"Soylent Green 2.0?" A Qualitative Analysis of Online Comments on Cultivated Meat in Germany and the Netherlands

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Martina Felicitas BAUMANN,[1,2] Laurens LANDEWEERD[1] and Denise VAN BAALEN[1]

Abstract

Cultivated meat attracts growing attention not only in news media and among experts and investors but also in social media discussions and online newspaper comments. While not representative of the general public, such comments offer valuable insights into public attitudes, perceptions, and concerns. We analysed 491 German and Dutch online comments to explore perceived benefits, risks, and barriers to cultivated meat development. Many commenters expressed optimism about sustainability and animal welfare benefits, yet concerns about health risks, fairness, and unnaturalness were widespread. Overall, attitudes were predominantly negative and highly polarised. We identify several contributing factors: polarising media events, societal divides around sustainability and responsibility, distrust in institutions and industry, over-promising technological narratives, and the spread of misinformation. These findings underscore the need for transparent communication, inclusive dialogue, and more nuanced public debate on the societal implications of emerging food technologies.

[1] Radboud University Nijmegen, The Netherlands
[2] Institute for Technology Assessment and Systems Analysis, Karlsruhe Institute of Technology, Karlsruhe, Germany

Corresponding author: Martina Baumann, martina.baumann@kit.edu

Biographical notes

Dr. Martina Baumann's past and current research is about (emerging) technologies in the health and life sciences (limb prosthetics, genome editing, 3D-bioprinting and health and fitness tracking) and their ethical and socio-economic implications. Currently, she am focusing on ethical aspects and the public perception of cultivated meat as a postdoctoral researcher.

Laurens Landeweerd (dr. mult.) specialises in the philosophy of the life sciences, science communication, and ethics. His research focuses on the role of the genres of the imagination in creative communication of research and innovation. He applies his research to policy advice at both the national level in the Netherlands and the international level within the EU.

Denise v. Baalen (MSc Data Science/Science in Society) currently works as a data analyst to uncover meaningful trends and inform policymakers in the field of education.

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Introduction

Cultivated meat, also referred to as cultured, in-vitro, lab-grown or cell-based meat, is produced through the cultivation of animal cells in controlled environments, offering an alternative to traditional meat production (Post et al., 2020). With its potential to reduce environmental impact and address ethical concerns related to animal welfare, cultivated meat has gained substantial attention across scientific, industrial, and public domains (Kirsch et al., 2023; Xie et al., 2025). As a novel food technology, its success hinges not only on its technological and economic feasibility and regulatory approvals but also on public acceptance, which shapes both political decisions and market viability (Kirsch et al., 2023; Xie et al., 2025).

Social media and online news comment sections serve as dynamic spaces where individuals exchange information, express opinions, and shape attitudes toward emerging technologies (Specht et al., 2020). Online comments are valuable research material, as they influence readers' perceptions and contribute to the polarisation of risk perceptions (Anderson et al., 2014). Although not representative of the public, they reveal key themes and concerns surrounding technologies. Compared to surveys, online discourse analysis offers a rapid and low-cost snapshot of public opinion, with reduced researcher bias (Laestadius 2015). In the case of cultivated meat, social media users tend to be somewhat more negative and concerned than survey respondents (Ryynänen & Toivanen, 2023), but both voice similar issues, such as safety and unnaturalness (Liu et al., 2021; Chen & Zhang, 2022).

Research across countries has identified recurring acceptance factors: concerns about health risks and unnaturalness, perceived personal and societal benefits, and demographic patterns such as more openness among younger generations (Bryant and Barnett, 2020; Siegrist and Hartmann, 2020; Szejda et al., 2021). Social and informational factors, such as who else supports or rejects cultivated meat and what is known about acceptance of cultivated meat, also strongly shape perceptions (Baum et al., 2021; Dai et al., 2024). Online comments may therefore capture attitudes more realistically than do surveys, based on the assumption that commenters are influenced by other commenters' opinions, in a sense mimicking peer influence in offline life. Experimental studies confirm that social media posts can affect risk and benefit perceptions and willingness to consume cultivated meat (Boykin, 2019; Kouarfaté and Durif, 2023; Leong, 2022).

Previous research on online discourse has relied heavily on automated sentiment and topic modelling (Chen and Zhang, 2022; Leong, 2022; Pilařová et al., 2022), which often lack the depth to capture nuances in values and reasoning. Qualitative content analysis, by contrast, enables a richer exploration of arguments, rhetorical strategies, and moral framings, revealing how people interpret the social, ethical, and cultural implications of cultivated meat. The qualitative media comment analyses in the literature are from only three countries (US, UK, Finland), are partly focused on the 2013 first cultivated meat burger tasting, and cover time frames up to the year 2019 (Chen and Zhang, 2022; Laestadius and Caldwell, 2015; Ryynänen and Toivanen, 2023). To date, there is no analysis of public perceptions based on online comments for Germany or the Netherlands. Germany and the Netherlands are especially relevant case studies for several reasons. First, both countries are significant markets within Europe in terms of alternative proteins. Germany represents the largest retail market for plant-based products in Europe, with consumer support for further growth driven by awareness of sustainability issues and the hope for economic opportunities. (Good Food Institute Europe, 2023; Good Food Institute Europe, 2024). The Netherlands has emerged as a hub for cultivated meat innovation and early commercialisation within the EU. It is home to pioneering cultivated meat startups such as Mosa Meat and Meatable, and has even implemented regulatory frameworks enabling pre-market tastings of cultivated meat products – a first in the European Union (Rijksoverheid, 2023). However, survey evidence suggests that public attitudes towards cultivated meat in particular are far from uniformly enthusiastic in these countries. Surveys have found moderate openness to trying cultivated meat among Dutch consumers (around 60% are interested in trying or open to cultivated meat) (Boereboom et al., 2022; GFI Europe, 2024). Similarly, German surveys indicate growing awareness and support for cultivated meat (of around 60%), but also notable reservations

– especially among older age groups or based on perceived risks (Weinrich et al., 2020; GFI Europe, 2023).

This study thus analyses Dutch and German online comments on news articles and social media videos to identify emerging attitudes, expectations, and controversies – such as responses to the Italian ban[1] – related to cultivated meat. We discuss (1) key consumer concerns and hopes that should inform communication and policy, (2) the polarising nature of cultivated meat debates and its underlying causes, and (3) similarities and differences compared to online discussions in other countries. Our goal is not only to inform acceptance strategies but also to deepen understanding of the normative dimensions of public discourse, thereby supporting democratic decision-making around cultivated meat (Leong, 2022).

Methods

Sources and Data Collection

Comments were collected from June-Oct 2023 from 12 German and 13 Dutch online discussions on cultivated meat (retrieved by the Dutch and German search terms for "cultivated meat"/"cultured meat"/"lab-grown meat"/"artificial meat") from 2020 to 2023. Including multiple platforms allowed us to capture a broader range of communicative settings, from journalistic contexts to more informal and deliberative spaces. These included YouTube videos (4 German, 6 Dutch) and online newspapers (8 German, 3 Dutch); the Dutch sample also contained Reddit (2) and Twitter (2) threads. Newspaper comment sections were selected based on accessibility and public availability, while videos were chosen for popularity (5k–1M views, typically 25–50k). Upper limits on the number of comments per discussion were introduced to ensure comparability across sources while maintaining analytical depth. Coding proceeded until no substantially new arguments or frames emerged, indicating qualitative saturation rather than statistical representativeness. The maximum number of comments coded was 30 for YouTube, 60 for German newspapers, 40 for Dutch newspapers, and 20 for Reddit/Twitter. Because open newspaper comment sections were rare, especially in Dutch outlets, this led to an imbalance between article and video sources. A list of all analysed sources is provided in the supplementary file.

