

# LABELING THE NEW MEATS: APPLYING PREEXISTING PRINCIPLES TO THE REGULATION OF RADICAL PRODUCTS

## INTRODUCTION

Over the course of the coming decade, the perception of what it means to be “meat” is going to radically change. Plant-based meat products have begun to mimic the taste and texture of meat so accurately that they are quickly becoming an acceptable alternative to traditional meat.<sup>1</sup> In the near future, in vitro meat (or so-called “lab-grown” meat) will be an indistinguishable alternative to meat harvested from animals.<sup>2</sup> These products promise to usher in a future of meat consumption unshackled from the animal suffering and environmental harm that are generally accepted today as a necessary evil in agriculture.<sup>3</sup> With these new products will come new regulatory challenges, not least of which is the issue of how these new meat products should be labeled.

This Note looks to past and present labeling regulations, as well as the theory behind labeling regulation, to argue for how the future labeling of meat substitutes should proceed. Section I of this Note introduces plant-based and in vitro meat and explores the unique aspects and implications of each. Section II examines current state and federal regulations that will affect the labeling of meat substitutes. Section III delves into the essential considerations that must be weighed when contemplating the mandatory labeling of consumer food products. Section IV looks at labeling regulations of plant-based milk and genetically engineered food products, and uses these examples as indicators for how regulation of meat substitutes should or could progress. Section V proposes specific regulatory approaches for plant-based and in vitro meat considering likely and potential future developments, and finally argues that similar standards should be applied to traditional meat.

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1. See discussion *infra* Section I.A.  
2. Carolyn Mattick & Brad Allenby, *The Future of Meat*, ISSUES SCI. & TECH., Fall 2013, at 64, 66; see also *infra* text accompanying note 34.  
3. For a discussion of the problems with traditional meat, see discussion *infra* Section V.C.

## I. MEAT ALTERNATIVES

### A. Plant-Based Meat

It looks like meat, it tastes like meat, it even bleeds like meat, but take a closer look at the Impossible Burger's ingredients and you will find an assortment of potato protein, wheat protein, as well as coconut and soy derivatives.<sup>4</sup> The Impossible Burger is one of several recently debuted products that promise to turn our conception of meat on its head.<sup>5</sup> However, these newcomers enter an already populated field of plant-based meats. While nobody is likely to mistake their products for actual meat, brands like Tofurky have spent several decades producing plant-based products intended to replace meat.<sup>6</sup> Already, plant-based meats boast \$670 million in yearly U.S. sales.<sup>7</sup>

The most obvious benefit of plant-based meat is that it allows vegetarians and vegans to consume types of foods which are ordinarily reserved for the omnivorous masses. With an increasing number of Americans choosing to abstain from meat,<sup>8</sup> it is no wonder that plant-based meats are seeing a steady growth in sales.<sup>9</sup> This increased popularity of plant-based foods is likely also the result of people trying to cut down on meat consumption due to the perceived immorality of factory farming.<sup>10</sup> Globally, the popularity of meat-free diets largely comes from religious traditions that hold a

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4. Matt Simon, *The Impossible Burger: Inside the Strange Science of the Fake Meat that 'Bleeds'*, WIREDC (Sept. 20, 2017, 11:00 AM), <https://www.wired.com/story/the-impossible-burger/> [https://perma.cc/PSD3-RYNC].

5. Impossible Foods is the maker of the new Impossible Burger, but competitor Beyond Meat has also recently debuted their faux burger. Mahita Gajanan, *The Meat Industry Has Some Serious Beef with Those 'Bleeding' Plant-Based Burgers*, TIME (Mar. 21, 2018), <http://time.com/5181524/impossible-burger-plant-based/> [https://perma.cc/93T5-6LLY].

6. *Our Story: Our Roots*, TOFURKY, <https://tofurky.com/our-story/our-roots/> [https://perma.cc/5V99-GVP5].

7. Press Release, Plant Based Foods Ass'n, *Plant-Based Food Sales Grow 20 Percent 1* (July 30, 2018), <https://plantbasedfoods.org/wp-content/uploads/2018/07/PBFA-Release-on-Nielsen-Data-7.30.18.pdf> [https://perma.cc/ER7X-B24P].

8. Marcelo Gleiser, *Is a No-Meat World Really Better?*, NPR (June 28, 2017, 4:32 PM), <https://www.npr.org/sections/13.7/2017/06/28/532880755/is-a-no-meat-world-really-better> [https://perma.cc/3PVG-LBRT] (finding a general trend of increasing numbers of Americans choosing meat-free diets).

9. See Plant Based Foods Ass'n, *supra* note 7 (showing plant-based meat sales increased 6 percent in 2017 and 24 percent in 2018).

10. A 2017 Ipsos Group survey found that 54 percent of U.S. adults were trying to consume fewer animal products and more plant-based products, 69.6 percent have some discomfort with the way animals are used in the food industry, and 48.9 percent support an outright ban on factory farming. Jacy Reese, *Survey of US Attitudes Towards Animal Farming and Animal-Free Food October 2017*, SENTIENCE INST. (Nov. 20, 2017), <https://www.sentiencainstitute.org/animal-farming-attitudes-survey-2017> [https://perma.cc/BX9G-XB3C].

vegetarian diet to be a moral good.<sup>11</sup> Although the perceived immorality of traditional meat is a major reason that people consume meat alternatives, it is far from the only reason to do so.

The environmental impact of producing plant-based meat is much smaller than producing traditional meat, meaning more plant-based meat substitution would be good for the environment.<sup>12</sup> Livestock activities produce an estimated 18 percent of total human-caused greenhouse gas emissions, and they produce nearly 80 percent of all emissions related to agriculture.<sup>13</sup> Beyond greenhouse gases, raising livestock has a tremendous negative impact on water supplies<sup>14</sup> and bio-diversity.<sup>15</sup> A final often-overlooked problem with using animals for food is that feeding and housing animals takes up a lot of space. Livestock production currently uses 30 percent of the world's land area—much of which could be given back to native plant and animal species and reforested if consumption of traditional meat were to substantially decrease.<sup>16</sup>

With meat consumption on the rise around the world, problems caused by traditional meat production will only get worse without substantial changes.<sup>17</sup> Since the problems of traditional meat production result from the process of raising billions of animals, a remedy might be found in divorcing meat from animals altogether. One way to accomplish this is through a large-scale transition to plant-based meat consumption, but another is production of real meat outside the bodies of animals.

### B. “Lab-Grown” Meat

While plant-based “meat” products are currently disrupting the meat industry, the meat substitute with the biggest long-term potential is real meat grown in a laboratory rather than in an animal.<sup>18</sup> Since the product is still in its infancy, many terms are currently used to refer to meat grown outside of

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11. See Jo Ann Davidson, *World Religions and the Vegetarian Diet*, J. ADVENTIST THEOLOGICAL SOC'Y, Fall 2003, at 114, 114–18 (exploring the strong traditions in Hinduism, Buddhism, and Jainism that find consumption of meat to be immoral and encourage a vegetarian diet).

