



## OPEN ACCESS

EDITED BY  
Evan Bowness,  
Trent School of the Environment, Canada

REVIEWED BY  
Elan Abrell,  
Wesleyan University, United States

\*CORRESPONDENCE  
Adriana Jiménez Rodríguez  
✉ [Adriana.jimenez@ucr.ac.cr](mailto:Adriana.jimenez@ucr.ac.cr)

SPECIALTY SECTION  
This article was submitted to  
Social Movements, Institutions and  
Governance,  
a section of the journal  
Frontiers in Sustainable Food Systems

RECEIVED 22 November 2022  
ACCEPTED 24 January 2023  
PUBLISHED 16 February 2023

CITATION  
Jiménez Rodríguez A (2023) Cultured meat,  
clean meat,... queer meat? A vegan queer  
ecofeminist perspective on the implications of  
cellular agriculture.  
*Front. Sustain. Food Syst.* 7:1104731.  
doi: 10.3389/fsufs.2023.1104731

COPYRIGHT  
© 2023 Jiménez Rodríguez. This is an  
open-access article distributed under the terms  
of the [Creative Commons Attribution License  
\(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction  
in other forums is permitted, provided the  
original author(s) and the copyright owner(s)  
are credited and that the original publication in  
this journal is cited, in accordance with  
accepted academic practice. No use,  
distribution or reproduction is permitted which  
does not comply with these terms.

# Cultured meat, clean meat,... queer meat? A vegan queer ecofeminist perspective on the implications of cellular agriculture

Adriana Jiménez Rodríguez\*

School of Modern Languages Literature Department, University of Costa Rica, San José, Costa Rica

This perspective article briefly explores the social implications of cellular agriculture from a Vegan Queer Ecofeminist point of view by referring to a synthesis of currently agreed-upon (possible) positive and negative effects of post-animal agriculture and highlighting how these effects actually ignore key ethical problems inherent in animal agriculture itself. By invisibilizing these, discussions of cellular-ag remain in danger of obscuring the ways in which an intact and unexamined paradigm based on capitalist, patriarchal speciesism will continue to foment exploitative and unjust practices in a dying planet. The article emphasizes the urgent need to address the complexities of cellular-ag from a multidisciplinary perspective that actively engages with the demands of true global justice for all, nonhuman and human.

## KEYWORDS

cellular agriculture, clean meat, vegan queer ecofeminism, multidisciplinary approaches, global food justice

## Introduction

In the past I have argued that the disconnection between fields like ecofeminism, vegan studies, queer ecologies, disability studies and animal studies, to name just a few, has weakened their individual discussions of planetary devastation in the Anthropocene as well as the articulation of possible ways in which we can survive in the ruins, like Haraway puts it (Jiménez, 2018). I think that we need to add cellular agriculture to the table, urgently, pun intended. Just how we add it, though, is extraordinarily complicated. Here I want to briefly explore the idea that cultured or clean meat is actually queer meat, but not quite in the contemporary understanding of the term *queer*. This meat is queer in its original denotation, the true strange and peculiar coupling of nature (cells) and science (technological manipulation of cells for human purposes) but alas not *queer* in the transgressive theoretical and ideological thinking practice. Some have called this cultured meat “Frankenstein meat”. Whereas the original monster-character was indeed queer, vegan, even, this “monster” meat is *strange* without the political and ideological *queer* force behind it. The key argument in favor of cultured meat is that eliminating animal agriculture will immeasurably benefit nonhumans and the environment; this is a laudable claim, but it holds present and yet-to-be-imagined complications in terms of execution. However, even if feasible, eliminating the cause of undeniable suffering and devastation without understanding the intersecting oppressive forces that created it in the first place does not address the true source of human destruction of the planet and the systemic barbarity that enables it.