Coding and Analysis

The coding scheme was developed inductively and deductively (Mayring and Fenzl, 2014). Coding consistency was ensured through joint development of the coding scheme, repeated comparison of coded material, and ongoing discussion of ambiguities and disagreements until shared interpretations were reached. The research paradigm is thus an interpretative qualitative content analysis. Main theory-based categories, derived from existing research on public perceptions of cultivated meat, included:

1. Sentiment/tone (negative, positive, neutral/undecided, or questioning)
2. Arguments for and against cultivated meat (subcategories derived from the material)
3. Controversies (defined by recurrent debated topics)
4. Neutral comments, covering technical-scientific, market-related, or future-oriented aspects

Individual commenters posted between 1 and 14 messages, but a maximum of three per person were coded. Repetitions or purely personal disputes were excluded. Coding focused on achieving qualitative saturation rather than full quantification. The unit of analysis was one sentence or one comment, depending on content separation. Coding was conducted manually in Atlas.ti without AI tools. All personal identifiers were removed to ensure anonymity. The two coders were M.B., a postdoc with a background in biotechnology and bioethics, and D.v.B., a Master's student with a background in computer science and philosophy. Both researchers had previous experience with qualitative interpretative research. The coding scheme, the results, and the interpretation for the discussion section were iteratively discussed between the two researchers.

Quantitative interpretation of frequencies was secondary due to small sample sizes. We did not directly

[1] Italy was the first country to officially ban the production, sale, and import of cultivated meat in 2023.

analyse click speech (upvotes/likes), although it significantly shapes online discourse (Pang et al., 2016). Upvotes determine comment visibility and often indicate agreement, particularly among minority opinion holders (Ordoñez and Nekmat, 2019). Thus, while we did not separately quantify upvotes, we analysed comments in the order of relevance shown by the platforms – partly influenced by upvotes. Despite these limitations, we provide a summary table showing the number of coded statements per category to illustrate overall tendencies in attitudes and argument frequencies.

Results

Table 1 presents the themes and subcategories that emerged from the material related to arguments in favour of and against cultivated meat (CM).

Table 1: number of statements per code, with percentages of the total number of coded statements in the coding group (e.g., number of statements mentioning animal welfare as an argument for cultivated meat per total number of arguments for cultivated meat)

	German		Dutch	
	n	%	n	%
(Personal) attitude of commenter	**309**		**161**	
Negative/sceptical	122	39	82	51
Neutral/unclear	59	19	42	26
Open	48	16	7	4
Positive/optimistic	63	20	26	16
Questioning	17	6	4	2
Arguments against cultivated meat	**183**		**145**	
Future of agriculture/cultural	7	4	9	6
Artificiality/disgust	48	26	39	27
Environment/animal welfare	15	8	17	12
Health	30	16	30	21
Not necessary/not sufficient	56	31	23	16
Other	14	8	17	12
Taste/Quality	13	7	10	7
Arguments for cultivated meat	**117**		**81**	
Animal welfare	30	26	24	30
Climate/environmentally friendlier	27	23	14	17
Current meat production is bad	10	9	18	22
Other	30	26	15	19
Quality, taste and health	20	17	10	12
Attitude towards Italian Ban	**26**		**0**	
Against ban	11	42		
Pro ban	15	58		
Controversies between commenters	**52**		**16**	
Meat eaters vs. vegetarians/vegans: health, footprint, animal welfare impacts	36	70	3	19
Ontology	8	15	0	0
Social impact of transition to cultured meat	4	8	2	13
Taste	4	8	1	6
Conspiracies	0	0	10	63

We analysed comments from 309 German and 161 Dutch individuals. In both countries, negative or sceptical attitudes were more frequent than positive or open ones, particularly in the Netherlands (Dutch: 51% negative vs. 20% positive/open; German: 39% negative vs. 36% positive/open). The most common argument against cultivated meat in the Netherlands was artificiality and disgust (27%), while in Germany it was lack of necessity (31%), followed by artificiality (26%). Health concerns ranked second among Dutch commenters (21%). Among positive arguments, animal welfare was most frequently cited (German: 26%; Dutch: 30%). Dutch commenters

focused more on current problems of meat production (22%), whereas Germans emphasised climate and environmental impacts (23%). Major controversies centred on conspiracy theories in the Netherlands (63%) and dietary choices in Germany (70%) (Table 1).

If not explicitly stated otherwise (by "only G"=only in German sample, "only D"=only in Dutch sample), the following qualitative observations were made in both samples (although only one statement from one of the countries is used to illustrate findings). We first present arguments in favour of CM, followed by arguments against CM. We then address specific requirements formulated in the comments, including market-related and technical considerations, as well as speculations and predictions about the future of CM and its broader societal impact (and to which we refer as "scenarios"). Furthermore, we present comments related to broader controversies, and finally, comments responding to a particularly controversial event – the ban in Italy – which generated a high volume of reactions and was therefore also reflected in our convenience sample.

Arguments for cultivated meat and optimistic attitudes

The most frequently mentioned arguments in favour of cultivated meat concerned its potential to reduce animal suffering and mitigate climate and environmental impacts. Regarding animal welfare, some commenters condemned animal slaughter in general, while most emphasised the unethical nature of industrial livestock production. Benefits were also linked to reducing related harms such as antibiotic and fertiliser use, poor labour conditions, and loss of biodiversity.

Environmental arguments were often expressed in general terms but occasionally referred to reduced land, water, and energy use, as well as lower greenhouse gas emissions. A few commenters acknowledged the need for renewable energy due to the high energy demands of production, yet remained positive overall.

Health-related benefits were primarily discussed in connection to avoiding problems of conventional meat production, including antibiotic residues, contaminants, and zoonotic risks, while the nutritional composition of cultivated meat was seen as adjustable and potentially superior.

Several commenters anticipated that cultivated meat could taste better than plant-based alternatives and even surpass conventional meat in tenderness and quality due to controlled production conditions. Some speculated about the possibility of cultivating human or extinct animal meat or creating entirely new flavour profiles.