12. See Simon, *supra* note 4 (noting the environmental benefits of switching to plant-based meats).

13. U.N. FOOD & AGRIC. ORG., *LIVESTOCK'S LONG SHADOW: ENVIRONMENTAL ISSUES AND OPTIONS*, at xxi, 112 (2006) [hereinafter *LIVESTOCK'S LONG SHADOW*], <http://www.fao.org/3/a0701e/a0701e.pdf> [<https://perma.cc/JB63-G3J4>].

14. *Id.* at 167–69.

15. *Id.* at 214–15.

16. *Id.* at 74.

17. See *id.* at 7–11 (explaining that urbanization and economic growth are shifting global dietary preferences toward meat, which combines with an increasing global population to greatly increase overall demand for meat). Despite increasing consumption of meat substitutes in the developed world, global economic and population growth largely in the developing world have caused a net increase in global meat consumption likely to continue in the near future.

18. See Mattick & Allenby, *supra* note 2, at 66; see also *infra* text accompanying notes 34–35.

an animal, including: “synthetic meat,” “lab-meat,” and “cultured meat.”<sup>19</sup> In this Note, I will use the term “in vitro meat,” which has a comparatively neutral connotation and has been used in much of the scientific and legal literature on the topic.<sup>20</sup> While in vitro meat has great potential, it is not yet viable as a consumer product.<sup>21</sup> However, with plant-based meats already on the market, now is the time for regulators to begin rethinking how they deal with meat and meat substitutes.

In order for in vitro meat to become a viable consumer product, scientists will need to achieve greater efficiencies in the multi-step production process, the generalities of which are unlikely to change.<sup>22</sup> The process starts with a few cells extracted from a living animal and ends with a full cut of meat. First, tissue is extracted from a live animal and the stem cells within are isolated.<sup>23</sup> Next, these cells are grown in a three-dimensional scaffold to assume the same structure as traditional meat.<sup>24</sup> A variety of cell types must be grown together in this scaffold, including fat, skeletal muscle, and other types of structural cells.<sup>25</sup> Finally, the meat is conditioned—a process required to achieve the texture of traditional meat.<sup>26</sup> Conditioning

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19. See, e.g., Patrick D. Hopkins & Austin Dacey, *Vegetarian Meat: Could Technology Save Animals and Satisfy Meat Eaters?*, 21 J. AGRIC. ENVTL. ETHICS 579, 582, 585 (2008) (using the terms “biotechnologically produced meat,” “cultured meat,” “synthetic meat,” and “in vitro meat”). The terms “lab-meat” and “lab-grown meat” are more common in non-academic articles on the subject, and as a result are more well known. See, e.g., John Birdsall, *Is Lab-Grown Meat Ready for Dinner?*, WALL ST. J. (Oct. 16, 2018, 10:45 AM), <https://www.wsj.com/articles/is-lab-grown-meat-ready-for-dinner-1539701100> [<https://perma.cc/39S4-9BJY>].

20. “In vitro” means “outside the living body and in an artificial environment.” *In Vitro*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/in%20vitro> [<https://perma.cc/6PW-W-MGBK>]. In vitro meat is distinguished from traditional meat, which is produced “in vivo,” meaning “in the living body of a plant or animal.” *In Vivo*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/in%20vivo> [<https://perma.cc/JNN6-NFLA>]. In acknowledging that in vitro meat biologically is real meat, and to avoid confusion, I will also be referring to non-in vitro meat as “traditional meat” throughout this Note.

21. Elie Dolgin, *Lab-Grown Meat Gets Rare Funding Boost*, 566 NATURE 161, 161 (2019) (“Despite the booming commercial interest in developing meat that is eco-friendly and ethically sound, critics argue that the industry lacks much of the scientific and engineering expertise needed to bring lab-grown meat to the masses. . . . ‘There are lots of technical hurdles here to overcome’ . . . .” (quoting Paul Mozdziak, a muscle biologist at North Carolina State University in Raleigh)).

22. *Id.*

23. *Id.* While ordinarily these cells are sourced from the bodies of living animals, to further avoid animal suffering at least one in vitro meat producer has sourced stem cells from umbilical cords which would otherwise be discarded. Erin Brodwin, *A New Lab-Grown Meat Startup Says It’s Overcome a Key Barrier to Making Meat Without Slaughter*, BUS. INSIDER (Sept. 28, 2018, 8:27 AM), <https://www.businessinsider.com/lab-grown-meat-startup-solving-barrier-meat-without-slaughter-meat-able-2018-9> [<https://perma.cc/BJA7-SXDF>].

24. Marloes L.P. Langelaan et al., *Meet the New Meat: Tissue Engineered Skeletal Muscle*, 21 TRENDS FOOD SCI. & TECH. 59, 61 (2010).

25. *Id.* at 61.

26. *Id.* at 62–63.

involves exercising the muscle cells through physical or electronic stimulation.<sup>27</sup>

Challenges and inefficiencies exist at every stage of the production process.<sup>28</sup> Major challenges include cell sourcing, producing muscle strands longer than those found in ground meat, and approximating the taste and color of meat without artificial additives.<sup>29</sup> Only when these and other challenges are overcome can in vitro meat be made indistinguishable from traditional meat and sold at a competitive price. While the first publicly consumed in vitro meat product was a hamburger produced for \$335,000 in 2013,<sup>30</sup> experts predict that certain in vitro meat products will be commercially viable within only a few years.<sup>31</sup>

Once viable, in vitro meat promises many of the same benefits as plant-based meats. While in vitro meat requires the use of actual animal tissue, its production process avoids the necessity of slaughter and would eliminate the need for animal suffering outside of the initial cell extraction process.<sup>32</sup> It also offers many of the same environmental benefits of eliminating the massive land use and carbon dioxide output from raising animals for meat production.<sup>33</sup> Moreover, unlike plant-based meat, in vitro meat could become indistinguishable from cuts of traditional meat.<sup>34</sup> The product could

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27. *Id.*

28. *Id.* at 63.

29. *Id.* at 63–64.

30. Mattick & Allenby, *supra* note 2, at 64–65.

31. *Id.* at 65. Major in vitro meat companies generally plan on having their products on the market by 2021. See Terence Chea, *Meat from a Lab? Startups Cook Up Alternative to Slaughter*, DENVER POST (July 9, 2019, 6:56 AM), <https://www.denverpost.com/2019/07/09/startups-cell-based-cultured-meats/> [<https://perma.cc/3V8S-FCFW>] (profiling Memphis Meats which expects to be viable by 2021); Andrés González & Silke Koltowitz, *The \$280,000 Lab-Grown Burger Could Be a More Palatable \$10 in Two Years*, REUTERS (July 9, 2019, 10:45 AM), <https://www.reuters.com/article/us-food-tech-labmeat/the-280000-lab-grown-burger-could-be-a-more-palatable-10-in-two-years-idUSKCN1U41W8> [<https://perma.cc/DAG9-Y77N>] (Biotech Foods in 2021).

