers. The study is thus not necessarily representative of the general Danish population and additionally the number of participants is not large. However, the results seem to resonate well with already existing evidence in terms of other studies and market data research.

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