Less frequently, commenters referred to technological progress, food security, or pragmatic advantages (mainly in the German sample). In the Netherlands, progress-oriented arguments were often coupled with national pride in the country's leadership in cultivated meat innovation and optimism about economic prospects:

> *I certainly think that the Netherlands should focus on setting an example for sustainability and keeping the climate in check. We are already doing it in water management, but if we focus on this as a country, we can also reap the benefits when it is financially profitable. (D, 12:9 ¶120–122 in Correspondent – Reddit)*

In contrast, in Germany, the attitude of being less open to new technologies was criticised:

> *(...) We have already slept through so many technologies..."Yes, precisely because of such statements as, "We need to get to the root of the problem, too much meat consumption..."The ban is considered better than the research and development that could then provide business opportunities. This is ideological wealth neglect. Only when the last overthinker has died out will we live up to our potential again, if by then we are not all just carrying misgivings. (D, 4:1 12 in Welt 2)*

An assumption behind the above arguments in favour of cultivated meat was that it could be produced at large scale, for affordable prices to be a mass product, and consequently might reduce factory farming or increase overall meat production considerably. A common argument was that current meat production would

not be sufficient to feed the growing world population and demand for meat in rising economies:

> *The additional growing demand for meat by emerging and developing countries can no longer be met with animal breeding and factory farming. It simply can't go on like this. (G, 3:36 85 in Welt 1)*

> *With species-appropriate husbandry, unfortunately, we cannot completely feed humanity. (G, 2:28 35 in Spiegel 2)*

Some positive commenters saw cultivated meat not as a solution for their own lives but pragmatically viable for other people who were not willing/able to reduce their meat consumption or buy organic meat (only G). The following commenter, for example, saw veganism as an optimal solution but not a realistic one due to human habits and rising prosperity in developing countries:

> *Well, I'm vegan and I think it's utopian to believe or hope that all the people in the world will voluntarily give up meat/animal foods for ethical reasons. So I really hope for technologies like this. That would be a big win for animals and nature. (G, 11:8 256 in Precht youtube)*

Taken together, supporters of cultivated meat most commonly argued that it could reduce animal suffering and help protect the climate and environment – although some commenters admitted that cultivated meat was a pragmatic but not ideal solution for these problems. Less often, cultivated meat was associated with higher food security and technological progress. Apart from these ethical and societal aspects, individual aspects that were mentioned included health benefits and better taste, nutrition, and novel meat experiences.

Arguments against cultivated meat and pessimistic attitudes

For every positive argument, respective counter arguments were expressed. Animal welfare and sustainability benefits were doubted and downplayed with reference to the use of foetal bovine serum, the necessity to kill animals used as a cell source, the high energy demand, and potential waste products. Animal killing as such was sometimes presented as natural and thus legitimate:

> *Since humans are omnivores by nature (we agree?) it is normal that we kill other species for our own food and health. (G, 11:24 ¶ 941 in Precht youtube)*

Cultivated meat was often depicted as an artificial product that would not reproduce the qualities of its natural counterpart. As an animal's life influences how it tastes, the assumption was that standardised cultivation of meat would lack such external factors and consequently produce meat that always tasted the same – or, as another commenter put it, that should not be considered "meat":

> *This is not meat at all. That settles it for me. Meat, milk, and eggs come from living things, not Petri dishes." (G, 11:12 ¶ 522 in Precht youtube)*

Further doubts were expressed about the possibility of producing cultivated meat with the qualities of structured meat, such as a beef steak, and with regard to affordability:

> *Extremely exciting topic, unfortunately still quite far away. When I look at the prices of veggie alternative products, I doubt very much that clean meat will somehow become affordable/mainstream in the next 5-10 years. (G, 12:19 ¶ 389 in Rittenau youtube)*

Unknown health risks were also considered in the use of living material in the process of cultivated meat production, which was seen as not fully controllable in an artificial environment:

> *How artificially and from which other chemical mixtures are these growth factors first isolated? Who guarantees that these growth factors are not also absorbed by humans (especially if steroid-like substances?) What about further cell culture contaminations due to immortalised cells (in normal language: "cancerous cells"). So many unanswered, not sufficiently tested questions – and then one wants to compare this with naturally grown organisms in which homoeostasis has developed for billions of years. Is that supposed to be a joke? No thanks, I'd rather eat vegan right now. (G, 7:5 ¶ 39 - 47 in TAZ 1)*

Reference to cancerous cells was made in only two instances in Germany, whereas it was made more often

in the Netherlands. Health concerns were also often put forward with reference to profit interests and general distrust of food companies and their assumed lack of transparency, or a general pessimism regarding innovations:

> *Cultivated meat...,Yet another industry. Every new invention of man has tentacles, coming at the expense of something else, and usually never improves anything. (D, 9:30 ¶163–164 in AD – newspaper)*

The combination of concerns related to corporate interests and unnaturalness was also common:

> *Eat healthy - and then lab meat? *gag* Especially so that the corporations earn even more money? Then rather natural meat from regional husbandry. Does anyone else know the movie 'Soylent Green'? please google it... (G, 3:23 ¶ 26 in World 1)*

Apart from a lack of trust in transparency about health risks there were also frequent worries about unexpected long-term health risks (only D):

> *For the time being, this falls under processed junk. First we need years of research into what it does to a body. Creating meat with electricity is very different from meat from a cow that converts grass into muscle/ meat. 0 confidence in the food industry in this regard. (N, 8:9 ¶49 in Nu.nl ik stap over - online newspaper)*

Artificiality was often taken as an argument of its own without further explanation, and disgust seen as reason enough to reject cultivated meat:

> *I just shudder at the thought of eating cells from a petri dish. (G, 2:71 ¶ 1031 in Spiegel 2)*

Also related to artificiality, commenters expressed opposition to a technologised food experience:

> *Why not inject the nutrients intravenously? With an electrode in the brain that can trigger every taste sensation? If you want to live like that - I don't. (G, 1:26 ¶ 121 in Spiegel)*

The progress narrative was also questioned from social and economic perspectives. Commenters predicted negative impacts on farmers and rural structures, including the possible disappearance of livestock or even extinction of certain species. Many doubted that farmers and butchers would benefit from the new system and voiced solidarity with them. Others criticised the capitalist and monopolistic tendencies of cultivated meat, warning that if large corporations patented production, a single type of "Google Burger" *(G, 10:19 282 in Quarks youtube)* might dominate the global market. This was seen as concentrating profits, reducing quality, and undermining environmental goals. Overall, commenters felt that potential downsides – such as hidden costs for taxpayers and consumers – were under-discussed, and that alternatives to cultivated meat were being overlooked amid technological enthusiasm:

> *We once thought plastic was a brilliant invention. We didn't look at the disadvantages, that was for later. And the same applies to a lot of changes. Jumping into something like a headless chicken because it seems better is simply not the way to do it. Insects seem like a better alternative to me. (N, 8:28 ¶115 in Nu.nl ik stap over- online newspaper)*

Finally, outright problem denial was used as an argument against cultivated meat, in which conventional farming and meat production were not seen as a problem. This perspective was often combined with the attitude that the biggest problem related to food security was rising meat consumption stemming from population (over)growth in other parts of the world. This group often had an angry and emotional tone to express their disapproval of moralisation of personal food choices.

Another group of commenters, often identifying as vegetarians or vegans, found the cultivated meat development unnecessary because there were other healthy and tasty food alternatives. Some commenters also pointed out that cultivated meat would solve only some issues of our food system, and not the biggest, such as the large extent of food waste. Doubts about the actual sustainability benefits of cultivated meat, for example due to the high energy demand for its production, were also raised several times. Other solutions were pointed out, like scaling down and eating less meat, and organic and local farming. More critical voices

evaluated the whole enterprise as problematic insofar as it supports the dangerous idea that there is no need for abstinence or change of personal lifestyle:

> *This is exactly where I see the great danger in the whole approach. We are made to believe that we can simply carry on as before. Renunciation is not necessary. Technology will invent something new so that we don't have to rethink our lives or even change anything. This is the attitude that will bring humanity to the brink of extinction, and such approaches will only further that. (G, 1:61 ¶ 689 in Spiegel 1)*

Taken together, arguments opposing cultivated meat focused on its artificiality, ethical inconsistencies, high energy demand, inferior taste, and potential health risks, often expressed with distrust toward corporations and governments. Additionally, scepticism about the necessity of cultivated meat was voiced by those who preferred alternative solutions such as reducing meat consumption, promoting plant-based diets, or improving traditional farming systems.