32. Taylor A. Mayhall, *The Meat of the Matter: Regulating a Laboratory-Grown Alternative*, 74 FOOD & DRUG L.J. 151, 161 (2019) (“[V]egans, vegetarians, and animal lovers may prefer laboratory meat for its animal welfare implications. . . . Many believe the current practices to be inhumane for animals who are raised solely to breed and die. ‘Victimless’ meat is a winning solution for those ethically concerned.”). Despite the decreased suffering associated with production of in vitro meat, it is not universally supported by vegans and vegetarians. When PETA, a popular animal rights group, announced a one-million-dollar prize for the first commercial in vitro meat product, some within the organization opposed the move, arguing that in vitro meat strengthened the idea that eating animal flesh can be ethical. John Schwartz, *PETA’s Latest Tactic: \$1 Million for Fake Meat*, N.Y. TIMES (Apr. 21, 2008), <https://www.nytimes.com/2008/04/21/us/21meat.html> [<https://perma.cc/GR92-XPLZ>].

33. See LIVESTOCK’S LONG SHADOW, *supra* note 13; Jennifer Penn, “Cultured Meat”: *Lab-Grown Beef and Regulating the Future Meat Market*, 36 UCLA J. ENVTL. L. & POL’Y 104, 109–11 (2018). But see John Lynch & Raymond Pierrehumbert, *Climate Impacts of Cultured Meat and Beef Cattle*, FRONTIERS SUSTAINABLE FOOD SYS., Feb. 2019, at 1, 8 (finding that “[r]eplacing cattle systems with cultured meat production before energy generation is sufficiently decarbonized and/or the more optimistic production footprints presented here are realized (assuming they can be), could risk a long-term, negative climate impact”).

34. Mattick & Allenby, *supra* note 2, at 66.

even go beyond indistinguishability and be engineered to be more nutritious and flavorful than traditional meat.<sup>35</sup> However, because the future of in vitro meat is speculative, so are the benefits.<sup>36</sup>

The speculative future of in vitro meat cuts both ways. Because in vitro meat is an innovative product, it could be harmful in its disruption of the current meat economy.<sup>37</sup> For instance, in vitro meat could exacerbate poverty in developing countries with primarily agricultural economies by shifting the production of meat back into industrialized economies.<sup>38</sup> Some also fear that the complexity and novelty of in vitro meat might make the product unforeseeably dangerous.<sup>39</sup>

In vitro meat's future is speculative partially because its adoption largely depends on public opinion. Many people have a negative perception of in vitro meat, considering it to be inauthentic or unnatural.<sup>40</sup> These perceptions threaten the product's success,<sup>41</sup> but they are likely malleable.<sup>42</sup>

Negative perceptions of in vitro meat also derive from ethical concerns regarding possible uses and effects of the technology. One ethical issue with in vitro meat is the potential for production of "unethical" meats. A person could, for instance, produce in vitro meat from human cells.<sup>43</sup> The potential for in vitro meat to violate cultural taboos around cannibalism is real, but this application of the technology is unlikely to materialize. Most new technologies can be used to violate deep-seated taboos and fundamental social norms, but rarely are such violations realized. One need only look to cloning technology to see that such fears are generally misplaced—livestock are now regularly cloned, but despite widespread panic a decade ago about the ethical implications of cloning technology, no human has ever

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35. *Id.*

36. *See id.* at 64–65 (emphasizing the uncertain future of in vitro meat and the possibility of negative consequences).

37. *Id.* at 67–68.

38. *Id.* at 68. *But see* Penn, *supra* note 33, at 112–13 (suggesting that in vitro meat could help to address food insecurity).

39. Hopkins & Dacey, *supra* note 19, at 585–86.

40. Clemens Driessen & Michiel Korthals, *Pig Towers and In Vitro Meat: Disclosing Moral Worlds by Design*, 42 SOC. STUD. SCI. 797, 807, 810 (2012).

41. Mattick & Allenby, *supra* note 2, at 65.

42. *See* Driessen & Korthals, *supra* note 40, at 807–08 (suggesting that current widespread cultural taboos around human corpses could naturally extend to animal corpses if the concept of meat was separated from the necessity of a corpse); Christopher J. Bryant et al., *Strategies for Overcoming Aversion to Unnaturalness: The Case of Clean Meat*, 154 MEAT SCI. 37, 44 (2019) (finding that messages that highlight the unnaturalness of conventional meat were effective in overcoming consumer concerns); Christopher Bryant & Julie Barnett, *Consumer Acceptance of Cultured Meat: A Systematic Review*, 143 MEAT SCI. 8 (2018) (reviewing empirical studies of consumer acceptance of in vitro meat).

43. Zachary Schneider, Comment, *In Vitro Meat: Space Travel, Cannibalism, and Federal Regulation*, 50 HOUS. L. REV. 991, 1023–24 (2013).

been cloned.<sup>44</sup> A final ethical concern is the status of current farm animals should they be entirely replaced by in vitro meat production.<sup>45</sup> Domesticated pigs, cows, and chickens could find that they have no place in a world without a traditional meat industry. While interesting to consider, such a world is far too distant and speculative for the question to have any logical bearing on current practices and regulation.<sup>46</sup> Despite ethical qualms, and despite mixed public opinion, in vitro meat is coming and regulators have already begun to consider its impact.

## II. CURRENT AND ANTICIPATED REGULATION

With the viability of plant-based and in vitro meat as large-scale substitutes for traditional meat just over the horizon,<sup>47</sup> states and the federal government are beginning to take steps to regulate these products. Missouri was the first state to enact labeling regulations when it sharply curtailed the ability to market meat substitutes as meat.<sup>48</sup> Meanwhile, the federal government has taken preliminary steps to create a framework for regulatory authority over in vitro meat.<sup>49</sup> The steps taken at this point by states and the federal government are not definitive. However, they establish the groundwork for how the next decade of regulatory developments are likely to progress.

### A. Missouri and State-Level Regulation

In August 2018, a bold new Missouri law went into effect that aimed to exclude in vitro and plant-based “meats” from the legal definition of meat.<sup>50</sup> Under this new law, it is a misdemeanor to represent a product as meat that “is not derived from harvested production livestock or poultry.”<sup>51</sup> Initially, the enforcement implications of the new act were unclear, and

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44. For a discussion of the debate around cloning regulation, see John F. Murphy, *Mandatory Labeling of Food Made from Cloned Animals: Grappling with Moral Objections to the Production of Safe Products*, 63 FOOD & DRUG L.J. 131 (2008).