## The story so far: Pros

No ethical vegan can oppose cellular-ag and its queer post-animal products: cultured leather, cultured dairy, cultured eggs, cultured gelatin, and cultured meat are also cruelty-free in its broader definition. Stephens et al. (2018) mention the main authors with negative views, mostly in terms of solving ethical problems with biotechnology, fetishization of meat, and

decontextualization and molecularization of sustainability (Cole and Morgan, 2013; Metcalf, 2013; Marcuse et al., 2015; Lee, 2019). Conscientious theoretical nit-picking aside, the naked fact is that monumentally less nonhumans will suffer: this is irrevocably good news for the billions of nonhumans currently experiencing unnecessary and unspeakable torture and murder at the hands of humans, especially birds and sea creatures (*via* industrial fishing). The radical transformations promised by cellular-ag advocates in terms of environmental devastation are less irrevocable yet still scientifically plausible. At this point in the literature, researchers throw numbers in every direction, and these numbers vary (sometimes significantly) depending on who is footing the bill, as usual; a TEA (techno-economic analysis) commissioned by the Good Food Institute, vs. a counter-analysis ordered by Open Philanthropy, for example, bear radically different results (Fassler, 2021). Cellular-ag start-up enthusiasts, whose energy and optimistic focus is quite frankly admirable, claim that cultured meat will reverse global warming and save the world, in extravagant Global North statements such as Shapiro's "It's not difficult to envision local meat breweries popping up in nations that might have erected factory farms instead" (Shapiro, 2018, p. 258). Many scholars, myself included (an inhabitant of those "nations", in effect), actually do find it quite difficult. More cautious experts such as Mattick, point out that real effects will depend on the raw materials used for production in this new era of cell domestication and its industrialization: "while it might be plausible to reduce the global warming potential of cultured meat by selecting targeted, low-carbon energy sources, such alternative fuels may impact diverse stakeholders in different ways (Mattick, 2018, p. 33). Therefore, whereas the only factual response to exactly how much will global warming decrease with the (still aspirational) substitution of traditional animal-ag is the potential for "uncertain environmental impact" (Dutkiewicz and Abrell, 2021, p. 4) there is no possible way that (a) the planet survives present rate farm factories (b) an incursion of cultured meat production at an industrial level could possibly make the current state of affairs worse. A somewhat sober conclusion on this end of the issue is that some of the variables in consideration are not actually real at this point and speculation is complicated in the extreme, but it seems at this point that cultured meat will lower pollution, carbon emissions, and considerably help human-caused environmental damage control—cultured leather, for example, already has proven this, as Shapiro explains in *Clean Meat* (Shapiro, 2018).

## The story so far: Cons

In terms of the industrialization of clean meat that is required for it to adequately substitute animal-ag, two main types of objections arise: technical and ethical. An exhaustive list of the technical issues exceeds the purpose of this short article, but the main ones include the need for cell scaffolding for whole cuts of meat (as opposed to less complex ground-meat products which do not require as much blood oxygenation), the standardization of a vegan culture medium—the traditional one is bovine serum extracted from calf fetuses, a grotesque process even in the current meat industry (Shapiro, 2018), and bioreactor scalability (Fassler, 2021). Shapiro and other authors state that alternate serums are already in use in most

cellular-ag companies, and that others are even going serum-free. This is probably true but difficult to confirm because in the capital-driven race for store-ready cultured meat, secrecy is paramount—this, I believe, is a major red flag. However noble the motivations—and my research so far indicates nothing but passionate zeal to end cruelty against nonhumans from the (overwhelmingly male) humans behind every single cellular-ag effort—patriarchal capitalism can only allow altruism the narrowest of margins, mediated by profit. The rest of the issues pertain precisely to how quickly companies can start selling their products at scale, and this requires not only the science itself but the money to pay for it, as I will discuss later.