Requirements

Commenters not only formulated assumptions and expectations – that were then used either for arguments for or against cultivated meat – but also described requirements for cultivated meat to be successful or interesting to them personally. These requirements were related to the product characteristics, marketing, impact and regulation.

Requirements regarding cultivated meat products pertained to good taste and aesthetics, affordable price, health aspects, and diversification of products. Some commenters found fish, dairy products and eggs more interesting than meat in several respects (G):

> *Is anyone doing research on laboratory fish? That would be much more important. While too much meat is often eaten, fish could be eaten even more for health reasons. But more fish simply cannot be caught or farmed without further destroying the oceans. Many fish products are also highly processed (e.g. tinned fish and fish fingers) so that manufacturers can better replicate the expected consistency. Most people would probably also have fewer reservations about fish products than about meat. So rather lab fish than lab meat (G, 7:1 ¶ 9 - 15 in TAZ 1)*

Commenters argued that marketing should use "ideology-free" communication and find a more attractive terminology (than "laboratory meat") (G). They furthermore believed that marketing should be transparent about cultivated meat developments and its potential health risks, to gain public trust (D). Labelling was also mentioned several times, especially with regard to the ban in Italy (G).

> *I am not a vegetarian and will definitely never become a vegan. I think it's enough to consume meat more consciously (and less). And if you want to eat lab-grown meat, you should be allowed to do so. Just like you are allowed to consume alcohol, sugar and the like. The only thing I would find important is appropriate labelling so that I can decide what I want to eat and what I don't. (G, 13:8 ¶ 77 in Welt 3 Italy ban)*

Accessible information was seen as essential for acceptance:

> *To be honest, I was a bit afraid of it. But if you explain it well, many people could be convinced by lab-grown meat. (G, 10:25 ¶ 436 in Quarks youtube)*

In both countries, the impact on environmental sustainability and animal welfare (mostly meaning the use of animal-free growth serum) were mentioned as an acceptance factor, but with taste, affordability and safety as additional requirements:

> *If there is an alternative that tastes the same, is cheaper, does not cause animal suffering and uses fewer resources, why should we categorically refuse this alternative? (G, 3:6 ¶ 372 in Welt 1)*

> *I would try it too. Provided, of course, that the problem with the serum is solved, the product is safe – and tastes good. (G, 1:16 ¶ 96 in Spiegel 1)*

Proper funding/support, fair distribution of economic gains, and helping farmers without subsidising conventional

farming were also demanded. For example, a commenter criticised the allocation of state budgets, referring to the war in Ukraine which Germany supported financially at the time:

> *Of course you have money for war but not for science. (G, 10:11 ¶ 43 in Quarks youtube)*

Taken together, commenters emphasised that for cultivated meat to gain acceptance, it had to be tasty, affordable, safe, and transparently marketed with appealing, non-ideological language. Environmental and animal welfare benefits were important, but acceptance also depended on clear regulation, fair economic distribution, and public funding priorities that supported innovation without favouring conventional farming.

Future scenarios

There were some comments speculating about the overall prospects and broader societal impacts of cultivated meat uptake in the future, to which we refer here as 'scenarios', with meaningful names chosen by us. Negative scenarios were 'Resistance' (only D), meaning farmers would protest against cultivated meat because it threatened their livelihood. Another was 'Soylent Green'[2] (only G), meaning there would be cultivated meat for the masses, and high quality 'real' meat for the 'elite' or 'deciders'. There were also references to a 'meat-lockdown':

> *Fear that the Soylent-green meat lacks all the micronutrients that make food tasty and healthy. Maybe the solution for us subjects, but the determiners in this world will continue to afford their good pasture-raised beef, just as most of us can today, but let's wait, the meat lockdown is already knocking at the door. (G, 3:5 ¶ 385 in World 1)*

The third was 'Decay of culinary traditions' (only G) in countries adopting cultivated meat, leading to an economic boost for 'natural' food in other countries, and cultivated meat as part of a future were functional food is predominant:

> *This could boost gourmet tourism to Italy, if you know you're definitely not getting fake meat there. The proof of origin 'Made in Italy' for meat products could experience an upswing. Just like 'Made in Germany' for technical products back in the day. (G, 6:3 ¶ 27 in FAZ 1.)*

> *The future may look like this... Food produced completely artificially. Accompanied by special preparations that have to be taken alongside. (G, 11:17 ¶ 735 - 736 in Precht youtube)*

A positive scenario related to 'Techno-optimism/determinism', seeing cultivated meat on the market in the near future at affordable prices:

> *That's going to come like the amen in the church. Has been in the conversation for a long time. (G, 9:13 ¶ 258 in arte youtube)*

> *The first vegan burger was also immensely expensive, today you get it in a value pack in every supermarket. With cell cultures, one can only hope that we will also be ready by the end of the decade, but probably sooner. (G, 2:18 ¶ 4 in Spiegel 2)*

Another optimistic scenario related to 'Evolution of ethics' (only G), meaning cultivated meat would help mankind realise how cruel and unethical meat production was:

> *I believe that 50 years from now we'll be shaking our heads in disbelief at how gruesome meat production once was. (G, 1:72 ¶ 495 in Spiegel 1)*

Taken together, commenters' thoughts about future prospects tended to be extreme and polarised, based on the assumption that cultivated meat would have a big impact in either a negative or a positive way.

[2] 'Soylent Green' is a dystopian science-fiction film, exploring themes of resource scarcity, climate change, and corporate corruption. In the film, Soylent Green is a food product made of processed corpses from government-run euthanasia centres.

Controversies

Commenters not only reacted to media framings but also engaged with each other's questions, assumptions, and values. These threads ranged from technical debates and comparisons with plant-based meat to moral reflections on the legitimacy of eating meat.

Speculations often addressed scientifically uncertain issues, differing somewhat between countries: *scaling-up challenges* (Germany), *antibiotic use* (Germany), and *affordability and sustainability* (both). Many discussions remained factual and reasoned, for example arguing that cultivated meat prices should be seen in light of existing subsidies for conventional meat, that environmental costs were not reflected in current prices, and that production at scale would reduce costs. Others weighed energy use against savings in land and water, noting that future production could rely on renewable energy. Knowledgeable commenters often corrected misconceptions such as those equating multiplying cells with cancer, or assuming that farmers would become obsolete.

Technical debates frequently shifted into broader worldview-driven discussions about diet: *Is meat healthy? Is killing animals justified? Does all meat harm the environment, or only factory farming?* A recurring emotional theme was artificiality versus naturalness. Most agreed that cultivated meat differed from plant-based alternatives, but opinions diverged on whether it was identical or fundamentally different from conventional meat. Reductionist views claimed that "life is just chemistry", while others insisted meat was only "real" if it came from a living animal.