45. Hopkins & Dacey, *supra* note 19, at 590.

46. *See id.* at 590–91 (suggesting that a slow transition to in vitro meat would likely result in a similarly slow decline in livestock populations and would be unlikely to cause a crisis of excess livestock).

47. While plant-based meats are currently viable as large-scale substitutes for some meat products—like ground beef—they are not yet viable alternatives to meat products as a whole. *See* Dana Hatic, *Impossible Foods Will Attempt the Impossible: A ‘World-Class’ Meatless Steak*, EATER (Jan. 11, 2019, 9:12 AM), <https://www.eater.com/2019/1/11/18177441/impossible-foods-fake-meat-substitute-steak> [<https://perma.cc/R629-MEZW>].

48. *See* discussion *infra* Section II.A.

49. *See* discussion *infra* Section II.B.

50. Act of June 1, 2018 Mo. Laws 1014 (codified in scattered sections of tit. X, XVI, XVII).

51. MO. REV. STAT. §§ 265.494, 265.496 (2018).

manufacturers of meat-substitute products feared for the worst.<sup>52</sup> However, later guidance from the Missouri Department of Agriculture stated that meat substitutes could still use the term “Meat” in their labeling so long as the term was accompanied by an appropriate qualifier like “Plant-Based.”<sup>53</sup>

Perceptions of the Act’s intent are mixed. Proponents claim the Act will prevent customers from being misled; opponents view the law as a shield protecting the traditional meat industry from competition.<sup>54</sup> The enacting legislators’ intentions appear to be a combination of these two understandings. They claim to be protecting Missouri’s cattle industry from competition with meat alternatives, and they assert that such competition is only possible due to misrepresentations about meat alternatives.<sup>55</sup> Because labeling restrictions diminish the ability of meat alternatives to compete, it is not surprising that the first state to enact such a restriction is also a major livestock producer.<sup>56</sup>

Missouri is not unique in enacting legislation to protect a domestic food industry. State regulation of food often favors local products, a tendency that has led courts to find many state food regulations unconstitutional.<sup>57</sup> In response to what they see as an unfair targeting of meat substitutes, a coalition of organizations, including the American Civil Liberties Union (ACLU) of Missouri, Tofurkey, and the Animal Legal Defense Fund, have come together to challenge Missouri’s new law.<sup>58</sup> The coalition alleges that the labeling law is unconstitutional under the Dormant Commerce Clause, a legal doctrine that prevents states from discriminating against or unduly burdening interstate commerce.<sup>59</sup>

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52. See Amy Martyn, *Missouri Is About to Criminalize Using the Word ‘Meat’ to Sell Meat Substitutes*, CONSUMERAFFAIRS (Aug. 28, 2018), <https://www.consumeraffairs.com/news/missouri-is-about-to-criminalize-using-the-word-meat-to-sell-meat-substitutes-082818.html> [<https://perma.cc/39L4-3S4C>] (explaining that the Missouri Attorney General’s office has refused to clarify how it will enforce this law).

53. Memorandum from the Mo. Dep’t of Agric. to the Meat Inspection Program, Missouri’s Meat Advertising Law (Aug. 30, 2018), <https://agriculture.mo.gov/animals/pdf/missouri-meat-advertising-guidance.pdf> [<https://perma.cc/YKG8-ARNW>].

54. Madison Park, *‘Fake Meat’ Is at the Center of Food Fight in Missouri*, CNN (Aug. 29, 2018, 9:55 AM), <https://www.cnn.com/2018/08/29/health/missouri-meat-law/index.html> [<https://perma.cc/MW6-Q8MR>].

55. See Martyn, *supra* note 52.

56. Rob Cook, *Ranking of States with the Most Beef Cows*, BEEF2LIVE (Jan. 14, 2020), <http://beef2live.com/story-ranking-states-beef-cows-0-108181> [<https://perma.cc/K2QM-DB2U>] (showing that Missouri ranks third among states in the number of beef cows).

57. See, e.g., *Dean Milk Co. v. City of Madison*, 340 U.S. 349 (1951).

58. Complaint for Declaratory and Injunctive Relief at 19–21, *Turtle Island Foods, SPC v. Richardson*, No. 2:18-CV-04173 (W.D. Mo. Aug. 27, 2018); *Lawsuit Raises the Stakes in Food Fight Over the Term “Meat,”* ACLU MO. (Aug. 27, 2018, 12:15 PM), <https://www.aclu-mo.org/en/news/lawsuit-raises-stakes-food-fight-over-term-meat> [<https://perma.cc/8YQG-R3FP>] [hereinafter ACLU].

59. Complaint for Declaratory and Injunctive Relief, *supra* note 58, at 19–21.



State food regulations have a long history of being struck down under the Dormant Commerce Clause.<sup>60</sup> Because Missouri's labeling restriction equally affects meat substitutes produced in-state and out-of-state, it is facially neutral.<sup>61</sup> But facially neutral laws can still be unconstitutional under the Dormant Commerce Clause when they have the effect or purpose of favoring in-state economic interests over out-of-state economic interests.<sup>62</sup>

Missouri's labeling law appears to have been enacted with such a discriminatory purpose. State legislators have explained their support of the law, saying, "[w]e wanted to protect our cattlemen in Missouri,"<sup>63</sup> and "[a]ll we're trying to do is basically just protect our meat industry."<sup>64</sup> The law also appears to have a discriminatory effect. By limiting how substitutes for traditional meat can be represented, Missouri is impairing these products' ability to appeal to consumers and compete with traditional meat.<sup>65</sup> Since Missouri is a major producer of traditional meat but not meat substitutes, the effect of the law is to favor in-state products over out-of-state products.<sup>66</sup> Because the labeling law was enacted with a discriminatory purpose and has a discriminatory effect, Missouri's law is likely unconstitutional under the Dormant Commerce Clause.<sup>67</sup>

Missouri is not the only state to enact a meat labeling law. Several other states have passed broadly similar laws, including Arkansas and Mississippi, where similar lawsuits were also brought.<sup>68</sup> As this issue

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60. See *Dean Milk Co.*, 340 U.S. at 356 (finding local processing requirement for milk to be unconstitutional); *Hunt v. Wash. State Apple Advert. Comm'n*, 432 U.S. 333, 351–54 (1977) (finding regulations protecting local apple industry from out-of-state competition to be unconstitutional under the Dormant Commerce Clause); *Bacchus Imps., Ltd. v. Dias*, 468 U.S. 263, 273 (1984) (finding an exemption from taxation for an alcoholic beverage only produced locally to be unconstitutional under the Dormant Commerce Clause).

61. Laura Murphy et al., *More than Curiosity: The Constitutionality of State Labeling Requirements for Genetically Engineered Foods*, 38 VT. L. REV. 477, 540 (2013) (explaining that a law is facially neutral when distinctions are not made between in-state and out-of-state business or products).