The ethical objections to industrialized cellular-ag abound, and, quite frankly, they are difficult to extricate from the technical ones for specific discussion. I believe, like many critics that have observed the epistemological holes in hailing cellular-ag as a techno-blessing that will solve all problems, that these ethical/technical entanglements also reside in the nucleus of patriarchal capitalism (and the planetary disaster that it has led us to). For starters, and in the process that Helliwell and Burton refer to as an ambiguous *remaking* of the agricultural world (Helliwell and Burton, 2021), a key aspect that worries experts across the board is worker displacement. The argument that farmers have always had to adapt and that they can "work elsewhere" sounds remarkably *a la* Marie Antoinette. Who will oversee a fair transition from animal-ag to cellular-ag both in terms of the human workforce and of the land? How can this process be modulated fairly? Indeed, "the synthetic revolution could also lead to the intensification of production and expansion of markets in ways that could look far less liberatory than imagined" (Abrell, 2021, 45). Newman et al. (2021) apply a telecoupling method to study socioeconomic and environmental implications over distances and relevantly point out, as an example, how cellular-ag dairy substitution in Canada would affect sugar plantations in an environmentally and politically vulnerable Brazil if cane sugar were chosen as an industrial raw material for production. The complications are vast, and to think that these research efforts on transnational geopolitical consequences of post-animal industrialization are as-yet speculative further emphasizes the need for caution in simplistic, overly optimistic projections. We can also never forget that, as to now, cellular-ag, even after overcoming the vegan serum hurdle, will continue to require donor nonhumans (avian and mammal) to provide cells for line production, as only fish cell lines are immortal. This raises numerous ethical complications, which Dutkiewicz and Abrell (2021) discuss at length. They conclude that ethical cell donation will per force require a guarantee of sanctuary-life status for all nonhumans involved, as well as strict nonhuman welfare regulations even in the private ag sectors—which so far are the overwhelming majority, one more troubling fact.

## Discussion: The vegan queer ecofeminist heart of the matter

Precisely as a vegan queer ecofeminist who works in the fields of literature, cultural studies and critical theory, I believe that this perspective on the social implications of biotechnological issues such

as cellular-ag is of vital importance. When Dutkiewicz and Abrell argue that “while cellular agriculture might diminish direct violence against animals, it would do little to change the underlying structural and epistemic violence that undergirds the use of animals, leaving anthropocentrism and speciesism unchallenged” (Dutkiewicz and Abrell, 2021, p. 4), I believe that they are right. These authors actually mention ecofeminist scholarship, which is unusual in the literature. Present discussions on cultured meat and its implications at large display much ignorance (or purposeful silence) of the decades-old claims of ecofeminist thinkers and their extensive writing on the patriarchal nature of the “structural and epistemic violence” that undergirds the barbaric animal-ag industry. Furthermore, in “many ways, the approach predicated on cultivating meat as a consumable is directly antithetical to the approach of cultivating care toward each other, other species, and the Earth at large” (Lee, 2019, p. 59). This reminds me very strongly of Gruen’s concept of entangled empathy, which I believe is much needed in any integral, multi-disciplinary approach to cellular-ag. Entangled empathy refers to a process that involves “a blend of emotion and cognition in which we recognize we are in relationships with others and are called upon to be responsive and responsible in these relationships by attending to another’s needs, interests, desires, vulnerabilities, hopes, and sensitivities” (Gruen, 2015). This process requires looking at specific, detailed contexts of oppression that situate human/nonhuman relationships in locations where species, gender, race, class, ability status and many more intersect. Patriarchal capitalist oppressions interfere with proper, *just* attention to all the participants in post-animal agriculture, the nonhumans, the human workers, the humans with access to clean meat and those without, the transformed geographies of the landscape, the resources for production, the water and energy, everything. The basis of all these types of violence is patriarchy, and its current political, ideological and economic system: capitalism. From a vegan queer ecofeminist perspective, the heart of the matter is that cellular-ag is trying to revolutionize the world in terms of human-caused planetary devastation without revolutionizing anything; in other words, cellular-ag enthusiasts are claiming the impossibility of achieving planetary justice while in slavery to capital. This truly is the impossible dream. I am not alone in this assertion. Cellular-ag, argues Abrell, “has the potential to achieve... liberatory aspirations”, but “its status as a project of the same capitalist system of production that gave us industrial animal agriculture raises questions about how capitalism might fundamentally limit that potential (Abrell, 2021, p. 4). I found this to be a latent concern in most of the literature.