Some commenters confused cultivated meat with plant-based analogues, linking expectations about its taste to negative experiences with vegan products, while others tried to clarify the distinction. In Germany, an additional cannibalism debate emerged, with some users seriously discussing whether eating meat grown from human cells would constitute cannibalism or pose health risks:

> *Niko, a serious question for you as a nutritionist: wouldn't the protein that we utilise best be our own meat? Ethically, this is certainly a level more controversial, but wouldn't it be much more efficient in the future if people sent in blood samples and then received protein optimised to their own DNA (i.e. muscle from their own meat)? Or do you see problems with this apart from the ethical aspect? Could it be the future after clean meat if humanity is ready for it? (G, 12:19 ¶ 481, Rittenau Youtube)*

Evaluative comments targeting other groups, mostly meat eaters or vegans respectively, but also people who were assumed to be misinformed and have non-logical arguments due to low education or "woke" with double standards, were encountered mostly in Germany:

> *Only the sentence 'I find it absolutely fascinating to eat a piece of meat and know that no animal had to die for it and I'm not ruining the climate' seems strange if the man is planning to get a restaurant seat in Israel for it. It reminds me of the participants on the vegan cruise shown on Extra 3 (some of whom travelled there by plane). (G, 1:17 ¶ 86 in Spiegel 1)*

In the Dutch sample, a commenter, replying sarcastically to a comment by someone who was disgusted about cultivated meat, wrote:

> *Lovely! Thousands of piglets stomping on each other in their shit.*

Taken together, the discussion threads were partly constructive and based on the exchange of viewpoints, but they often moved quite suddenly towards ideological argumentation or even personal attacks.

Attitudes towards the ban in Italy

Overall, the comments responding to articles about the Italian ban expressed a particularly negative attitude towards cultivated meat, and the ban itself was controversial. Critical comments on the planned ban mainly targeted it as being wrong, as it would curtail freedom (reference was made here to other unhealthy but freely available drinks and food), or help cultivated meat gain undeserved attention. According to some

commenters, being open to innovation and clarifying the health aspects of cultivated meat would be better options. Several commenters criticised the reasons put forward by the Italian government – traditions and health – and rather saw the meat lobby as the main driver:

> *A pure lobby decision in favour of their own meat industry for fear of the threat of competition. I probably wouldn't eat artificial meat either, but you don't have to ban it for those who think it's good." (G, 6:4 ¶ 20 in FAZ 1).*

Only one commenter expressed their being personally affected:

> *We don't mind your meatball, but why do you want to ban our lab-grown meat? (G, 6:35 ¶ 396 in FAZ 1)*

Commenters who rated the Italian ban favourably thought that cultivated meat was disgusting and of lower quality than "natural" foods:

> *High-quality food cannot be imitated at will, even if it is technically possible. The quality will always be different, certainly worse." (G, 13:15 ¶ 157 in Welt 3 Italy ban)*

Intransparency was also criticised, with reference to insect powder which was assumed to be added to products secretly. Another argument brought forward by those supporting the ban was the protection of traditions, and the belief that the EU should not interfere with national policies or personal diet choices. Health was also mentioned by comparison with harmful chemical substances, drugs, weapons, AI technology, and glyphosate, which had to be forbidden in order not to cause damage as well.

Discussion

Cross-country similarities and differences

A direct comparison between the Netherlands and Germany revealed overall similarities and only subtle thematic differences. The most notable difference was that German controversies centred on vegan versus meat-based diets, while Dutch discussions focused more on conspiracy theories.

Earlier studies found that public concerns about cultivated meat mainly related to individual risks (e.g., health, taste, disgust), whereas benefits were framed at the societal or global level (e.g., animal welfare, environment, food justice) (Laestadius, 2015; Verbeke et al., 2015). Our findings support this pattern and align with Laestadius (2015) and Ryynänen & Toivanen (2023), showing that the same values can be used to argue both for and against cultivated meat, depending on underlying worldviews and expectations.

Cross-country comparisons highlight contextual nuances. In Finland (Ryynänen and Toivanen, 2023), commenters rarely mentioned foetal bovine serum or food security, possibly due to cultural factors or the earlier timeframe (2013–2019). Finnish discussions focused on rural impacts and media bias, treating cultivated meat as a policy issue – unlike Germany, where it was framed more as a matter of adoption or failure. A Chinese Twitter analysis (Chen and Zhang, 2022) reported higher acceptance levels but introduced unique concerns such as foreign influence, price, feminisation, and product quality. In the U.S. (Specht et al., 2020), discussions revolved around taste, practicality, regulation, and farmer opposition, with less focus on disgust or artificiality than in Europe. In an earlier U.S. study (Laestadius and Caldwell, 2015), more critical views like techno-dystopic comparisons (e.g., cannibalism, *Soylent Green*) were common and the general attitude was more negative, resembling our German findings. In the UK (Goodman et al., 2024), social media narratives portrayed cultivated meat as a techno-fix, a virtuous innovation, or as conflicting with farming and consumer acceptance. In this respect they echoed the polarisation seen in our Dutch and German samples.

Taken together, cross-national discussions share core themes, while the emphasis on specific issues – such as policy, health, or cultural values – and the focus on individual or societal arguments varies by country and period, reflecting diverse cultural, political and media contexts.

Key requirements and concerns

It is also insightful to compare the key requirements and concerns of online commenters with those found in studies using surveys or focus groups. Quantitatively, negative commenters predominated, contrasting slightly with survey data showing that about half of Germans and Dutch would try or buy cultivated meat if quality and price matched conventional meat (GFI Europe, 2024). Qualitatively, the attitudes and expectations expressed in comments largely mirrored findings from focus group and survey research.

Commenters' main requirements for acceptance concerned product characteristics: taste, price, and health. Environmental sustainability and animal welfare (especially avoiding animal serum) were also common expectations, consistent with previous acceptance studies (Bryant and Barnett, 2020). Additional demands focused on marketing and communication, calling for "ideology-free" messaging, a more appealing term than "lab meat," and transparency about health risks.

Many commenters saw the profit interests of big corporations as the main driver for cultivated meat development, and some demanded proper funding of research and fair distribution of economic gains. Such trust and justice issues are rarely investigated explicitly in surveys (Bryant and Barnett, 2020; Siegrist and Hartmann, 2020).

The "polarisation potential" of cultivated meat

For communication and policy, the most important finding to be discussed is not so much the specific requirements or concerns voiced by online commenters, as the broader discussion climate and its dynamics. Commenters' opinions were highly polarised, with most expressing either strong opposition or uncritical enthusiasm. Similar patterns have been observed by Ryynänen and Toivanen (2023) and Goodman et al. (2024), who note that identical values and arguments are often used both to support and to oppose cultivated meat – depending on underlying assumptions or value priorities. For instance, some support it as a sustainable solution, while others reject it as environmentally harmful.

This dynamic reflects the idea of a societal "trigger point" (Mau et al., 2023): a topic provoking extreme reactions despite shared core values, often due to deeper fears such as loss of freedom, cultural change, or loss of control. These emotions can be amplified by "entrepreneurs of polarisation": politicians, media actors, or influencers who exploit them (Mau et al., 2023).

To better understand this polarisation, also evident in other countries like the UK (Goodman et al., 2024), we examine potential drivers in the following:

- Reactions to political actions against cultivated meat.
- Existing trigger points around diet, sustainability, and personal responsibility.
- Distrust in institutions, government, and industry, and links to other contested technologies.
- Over-promising narratives and "all-or-nothing" visions of the future.
- Misinformation and conspiracy theories.
- Finally, as social media algorithms amplify emotional and negative content, online discussions may overrepresent extreme views, giving a distorted picture of broader public opinion – though addressing this bias lies beyond the scope of this article.