62. See, e.g., *Hunt*, 432 U.S. at 351 (finding a state labeling law for apples unconstitutional due to its discriminatory effect on out-of-state apple producers); *Bacchus Imps.*, 468 U.S. at 271–73 (finding a state tax exemption for a local product unconstitutional because of both its discriminatory purpose and discriminatory effect favoring in-state producers).

63. See Sara Brown, *How Missouri Began to Tackle Fake Meat: Missouri Sen. Sandy Crawford*, DROVERS (May 31, 2018, 8:03 AM), <https://www.drovers.com/article/how-missouri-began-tackle-fake-meat-missouri-sen-sandy-crawford> (quoting Sen. Sandy Crawford).

64. Martyn, *supra* note 52 (quoting Rep. Jay Houghton).

65. See ACLU, *supra* note 58.

66. Missouri is home to no major players in the meat substitute industry. However, Missouri's traditional animal and animal products industry had over eight billion dollars in sales in 2016. MO. DEP'T OF AGRIC., ECONOMIC CONTRIBUTIONS OF MISSOURI AGRICULTURE AND FORESTRY 28 (2016), <https://agriculture.mo.gov/economicimpact/county-pdf/MissouriAgForestryEconomicContributionStudy.pdf> [<https://perma.cc/DH4H-9ACC>] (author's calculations).

67. See *Hunt*, 432 U.S. at 351; *Bacchus Imps.*, 468 U.S. at 271–73.

68. Complaint for Declaratory and Injunctive Relief, *Turtle Island Foods, SPC v. Soman*, No. 4:19-cv-000514-KGB (E.D. Ark. July 22, 2019); Alina Selyukh, *What Gets to Be a 'Burger'? States*

becomes more prominent and as more states take meat labeling into their own hands, the federal agencies that regulate food labeling may choose to step in to preempt state laws with a uniform standard.

### B. Federal Regulation

Federal regulation of food, including food labeling, is primarily performed by the Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA).<sup>69</sup> While the FDA has wide-ranging authority over most food products, the USDA is only responsible for the regulation of meat, poultry, and other select animal products.<sup>70</sup> The lines of authority between these two bodies are not always straightforward. While the USDA regulates the meat of all traditionally farmed land animals, the FDA regulates a diverse group of other meat products.<sup>71</sup> Further confusing the line is the FDA's jurisdiction over additives to meat products.<sup>72</sup>

Plant-based meat substitutes clearly fall under FDA jurisdiction since they contain no animal products, but authority over in vitro meat is less clear.<sup>73</sup> On March 7, 2019, the FDA and USDA released a formal agreement for shared authority over in vitro meat.<sup>74</sup> Under this plan, the FDA will oversee cell collection, growth, and differentiation, while the USDA will oversee harvest, production, and labeling.<sup>75</sup> Regardless of whether this is a sound strategy for regulation, there is a question of whether this is proper under the entities' statutory authorizations.

The statutory argument for USDA authority over in vitro meat rests upon the assertion that in vitro meat fits the definition of a "meat food product" under the Federal Meat Inspection Act (FMIA).<sup>76</sup> The FMIA gives the

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*Restrict Labels on Plant-Based Meat*, NPR (July 23, 2019, 3:57 PM), <https://www.npr.org/sections/thesalt/2019/07/23/744083270/what-gets-to-be-a-burger-states-restrict-labels-on-plant-based-meat> [<https://perma.cc/USC6-TEAR>].

69. Daniela Galarza, *USDA vs. FDA: What's the Difference?*, EATER (Mar. 24, 2017, 1:32 PM), <https://www.eater.com/2017/3/24/15041686/fda-usda-difference-regulation> [<https://perma.cc/FQG3-6ZTS>].

70. *Id.*

71. *Id.*

72. *What Does FDA Regulate?*, U.S. FOOD & DRUG ADMIN. (Mar. 28, 2018), <https://www.fda.gov/about-fda/fda-basics/what-does-fda-regulate> [<https://perma.cc/KFN8-V9F8>].

73. *Id.*

74. U.S. Food & Drug Admin. & U.S. Dep't of Agric., *Formal Agreement Between the U.S. Department of Health and Human Services Food and Drug Administration and U.S. Department of Agriculture Office of Food Safety* (Mar. 7, 2019) [hereinafter *Formal Agreement*], <https://www.fsis.usda.gov/wps/wcm/connect/0d2d644a-9a65-43c6-944f-ea598aacdec1/Formal-Agreement-FSIS-FDA.pdf?MOD=AJPERES> [<https://perma.cc/U7GX-BVAB>].

75. *Id.* at 2–3.

76. 21 U.S.C. § 601(j) (2018). The definition of "poultry product" in the Poultry Products Inspection Act of 1957 (PPIA) is also relevant to determine which agency has jurisdiction regarding in

USDA authority, including labeling authority,<sup>77</sup> over meat food products.<sup>78</sup> A meat food product is defined as an edible product made from any “portion of the carcass” of various traditionally farmed mammals.<sup>79</sup> “Carcass” is not a defined term in the statute, so Congress presumably meant for it to go by its ordinary meaning—the dead body of an animal.<sup>80</sup> Going by ordinary meaning, the statute arguably does not give the USDA authority over in vitro meat because in vitro meat itself is not the carcass of an animal, as it is grown independently of a body, and does not contain any portion of the carcass of an animal.<sup>81</sup> Alternatively, in vitro meat could plausibly be considered an animal carcass despite never having been part of an animal’s body because the cellular line originated in an animal’s body.<sup>82</sup>

Unlike the USDA, the FDA has a generalized authority to regulate food products.<sup>83</sup> This generalized authority to regulate food is limited by the exemption from authority for all meat and meat food products regulated by the USDA.<sup>84</sup> Therefore, if the USDA cannot regulate in vitro meat because it does not contain any portion of an animal carcass, the FDA would have authority to regulate in vitro meat under its general authority to regulate food.

For the FDA to have authority over collection, growth, and differentiation, and for the USDA to then have authority over harvest, production, and labeling, the cells at issue cannot be a carcass until the

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in vitro meat derived from domestically raised poultry. 21 U.S.C. § 453(f) (2018). Because the PPIA came after the FMIA, and uses nearly identical language, poultry does not require separate analysis because the statutory frameworks for FMIA and meat regulation under the Act are equally applicable to the PPIA and poultry regulation. 21 U.S.C. §§ 451–72 (2018).

77. 21 U.S.C. § 607 (2018).

78. See 21 U.S.C. §§ 601–26 (2018).

79. 21 U.S.C. § 601(j). A poultry product is similarly defined as an edible product made from “any poultry carcass, or part thereof.” 21 U.S.C. § 453(f).