The goal is to keep food justice in sight. This concept is key to understand the level of complexity required in adequately preparing and proposing a cellular-ag substitution of animal agriculture. Food justice involves resisting the current capitalist global food regime and will “require a radical rethinking of this rationalist, centrist conceptual structure as well as a political reorganization of power” (Portman, 2018, p. 460–461) and avoiding scenarios where “the Global South can easily become regarded as either recipient or raw-material supplier” (Jönsson, 2020, p. 931). Thus, hardened pessimistic skeptics like Fassler (2021), whose main argument is basically is that the science needed for a cellular-ag market revolution simply does not exist and that cultured meat “may never reach price parity on its own terms. It will likely need public or philanthropic support to be competitive” are in fact, not wrong. If the pressing issue is

cost, to be able to access consumers in order to return investments, then, indeed “encouraging public–private partnerships, collaborating on public and private investment, developing infrastructure and supporting training will all be necessary” (Fraser et al., 2021). The private sector is simply not going to manage by itself; there has to be financial and political partnership with governments. Let us consider Eat Just, ready “to open a large-scale cultivated meat plant in Doha, Qatar, in partnership with two state-backed organizations—Doha Venture Capital, a VC firm, and the Qatar Free Zones Authority” (Fassler, 2021); the technology is coming, no doubt about it, and joint private and public efforts seem the only way to go. This, unfortunately, becomes a gargantuan feat in countries like the United States, where what little centralization exists is rigged to benefit the animal agriculture corporate sector, which has amassed immense power, and, which, coincidentally, has a lot to do with the present-day low prices of dead nonhuman meat that make it so pressing for cultured meat to race to compete. In fact, “farm subsidies cost the American taxpayer about \$20 billion every year, more than double the EPA’s budget, mostly to support wealthy corporate farms” (Shapiro, 2018, p. 162). Another important thing that governments could help influence is in taking the attention away from consumers (by financially and ideologically supporting cellular-ag products, as they have done in the past for privileged food industries). Pages and pages of research refer to how difficult it will be to convince consumers to choose cultured meat consistently—and here the hysterical anti GMO groups definitely play a part, never mind that rennet and heme are already present in store products and that the vast majority of GMO plantations actually support feed crops for animal agriculture (Shapiro, 2018, p. 203, 234). I would love nothing more than to believe that consumers just “don’t think about the inefficiency, the filth, cruelty, the climate change. But once they know there’s an alternative that’s healthier, that doesn’t include the pathogens, and that doesn’t harm animals, people will absolutely switch over” (Shapiro, 2018, p. 164), but unfortunately I am not quite that optimistic. In any event, whether good sense manages to prevail or not seems irrelevant given the reality of the planet. Soon there will be no choice. This seems a judicious moment for states worldwide to take an energetic stand for survival, capitalist consumer free-will aside.

An ecofeminist, entangled-empathy, global food justice perspective is the most balanced. Where can we possibly start, when the task at hand seems close to impossible? I would like to end with a very specific example: Datar’s comment in Shapiro’s book (one of the few women that he mentions significantly) whose statement on the “competition” between plant-based meat products and cultured meat is emblematic of what an explicitly vegan queer ecofeminist perspective can contribute to this discussion: *we need both*, desperately, and any other alternatives that come up along the way, “a hybridization of cultured and plant-based foods similar to what Impossible Foods is doing with its yeast-produced heme” (Shapiro, 2018, p. 172). Stephens et al. concur, when they argue for “a multi-faceted response which includes a range of approaches, including promoting meat reduction and plant-based proteins, improved waste management strategies, and policy reforms that redress the systemic inequalities within contemporary protein and livestock food systems” (Stephens et al., 2018, p. 164). Only this, hand-in-hand with a real global paradigm shift, can guarantee any degree of planetary preservation.

## Conclusion: Proceed with interconnected/interdisciplinary caution

The ethical and practical human atrocities that have created the current devastated state of planet Earth have officially proven to what lengths the division between fields of study need to disappear. Time is of the essence, now more than ever. Cellular-ag is the stuff of science fiction (in the *now*), and as such, we need to team up and look at all its related phenomena from a multidisciplinary perspective. Humans and nonhumans alike have too much at stake to allow for blind spots. Science can only become stronger and more ethical when aided by cultural studies experts from all its critical schools of thought. Other areas as well, for example degrowing economy theories that lead to greener economic policies, are indubitably of the utmost importance to any integral cellular-ag endeavor. How can we make this Frankenstein survive? I argue that we make this *queer* meat work (wholly engaged with true *global justice*) by understanding that a monolithic, un-interrogated capitalist-patriarchal adjacent, biological science-exclusive approach will inevitably fail. We better start engineering the political into this queer post-animal meat along with proteins and fats because we can all agree that the inexcusably horrific murderous ways in which humans are procuring their meat right now finally have an expiration date.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## References