Reactions to political actions against cultivated meat

German commenters expressed diverging opinions about whether it was necessary or legitimate to ban cultivated meat. There was some agreement with the ban based on health concerns and protection of traditions, but also a lot of criticism, in which the meat lobby was seen as the main driver of the ban. Comparisons were made with unhealthy substances like alcohol and sugar, which the commenters believed should be free to consume, but also with drugs and weapons, which they felt should be forbidden to protect

citizens. Overall, the comments in our sample responding to the two articles about the Italian ban expressed an overwhelmingly negative attitude towards cultivated meat (70%), although statements explicitly assessing the ban as such were more balanced (42% against, 58% in favour of the ban, see Table 1). This result stands in contrast to the neutral reporting on the ban in the articles, citing both opponents and proponents of the ban. An explanation for this result may be that the signalling effect of political action against cultivated meat, combined with an uncritical newspaper framing, encouraged the expression of opinions opposing cultivated meat. Another explanation may lie in pre-existing attitudes of the specific newspaper readership (Welt and FAZ are both rather conservative papers; unfortunately, we did not find a leftist paper reporting on the ban and providing comment material for comparison). Both ways, a leaning towards negative views can be strengthened by the so-called spiral of silence (Neubaum and Krämer, 2018; Ordoñez and Nekmat, 2019). Comments on online platforms are not a direct reflection of readers' viewpoints, as they are contingent on their willingness to comment. While this is to some degree due to individual personality variations, the social environment in the comment section plays a role that may affect specific groups of readers differently to others. When comments show a clear majority opinion, minority opinion holders often refrain from speaking out due to fear of being ostracised. This self-silencing of minority opinions in dominant opinion environments is known as the Spiral of Silence (SoS) (Noelle-Neumann, 1974), and its effect has been found to be especially strong online, where there is greater fear of being attacked for expressing one's opinion (Neubaum and Krämer, 2018). When readers perceive themselves to be a minority opinion holder, especially when the atmosphere in the comment section is perceived to be hostile, we can expect the SoS to take effect. In these cases, the comments are no longer a good reflection of reader opinions, but disproportionately reflect the majority viewpoint.

The cultivated meat industry and organisations supporting it expressed concerns about the potential for a snowball effect initiated by actions like the ban in Italy (followed by attempted bans in Austria and Hungary), potentially leading to a Europe-wide prohibition of cultivated meat or at least impediments to innovation in the sector (Sabelli, 2023). This could result not only from direct governmental-level influence among EU member states but also from the amplification of opposition through (social) media.

Existing trigger points around diet, sustainability, and personal responsibility

The topic of cultivated meat sparked a lot of controversy over general aspects of meat eating and the effects of diet on health, sustainability and animal welfare. A significant proportion of comments highlighted the perceived "unnaturalness" of cultivated meat or framed meat consumption as a cultural or biological necessity for humans. This aligns with broader themes of the so-called "culture wars", which often include denying animal welfare issues in conventional meat production and emphasising "natural" meat as essential. This strategy is deliberately used on social media by opponents of cultivated meat (Changing Markets Foundation/Ripple Research, 2023).

Differences in commenters' underlying meaning systems are evident, as naturalness and purity are often seen as evaluation criteria for the edibility of cultivated meat (Ryynänen and Toivanen, 2023; Siegrist and Sütterlin, 2017). Humans' position in nature and perceptions of masculinity ("I shoot my own meat") are also mentioned. Disgust of cultivated meat can be a consequence of food neophobia (Siegrist and Hartmann, 2020), but it can also be explained as a reaction to a violation of moral intuitions that stem from culturally transmitted understandings of what is pure, natural and normal (Ryynänen and Toivanen, 2023). It is not surprising in this respect that companies use(d) the term "clean meat", although disgust may also arise in certain cultures or groups if food is perceived as too clean to be natural.

Evaluations of cultivated meat are currently also interwoven with well-known dietary polarisation and "political diets". Eating preferences have gained political relevance in times of climate change, as vegan or vegetarian preferences and left-wing attitudes seem to coincide naturally or logically (Grünhage and Reuter, 2021). For instance, in Germany, the right-wing populist party "Alternative für Deutschland" (AfD) submitted

parliamentary questions about the "militant vegan scene" (LANDTAG NORDRHEIN-WESTFALEN, 2018). Leaders of conservative parties regularly criticise the assumed moralising tone of the green party with regard to food choices, and even claim to see a threat of politically forced insect eating, while vegan web forums condemn right-wing anti-vegan policy positions (Gebauer, 2020; Grünhage and Reuter, 2021). Notwithstanding their political orientations, vegans and omnivores may have hostile attitudes towards each other (Davis 2023). Existing dietary group polarisation most likely also affects attitudes towards cultivated meat. Depending on how cultivated meat is framed – either as a better tasting alternative to other plant or insect-based meat alternatives, or as a healthier, more sustainable and animal-friendly version of natural meat –, it may evoke negative or positive reactions in persons who are already polarised around food choices. In the current political climate, committed meat eaters may feel threatened by moralisation and suggestions to replace their meat of choice.

Given the political significance of food choices, particular framings may also be strategically advanced by political actors (Grünhage and Reuter, 2021; Saha, 2023; Clifford, 2018). In the media, agricultural lobbies and opposing governments have often implied a degree of replacement perceived as threatening by the existing meat industry, thereby constructing a forced-choice narrative (Baumann, 2025).

The material we analysed suggests that cultivated meat increases existing polarisation, with those who are fundamentally opposed to meat reduction rejecting cultivated meat as a solution, and cultivated meat arousing feelings of threat and expressions of anger. Comments about disgust and artificiality were often hostile, some even targeting groups or other commenters personally.

Some years ago, Driessen and Korthals argued that new technologies should not only be seen as either a threat with side-effects and an undemocratic techno-fix ,or as a solution, but as a means to spark and shift debates about societal problems, and introduce new arguments (Driessen and Korthals, 2012). Our analysis supports the hypothesis that cultivated meat fuels debates among the public about the problems of conventional meat production. Whether the media attention surrounding cultivated meat fundamentally shifts the debate about conventional meat by introducing new arguments or changing the prioritisation of existing ones would, however, require an in-depth analysis of this debate. What we do see clearly is that the involvement of political actors in the debate around CM has a moralising and polarising effect.

Distrust in institutions, government, and industry, and links to other contested technologies

Ryynänen and Toivanen (2023) argued that many commenters may be unfamiliar with cultivated meat and lack information, and this may lead to difficulties integrating it into their meaning system, and, ultimately, rejection. In their study they found that commenters were comparing it with more familiar products such as conventionally produced meat, available plant-based alternatives, genetically modified foods, and artificial organs produced by medical cell culturing technologies (Ryynänen and Toivanen, 2023). In a study of Chinese Twitter messages, comparisons to genetic modification in plants and phytoestrogens in soy beans were drawn, both with reference to potential health risks (Chen and Zhang, 2022). There was scepticism about the quality of cultivated meat, with reference to other meat alternatives (Chen and Zhang, 2022). Similarly, we found references and comparisons to plant-based meat analogues, primarily as an argument against cultivated meat due to the perception of excessive use of unhealthy chemical additives and an inferior taste. Although there are parallels in the public discourses on gene technology and cultivated meat (Mohorčich and Reese, 2019), we found only one reference to gene technology (with a negative attitude) in our comment sample. We also encountered comments expressing fears of "meat lockdowns" (analogous to COVID-19 pandemic lockdowns) or scenarios reminiscent of the dystopian film *Soylent Green*. These comments referred to hypothetical societal and political situations where conventional meat consumption might be restricted or even banned, with cultivated meat being forcefully or secretly added to the diets of specific populations. This suggests that concerns stem from associations not only with products or technologies which are assumed to be similar, but also with socio-political contexts and past experiences.