80. See *Carcass*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/carcass> [<https://perma.cc/XQ74-VC7E>] (defining carcass as “1: a dead body . . . especially: the dressed body of a meat animal . . . 2: the living, material, or physical body . . . 4: the underlying structure or frame of something”); see also LARRY M. EIG, CONG. RESEARCH SERV., 7-5700, STATUTORY INTERPRETATION: GENERAL PRINCIPLES AND RECENT TRENDS 8 (2014) (“Words that are not terms of art and that are not statutorily defined are customarily given their ordinary meanings, frequently derived from the dictionary.”).

81. See *supra* notes 23–27 and accompanying text. Since initially extracted stem cells can replicate nearly indefinitely, it is unlikely that in vitro meat would contain any cells which were previously in a living animal. Langelaan et al., *supra* note 24, at 60.

82. See Langelaan et al., *supra* note 24, at 60–61 (discussing how stem cells sourced from the bodies of animals are used to produce in vitro meat).

83. 21 U.S.C. § 341 (2018) (“[The Secretary] shall promulgate regulations fixing and establishing for any food, under its common or usual name so far as practicable, a reasonable definition and standard of identity, a reasonable standard of quality, or reasonable standards of fill of container.”); see also 21 U.S.C. §§ 342–43 (2018).

84. 21 U.S.C. § 392 (2018).

USDA takes over.<sup>85</sup> The agencies appear to contemplate a production process wherein cells are grown and then assembled into meat products.<sup>86</sup> To comply with the statutory authorizations, the definition of “carcass” must include fully assembled meat products which resemble cuts of meat, but not include disorganized collections of cells.<sup>87</sup> Given the common definition of “carcass,” this is a stretched interpretation of the statutes, albeit one that is necessary to accomplish the desired cooperative regulation.<sup>88</sup> If the agencies proceed with their planned regulatory framework, the USDA will have authority over labeling. However, this framework is susceptible to legal challenges due to the unclear statutory authority on which it stands.<sup>89</sup>

### III. REGULATORY CONSIDERATIONS

Historically, the primary purpose of labeling regulation has been to ensure that consumers know the content of their food.<sup>90</sup> Labeling regulations can also serve several secondary functions. Regulations can mandate or allow disclosure of the process by which food is produced. When the process of production does not affect the content of food, process disclosures allow consumers to make consumption choices based on ethical considerations. Regulation of labeling is not always necessary, and should

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85. The question of who has authority essentially comes down to the definition of “carcass.” *See* discussion of authority *supra* notes 76–82 and accompanying text. To fit the statute, the announced division of authority requires that the material at issue not be a carcass under FDA authority, then become a carcass under USDA authority. To further complicate matters, USDA authority only encompasses meat from most traditionally farmed animals. 21 U.S.C. § 601(j) (2018). Therefore, the announced division of authority will only work with the cells of such animals.

86. The FDA would have authority over the collection of the initial stem cells, the growth of these cells, and their differentiation into various types of cells found in meat. Formal Agreement, *supra* note 74, at 2–3. The USDA would have authority over the process of “harvesting” these cells from where they were grown, producing meat products out of them, and labeling these meat products. *Id.* at 3. This process of production is somewhat different from the one described in Section I.B. *See supra* notes 23–27 and accompanying text. The difference is unsurprising because it is not yet clear what large-scale in vitro meat production will look like.

87. Such an interpretation is somewhat justifiable—one would not generally refer to a single cell as a carcass. However, growth of cells in vitro is done not individually but rather in large groups.

88. For the common meaning of “carcass,” *see supra* note 80 and accompanying text.

89. Walter G. Johnson, *Conflict over Cell-Based Meat: Who Should Coordinate Agencies in U.S. Biotechnology Regulation?*, 74 *FOOD & DRUG L.J.* 478, 489 (2019) (“The jurisdictional debacle over cell-based meat ultimately yielded a compromise, but only after months of uncertainty and clashes between stakeholders and regulators. Though the FDA-USDA agreement represents a temporary point of stability, conflict could still return during implementation of the oversight scheme, given the nonbinding nature of the MOU.”).

90. Josh Dhyani, *Science-Based Food Labels: Improving Regulations & Preventing Consumer Deception Through Limited Information Disclosure Requirements*, 26 *ALB. L.J. SCI. & TECH.* 1, 20 (2016) (“[U]p until 1990, regulation had conveyed to consumers that what appeared on food labels was there to provide information about the nutritional value of food and protect consumer expectations as to the quality of food.”).

generally be employed only when a market failure has resulted in consumers not being adequately informed.

### A. Primary Interests

Labeling regulation is focused on satisfying consumer informational needs and desires.<sup>91</sup> A consumer's primary informational interest when buying food is knowing the content of that food,<sup>92</sup> and therefore content disclosure has been the primary purpose of labeling regulations.<sup>93</sup> An important informational goal of labeling regulation is satisfying the consumer's interest in knowing the health and nutrition of food, because these aspects of food have tangible physical effects on consumers' bodies.<sup>94</sup> This interest is currently satisfied by federally regulated ingredients lists and nutritional information disclosure,<sup>95</sup> and is also satisfied by product descriptions, which are often regulated on content grounds.<sup>96</sup> Accurate health and nutritional information is beneficial because it allows consumers to make informed consumption choices based on the physical effects that the food will have on their bodies.

The content of food determines not just its nutritional value, but also the experience of consuming it. Consumers enjoy food because it both fuels their bodies and provides them pleasure from eating it.<sup>97</sup> For the purpose of this Note, I will refer to the broader experience of eating food as "flavor."<sup>98</sup>

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91. Cass R. Sunstein, *On Mandatory Labeling, with Special Reference to Genetically Modified Foods*, 165 U. PA. L. REV. 1043, 1051 (2017).

92. 81 percent of those surveyed reported taste to be a significant factor in food purchase decisions, and 61 percent reported healthfulness to be a significant factor. Only 39 percent reported sustainability to be a significant factor in food purchase decisions. Health and flavor are aspects of content, while sustainability is an aspect of the production process. INT'L FOOD INFO. COUNCIL FOUND., 2018 FOOD & HEALTH SURVEY 38 (2018) [hereinafter 2018 FOOD & HEALTH SURVEY], <https://www.foodinsight.org/2018-FHS-Report-FINAL.pdf> [<https://perma.cc/X37W-VMXH>].

93. Dhyani, *supra* note 90, at 20.

94. Diana R. H. Winters, *Less May Be More: Reading into FDA's Labeling Requirements*, 19 SMU SCI. & TECH. L. REV. 419, 427 (2016) ("Mandatory labels are tools to achieve improved health outcomes by assisting consumers in making good choices.").

95. For a discussion of the development of mandatory nutrition labeling, see Dhyani, *supra* note 90, at 15–17. Nutrition labels are frequently used by consumers. See Dan J. Graham & Robert W. Jeffery, *Predictors of Nutrition Label Viewing During Food Purchase Decision Making: An Eye Tracking Investigation*, 15 PUB. HEALTH NUTRITION 189, 194 (2011) (stating that 40 to 60 percent of consumers view nutrition information of food when purchasing).