- Abrell, E. (2021). 'From livestock to cell-stock': farmed animal obsolescence and the politics of resemblance. *Tsantsa*. 26, 37–50. doi: 10.36950/tsantsa.2021.26.6943
- Cole, M., and Morgan, K. (2013). Engineering Freedom? A critique of biotechnological routes to animal liberation. *Configurations*. 21, 201–229. doi: 10.1353/con.2013.0015
- Dutkiewicz, J., and Abrell, E. (2021). Sanctuary to table dining: cellular agriculture and the ethics of cell donor animals. *Politics Anim.* 7, 1–15.
- Fassler, J. (2021). "Lab-grown meat is supposed to be inevitable," in *The Science Tells a Different Story. The Counter* (Jeffrey Kittay). Available online at: <https://thecounter.org/lab-grown-cultivated-meat-cost-at-scale/>
- Fraser, E., Newman, K. A., Newman, L., Massow, M., von and Newell, R. (2021). "Lab-grown meats and cow-free dairy can meet the demand for protein and help address climate change", in *The Conversation*.
- Gruen, L. (2015). *Entangled Empathy*. New York: Lantern Books.
- Helliwell, R., and Burton, R. J. F. (2021). The promised land? Exploring the future visions and narrative silences of cellular agriculture in news and industry media. *J. Rural Stud.* 84, 180–191. doi: 10.1016/j.jrurstud.2021.04.002
- Jiménez, A. (2018). 'Strange coupling': vegan ecofeminism and queer ecologies in theory in practice chapter 2: queer ecologies, complications and possibilities in coupling with queer vegan ecofeminism(s). *Revista de Lenguas Modernas*. 28, 403–425. doi: 10.15517/rlm.v0i28.34847
- Jönsson, E. (2020). On breweries and bioreactors: probing the "present futures" of cellular agriculture. *Trans. Inst. Br. Geogr.* 45, 921–936. doi: 10.1111/tran.12392
- Lee, A. (2019). The Milkmaid's tale: veganism, feminism, and dystopian food futures. *Windsor Rev. Leg. Soc. Issues*. 40, 27–66.
- Marcuse, A., Gaspar, R., Rutsaert, P., Seibt, B., Fletcher, D., Verbeke, W., et al. (2015). Analogies, metaphors, and wondering about the future: Lay sense-making around synthetic meat. *Public Understand. Sci.* 24, 547–562. doi: 10.1177/0963662514521106
- Mattick, C. S. (2018). Cellular agriculture: the coming revolution in food production. *Bull. At. Sci.* 74, 32–35. doi: 10.1080/00963402.2017.1413059
- Metcalfe, J. (2013). Meet shmeat: Food system ethics, biotechnology and re-worlding technoscience. *Parallax*. 19, 74–87. doi: 10.1080/13534645.2013.743294
- Newman, L., Newell, R., Mendly-Zambo, Z., and Powell, L. (2021). Bioengineering, telecoupling, and alternative dairy: agricultural land use futures in the Anthropocene. *Geogr. J.* 1–16. doi: 10.1111/geoj.12392
- Portman, A. (2018). Food sovereignty and gender justice. *J. Agric. Environ.* 31, 455–466. doi: 10.1007/s10806-018-9739-2
- Shapiro, P. (2018). *Clean Meat*. New York: Gallery Books.
- Stephens, N., Di Silvio, L., Dunsford, I., Ellis, M., Glencross, A., and Sexton, A. (2018). Bringing cultured meat to market: Technical, socio-political, and regulatory challenges in cellular agriculture. *Trends Food Sci. Technol.* 78, 155–166. doi: 10.1016/j.tifs.2018.04.010

## Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

## Funding

Publication of this research is supported by the Food and Agriculture Institute at the University of the Fraser Valley.

## Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.