A related factor influencing the acceptance of cultivated meat, likely tied to broader socio-political perceptions and experiences, is trust in the associated stakeholders. This area remains under-researched, though some insights are available. Studies show conflicting results regarding whether general distrust in science significantly predicts the acceptance of cultivated meat (Lewisch and Riefler, 2023; Wilks et al., 2019). Trust in food authorities has been positively associated with willingness to try cultivated meat, but trust in food retailers shows no such correlation (Muiruri and Rickertsen, 2024). These findings suggest that trust in the food industry may play a more significant role in shaping perceptions of cultivated meat than general trust in science (Siegrist and Hartmann, 2020). This aligns with our observation that concerns about the profit motives of food companies – often associated with the chemical industry – were frequently mentioned, whereas there were no references to "irresponsible scientists" or the like.

Over-promising narratives and "all-or-nothing" visions of the future

A moderate degree of polarisation was also evident in how commenters described the prospects of cultivated meat. While some described cultivated meat as something that would come "like the amen in the church", would be affordable in a couple of years and would mark an evolutionary step in human ethical behaviour, others assumed there would be significant technical challenges, a decay of culinary traditions, resistance by farmers, or even dystopic "Soylent green" and "meat-lockdown" scenarios. Somewhat moderate future scenarios, such as greater variety of meat alternatives providing choice, and a new transformation option for farmers, were less common. Both optimistic and dystopic pessimistic scenarios tended to overestimate (at least viewed from our state of knowledge as of today) the disruptive potential of cultivated meat. They also shared a deterministic view, with little reflection of political measures or other circumstances fostering or hindering cultivated meat adoption and impacts. Related to that, the optimistic predictions were largely centred on technology and product characteristics, and less on broader cultural and societal aspects. Suggestions for positive visions including such aspects were the "stem cell zoo", the development of a DIY culture as in the case of craft beer brewing, or a "pig in the backyard" providing the stem cells for a cultivated meat 3D printer (Böhm et al., 2018; Nextnature.net, 2014; Van der Weele and Driessen, 2013). All these positive scenarios had in common their aim of providing for more autonomy in food production and bringing people (back) closer to the source of meat.

Optimistic visions including cultural and societal aspects, and a realistic picture of funding and infrastructure requirements, were also missing in news articles (Baumann, 2025). This may explain the tendency in the comments towards dystopic scenarios and overestimation of the feasibility of large-scale production of cultivated meat.

Misinformation and conspiracy theories

A recent study identified strategies used on social media to disparage vegan diets while promoting the appeal of animal products (Changing Markets Foundation/Ripple Research, 2023). The research found that such targeted misinformation originated from a relatively small number of accounts and specific stakeholders, including the meat industry and right-wing conservative politicians. The disparaging posts focused on several key attack points, some of which portrayed alternative meat products as unhealthy, unsustainable, and part of an "elite agenda", thereby associating cultivated meat with conspiracy theories (Changing Markets Foundation/Ripple Research, 2023).

These strategies were also evident in our sample. Commenters questioned the sustainability of cultivated meat, arguing that its production would require as much feed and energy as traditional livestock. It is difficult to tell in where this is just a self-derived assumption, and where it directly echoes specific misinformation, such as life cycle analyses (LCAs) with questionable assumptions. Health-related concerns about cultivated meat were often based on the assumed use of chemical additives, bacterial contamination, and its categorisation as highly processed food. The specific misinformation that cultivated meat resembles cancerous tissue was

rare, mentioned by only 1–2% of commenters. Explicit references to a lack of safety research and regulation, which is another misinformation strategy, were absent; however, such concerns were implied through the assumption that unhealthy products might reach the market.

Conspiracy theories regarding cultivated meat, identified as the most common misinformation category in the Changing Markets Foundation study, were infrequent in our dataset, with only 1–2% of commenters explicitly expressing such views. Some comments linked cultivated meat to the World Economic Forum (WEF) or the UN's Agenda 2030, framing it as part of the "Great Reset". Others drew comparisons to the safety of COVID-19 vaccines, implying that both were dangerous. A few commenters even claimed that space travel and cultivated meat were fabricated concepts, referencing a video of Dutch astronaut André Kuipers visiting a cultivated meat company.

Overall, tracing explicit misinformation in our sample proved challenging due to the limited information we could extract from comments. Explicit, well-documented misinformation – such as conspiracy theories or claims about cancer – was rare. Most often, it remained elusive whether a comment on the health risks of cultivated meat was provoked by a specific piece of misinformation a commenter had read elsewhere, or was based solely on their own general assumptions, distrust, and reference to better known technologies, or a "culture wars" attitude. Many commenters seemed to rely on general assumptions or misconceptions rather than targeted misinformation. Experimental studies are needed to explore the effects of targeted misinformation and the origins of assumptions that lead to misunderstandings. A key challenge is the perception of "artificiality", which is not an objective category. Some individuals may view the cultivation of cells in a bioreactor as inherently unnatural, while others might interpret "artificial meat" or "lab-grown meat" to imply chemical production methods or heavily processed food containing additives. Addressing these varied interpretations highlights the need for clearer communication about the production process to combat misinformation.

Limitations

This study has several limitations that should be acknowledged. First, the analysis is based on self-selected online comments, which are not representative of the general population. Comment sections often attract individuals with stronger opinions, potentially amplifying polarised or emotionally charged views. Furthermore, due to the declining availability of open newspaper comment sections – particularly in Dutch outlets – the dataset contains a higher proportion of video-based discussions. This may amplify more affective or polarised expressions typical of audiovisual platforms. Second, the dataset is limited to German and Dutch online media and may therefore reflect country-specific media cultures, political contexts, and levels of public engagement with food technologies. Third, while we provide a summary table showing the number of coded statements per category, quantitative interpretation of frequencies was secondary due to the relatively small sample sizes. Moreover, we did not directly analyse click speech (upvotes/likes), although such interactions strongly influence comment visibility and may signal agreement, particularly among minority opinion holders.

Conclusions

Online comment analysis reveals both similarities and contrasts with surveys on cultivated meat acceptance. While concerns about product characteristics, sustainability, and animal welfare align with existing studies, issues of trust and justice were more prominent. Unlike surveys, a majority of commenters were negative, often opposing cultivated meat due to perceptions of artificiality, corporate motives, and distrust in regulations. Supporters saw potential and few challenges in replacing factory farming and improving sustainability. Health concerns were less common but linked to distrust. As regards communication and policy, the most compelling insight lies less in the specific requirements or concerns voiced by online commenters than in the broader discussion climate and its dynamics. Our findings highlight the polarised discourse and the need to address trust alongside technological and sustainability claims.