96. The FDA requires that the name of a product describe "the basic nature of the food or its characterizing properties or ingredients." 21 C.F.R. § 102.5 (2018). The name of a product is important for consumer nutrition information because it implies to consumers whether a product is healthy or unhealthy. See Graham & Jeffery, *supra* note 95, at 196 (explaining that shoppers spend less time looking at nutritional information where the product name implies it is healthy or unhealthy).

97. See 2018 FOOD & HEALTH SURVEY, *supra* note 92.

98. While food consumption is an experience involving multiple different senses, in common parlance people describe whether they like a food in terms of whether it tastes good. People taste flavors, hence the sensory experience of consuming a food can be described as a flavor.

While not conducive to objective regulation, consumers have a substantial interest in knowing how their food will taste.<sup>99</sup> Since flavor is subjective, flavor regulations generally take the form of restrictions on misleading product names and descriptions.<sup>100</sup> The name and description of a product implies not only its ingredients and nutritional value, but also qualities of taste and texture that broadly describe the flavor of the food. Beyond restrictions on misleading labels, companies are generally able to make subjective claims about the flavor of their products.

### *B. Secondary Interests*

Secondary interests are those consumer interests that do not involve the content of food. One such interest is the consumer interest in knowing the process of food production.<sup>101</sup> The process of production often affects the actual content of food, but when it does not, knowledge of the production process may nonetheless serve the consumer interest in ethical consumption. Consumers have an interest in consuming food which they believe to be ethically produced.<sup>102</sup> Ethical indicators on food packaging can disclose, for instance, whether foods were grown without synthetic pesticides or without the use of genetically modified ingredients.<sup>103</sup> Ethical indicators allow consumers to make consumption choices which reward ethically preferable production techniques.<sup>104</sup>

Ethics and nutrition can often get confused from the consumer viewpoint—a substantial problem when the primary goal of labeling regulation is to make consumers more informed.<sup>105</sup> For instance, the label “organic” is seen by many as a signal that a product is more nutritious,<sup>106</sup>

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99. See 2018 FOOD & HEALTH SURVEY, *supra* note 92, at 38.

100. See Dhyani, *supra* note 90, at 8–15 (describing how the Food, Drug, and Cosmetic Act’s restrictions on “false or misleading” labels have been applied over the years to ensure consumers are getting what they expect with regard to the content of their food).

101. Nearly half of consumers surveyed reported that understanding how food is produced is an important factor in their purchasing decisions. 2018 FOOD & HEALTH SURVEY, *supra* note 92, at 44.

102. Roughly two-fifths of consumers reported the environmental sustainability of food production to be an important factor in their food purchasing decisions. 2018 FOOD & HEALTH SURVEY, *supra* note 92, at 44. Similarly, about two-fifths of consumers reported that animal welfare was an important factor in their food purchasing decisions. *Id.* Environmental sustainability and animal welfare are both aspects of the food production process which do not affect the content of food and are purely matters of ethics.

103. See Jason Czarnezki et al., *Creating Order Amidst Food Eco-Label Chaos*, 25 DUKE ENVTL. L. & POL’Y F. 281 (2015) (surveying the many different ecological labeling schemes).

104. See Sunstein, *supra* note 91, at 1051–52 (discussing how mandatory disclosure of information about the ethics of products, such as whether they harm animals, can influence consumption choices).

105. See *id.* at 1050–56 (walking through the four major rationales for labeling regulations, all of which center around informing consumers).

106. 55 percent of those surveyed believed that organic produce was healthier than non-organic produce. 76 percent of those who purchased organic foods reported doing so for health reasons, whereas

when it is actually an ethical indicator describing a process of production involving fewer artificial pesticides and no genetic engineering.<sup>107</sup> Consumer confusion over whether an indicator is about nutrition or ethics results in less-informed purchasing decisions and is counterproductive to the goal of informing consumers.<sup>108</sup> The possibility of harm from this confusion means that the optimal regulatory approach should clarify the purpose behind a label.

### C. Market Failures

Because consumers desire labeling of both primary and secondary aspects of food, producers, absent a market failure, should supply that information to meet consumer demand.<sup>109</sup> When such a market failure exists regulators must step in to ensure disclosure of desired information.<sup>110</sup> The core of labeling regulation is thus informing consumers where market failure prevents them from being informed.

In the labeling context, the standard market failure is incomplete information, or consumers lacking the information they need to make informed consumption choices—potentially including both content and process information.<sup>111</sup> Once it has been determined that there is a market failure, the next question is whether mandating a label will cause more benefit than harm.<sup>112</sup> While the administrative costs of labeling and the benefit to consumers of obtaining desired information are obvious, there are also many potential costs of labeling that are more conceptual and difficult to quantify.<sup>113</sup> Determining whether benefits outweigh costs is therefore

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only 33 percent reported doing so for the ethical reason of helping the environment. CARY FUNK & BRIAN KENNEDY, PEW RESEARCH CTR., THE NEW FOOD FIGHTS: U.S. PUBLIC DIVIDES OVER FOOD SCIENCE 38 (2016), [https://www.pewresearch.org/internet/wp-content/uploads/sites/9/2016/11/PS\\_2016.12.01\\_Food-Science\\_FINAL.pdf](https://www.pewresearch.org/internet/wp-content/uploads/sites/9/2016/11/PS_2016.12.01_Food-Science_FINAL.pdf) [<https://perma.cc/BLZ7-MZEN>].

107. The goal of the organic label is to signal use of practices which promote conservation—namely not using synthetic chemicals, genetic engineering, or various other practices. *National Organic Program Fact Sheet*, U.S. DEP'T OF AGRIC. (2016), <https://www.ams.usda.gov/sites/default/files/media/TheNationalOrganicProgramNov2016.pdf> [<https://perma.cc/M29Q-HKT4>].

108. The goal of labeling regulation is generally to provide consumers with information they need to make informed consumption choices. Sunstein, *supra* note 91, at 1050–51. Therefore, when a label confuses consumers and causes them to make consumption choices on false grounds, such a label is counterproductive to the primary goal of labeling regulation and exacerbates the informational market failure. However, if the benefits of reducing an externality outweigh the costs of consumer misinformation, a confusing label could potentially be justified. *See id.* at 1056–68 (discussing the intricacies of cost-benefit analysis of labeling requirements).

109. *Id.* at 1050–51.

110. *Id.*

111. *Id.* at 1051. Consumer information is a good unto itself, but it also results in the secondary benefit of more efficient economic choices. *Id.*

112. *Id.* at 1056.