As researchers have argued regarding other controversies surrounding food technologies (notably, genetically modified crops and insect-based food (Dürnberger, 2019; Léonie de Jonge, 2024; Mohorčich and Reese, 2019)), polarised reactions to cultivated meat are unlikely to stem from fundamental value differences between opponents and proponents. Although different conceptions of "nature" and naturalness may play a role, controversies around cultivated meat are mostly the result of a range of political, societal, and psychological factors, and deliberate shaping of public perceptions by interested stakeholders via (social) media.

Various misinterpretations and echoes of misinformation on cultivated meat that we found in comments highlight the need for clearer communication about its production process, characteristics and regulation. However, broader cultural ("war") issues, conspiratorial thinking, and distrust rooted in past experiences, cannot be resolved with information alone. These factors reflect deeper societal divides that require a multifaceted approach if they are to be addressed effectively. Multi-stakeholder dialogues would be a first step to counteract ideological discussions and political misuse, by finding common underlying values and challenging assumptions that trigger extreme reactions. Such debates can be informed by exploratory media analyses like the one we provided, which may identify not only information needs on the side of the public, but also blind spots, neglected topics and narrow perspectives in the debate. Public dialogues may contribute to positive as well as alternative and broader visions of sustainable food systems, which currently appear only rarely in the media. A more nuanced public debate on realistic futures of cultivated meat would include regulatory and societal influencing factors. Topics such as state funding, open science versus patenting, and the regulation of safety – as well as taxes and subsidies – are currently underrepresented in the public debate, despite being crucial factors for public acceptance. This is particularly important given widespread concerns that a profit-driven industry may override consumer interests.

An international comparison shows that while public and media perceptions of cultivated meat share common themes in different countries, the emphasis on specific issues – such as policy, health, or cultural values – and the focus on individual or societal arguments varies, though this could also be a platform or time frame effect. (International) political actions and their resonance in (social) media is another topic for further research on the global dimension of online discourses on cultivated meat.

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Appendix 1

List of the articles and videos used for the analysis		
Source	**URL**	**Topic/content**
Avondshow - YouTube	https://www.youtube.com/watch?v=-fYs5Aj4IDNw	Cultured meat development (general), and why we need it
Nu.nl - YouTube	https://www.youtube.com/watch?v=-jz5kt4TSxrU	How cultured meat is made
Jeugdjournaal - YouTube	https://www.youtube.com/watch?v=eLK86Lx_1tc	How cultured meat is made, and how that compares to conventional meat
Telegraaf – YouTube	https://www.youtube.com/watch?v=82yqczTqqE0	Company Meatable, how they make cultivated meat and the (approval) challenges they face
Buitendienst - YouTube	https://www.youtube.com/watch?v=d9bByNb-Jso	How cultured meat is made (interview with Mark Post)
WNL - YouTube	https://www.youtube.com/watch?v=Vp1mvBZ5qP8	Company Mosa Meat, what they do and why (interview CEO and astronaut André Kuipers)
DeStentor – local newspaper	https://www.destentor.nl/economie/nobelprijswinnaars-kweekvlees-moet-koeien-kippen-en-varkens-deels-overbodig-maken~adb7bc09/	Why we need to invest in cultured meat in Europe
Nu.nl - newspaper	https://www.nu.nl/stelling/6271306/stelling-ik-stap-over-op-kweekvlees-zodra-dit-kan.html#nujij	Article prompting to react to statement: "I will move to cultivated meat when possible" (Note: there is no poll, responses do not always actually reply to the statement.)
AD - newspaper	https://www.ad.nl/economie/nobelprijswinnaars-kweekvlees-moet-koeien-kippen-en-varkens-deels-overbodig-maken~adb7bc09/	Why we need to invest in cultured meat in Europe
RTL - Twitter	https://twitter.com/RTLnieuws/status/1750398143005339757	Approval for tasting cultured meat in the Netherlands (link to own news website, but no comments possible there)
Correspondent - Twitter	https://twitter.com/S_VanTeutem/status/1749739873848685011	Why we need to invest in cultured meat in the Netherlands (link to own news website, but no comments possible there)
Correspondent - Reddit	https://www.reddit.com/r/nederlands/comments/19dkrpv/kweekvlees_is_de_toekomst_en_nederland_kan_de_weg/	Exactly the same article as above
Nu.nl - Reddit	https://www.reddit.com/r/thenetherlands/comments/14sfyzh/vlees_zonder_dierenleed_stap_dichterbij/	Approval for tasting and why we need to invest in cultured meat.
Arte - YouTube	https://www.youtube.com/watch?v=hmMAHbzFCPQ	Discussion of investments and if cultured meat is feasible or just based on an investment bubble
Quarks (WDR) - YouTube	https://www.youtube.com/watch?v=pLk1moqS-XM	Popular science format, including Interview with Mark Post, topic of upscaling
Nico Rittenau - YouTube	https://www.youtube.com/watch?v=_vCfhQMe7m4	Analysis of short- and long-term prospects, including company interviews, and ethical assessment by a very popular vegan cookbook author and food researcher

Richard David Precht - YouTube	https://www.youtube.com/watch?v=CsGJwO-flYc	Optimistic (regarding feasibility), but critical view by Richard David Precht, a popular philosopher, focusing on an ethical critique on economic and market aspects
Spiegel – national magazine	https://www.spiegel.de/wissenschaft/mensch/fleisch-aus-dem-labor-wir-brauchen-alternativen-die-keinerlei-verzicht-bedeuten-a-68ffe7b9-3886-45fb-b2b8-0859d8d36efb#kommentare	Interview with Nick Lin-Hi, an economic ethicist with a very optimistic view on market prospects of cultured meat
Spiegel – national magazine	https://www.spiegel.de/wissenschaft/usa-behoerde-haelt-laborfleisch-fuer-sicher-a-53696696-70bc-4b19-93ef-b1761f1cdc90	Rather critical view on price and sustainability, reporting on regulatory approval by FDA
Welt – national newspaper	https://www.welt.de/wirtschaft/article230832431/Clean-Meat-Jetzt-beginnt-die-echte-Fleischlos-Aera.html	Interview with Nick Lin-Hi, an economic ethicist with a very optimistic view on market prospects of cultured meat
Welt – national newspaper	https://www.welt.de/wissenschaft/article238230157/Laborversuch-Das-deutsche-Fleisch-aus-dem-3D-Drucker.html?icid=search.product.onsitesearch	Researcher on funding needs for cultured meat
Welt – national newspaper	https://www.welt.de/wissenschaft/article248583088/Laborfleisch-In-Italien-darf-Fleisch-aus-dem-Labor-kuenftig-weder-hergestellt-noch-verkauft-werden.html#Comments	Pro and contra voices on the Italian ban (animal rights organization, against EU constitution, Italian politicians) without opinion of the author
Zeit – national newspaper	https://www.zeit.de/2021/02/in-vitro-fleisch-fleischersatz-klimawandel-labor-zuechtung?utm_referrer=https%3A%2F%2Fwww.google.com%2F	Basic explanation of cultured meat production and likely product characteristics
FAZ – national newspaper	https://www.faz.net/aktuell/italien-untersagt-die-produktion-von-labor-fleisch-18784581.html	Critical comment piece on the Italian ban
TAZ – national newspaper	https://taz.de/Laborfleisch-der-Zukunft/!5923105/	Critical attitude, artists project on 'mammoth meat'
TAZ – national newspaper	https://taz.de/Neue-Proteinquellen/!5823710/	Short passage on cultured meat on similarity to conventional meat