113. Costs of labels include: the cognitive cost of consumers having to take the time to consult labels, the hedonic cost of consumers feeling bad about participating in consumption which a label says

often a matter of educated guessing. One way to estimate the net benefit is the excess of how much consumers are willing to pay for the label over the cost of adding and administering the label.<sup>114</sup>

Another common market failure that can justify labeling is the existence of negative externalities, also known as third-party effects.<sup>115</sup> A negative externality is a cost created by one party but incurred by another.<sup>116</sup> Economic efficiency is achieved when externalities are eliminated and parties are forced to internalize all of the costs of their decisions.<sup>117</sup> A common example of a negative externality is the environmental cost of pollution—a cost rarely internalized by the companies that cause the pollution.<sup>118</sup> Ethics labels can internalize part of the cost of externalities by allowing customers to “punish” companies by not consuming their products when the externalities of production are viewed as unethical.<sup>119</sup> For instance, if products had to be labeled with the amount of carbon dioxide used to produce them, consumers who cared about carbon dioxide emissions could switch to lower emission products, thereby incentivizing companies to decrease emissions. In cost-benefit analyses of labeling requirements, externalities are also an important consideration. The value of economic efficiency and equity must be weighed against the costs of labeling.<sup>120</sup>

#### IV. EXISTING FRAMEWORKS FOR REGULATION

Meat substitutes are not the only food innovations that have recently raised regulatory questions. Rather, they are only the latest in a series of food innovations made over the last few decades. GMOs and plant-based dairy substitutes have forced both the states and the federal government to develop regulatory approaches to new food products. These approaches and

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is bad, and the hedonic cost of consumers who change their consumption to a less preferred product due to labeling. *Id.* at 1059–60. Benefits to health or morality of production practices can result from labeling; however, estimating these benefits requires estimating first the likelihood of consumer behavioral changes, and second the effects that such changes will have. This two-part estimation process renders accurate prediction difficult. *Id.* at 1061–64.

114. *Id.* at 1062.

115. *Id.* at 1051–54.

116. *Externality (Negative Externality or Positive Externality)*, BOUVIER LAW DICTIONARY (Wolters Kluwer desk ed. 2012).

117. Economic efficiency requires enterprises to bear the cost of the externalities that they create, incorporating this cost into the goods produced. *Pigovian Efficiency*, BOUVIER LAW DICTIONARY (Wolters Kluwer desk ed. 2012).

118. Jeff L. Lewin, Comment, *Which Externalities Should We Internalize?—Comment on The Role of Law in Defining Sustainable Development: NEPA Reconsidered by Professor David Hodas*, 3 WIDENER L. SYMP. J. 327, 331–32 (1998).

119. See Sunstein, *supra* note 91, at 1051–52 (discussing mandatory labeling as a method of protecting third parties, but only to the extent that consumers care about third-party harms).

120. *Id.* at 1066–68. When externalities are involved, consumer willingness to pay for a label is a less accurate measure of benefit because it does not completely capture third-party effects. *Id.* at 1062.



the ways in which they developed can shed light on the future of meat substitute regulation.

*A. Genetically Modified Organisms (GMOs)*

Before the 2016 passage of the National Bioengineered Food Disclosure Standard,<sup>121</sup> the United States had no federal GMO labeling requirement.<sup>122</sup> The FDA's policy toward GMO labeling before 2016 can be found in its 1992 Statement of Policy.<sup>123</sup> The FDA chose not to mandate the labeling of GMOs because it found them to be Generally Recognized as Safe (GRAS).<sup>124</sup> Instead of mandating labeling, the agency allowed non-GMO products to label themselves as "GMO free" if such claims could be substantiated.<sup>125</sup>

It was only after a series of states passed their own GMO labeling laws that the federal government decided to reverse its policy and mandate labeling. In 2013, Connecticut passed the first GMO labeling law; Maine and Vermont quickly followed suit.<sup>126</sup> In direct response to state labeling regulations, Congress passed the Bioengineered Food Disclosure Standard (BE Standard) and it was signed into law by the President.<sup>127</sup> The BE Standard preempted state labeling requirements and instituted federal GMO labeling requirements.<sup>128</sup>

Under the BE Standard, bioengineered products are not treated as any more or less safe than non-bioengineered food—effectively accepting the FDA position that GMOs are GRAS.<sup>129</sup> Nonetheless, the law requires that food manufacturers disclose the bioengineered status of food on its packaging.<sup>130</sup> The law does not mandate "non-GMO" or "non-bioengineered" labels for products that are not bioengineered, but it does

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121. National Bioengineered Food Disclosure Standard, Pub. L. No. 114-216, 130 Stat. 834 (2016) (codified at 7 U.S.C. §§ 1639-1639j, 6524).

122. Courtney Begley, Note, "So Close, Yet So Far": *The United States Follows the Lead of the European Union in Mandating GMO Labeling. But Did It Go Far Enough?*, 40 *FORDHAM INT'L L.J.* 625, 704 (2017).

123. *Id.* at 645.

124. *Id.* at 643-44.

125. *Id.* at 650-51.

126. *Id.* at 691-95. Washington, Oregon, and California also attempted to pass GMO labeling laws. These states tried to do so by ballot initiative, but none succeeded, likely due in part to massive campaigns against the initiatives by the GMO industry. *Id.* at 699-700. This precedent of state level regulation prompting the federal government to intervene with its own preemptive regulations could potentially play out the same with meat substitute labeling given the state level push for legislation similar to that passed by Missouri. *See supra* note 68 and accompanying text.

127. Begley, *supra* note 122, at 704.

128. *Id.*

129. *Id.* at 705.

130. 7 U.S.C. § 1639b(d) (2018).

allow use of such labels where they are true.<sup>131</sup> While this labeling mandate satisfied the concerned states, what matters more is whether it was the correct choice according to labeling policy considerations.

GMOs only differ in content from non-GMOs in that they contain DNA which does not occur naturally.<sup>132</sup> This content difference is ignorable because it does not necessarily affect the taste or nutritional value of food.<sup>133</sup> In judging categorically broad labeling, non-categorical differences can be ignored. Since the content of GMO food is not necessarily altered, the consumer information interest in GMO labeling is fundamentally ethical, dealing with the process of production. Therefore, the benefit of mandated disclosure of GMO status is increased consumer ethical information which remedies an information insufficiency. Since there is no consensus around whether GMOs create negative externalities, any benefit from reduced externalities is speculative.<sup>134</sup> The benefits of mandatory labeling are therefore minimal. Mandatory GMO labeling is likely to cause harm. GMO disclosure creates the same content versus process confusion as organic labels and therefore imposes a significant cost by impairing consumers' ability to make rational choices.<sup>135</sup> Since content information is more important to consumers and the cost of content misinformation is already significant, the cost of content misinformation almost certainly outweighs the benefit to consumers of increased ethics information.

While mandatory GMO labeling remedies a prior lack of ethics disclosure, it comes at the cost of consumer confusion.<sup>136</sup> Because the benefits of this regulation do not clearly outweigh its costs, GMO labeling serves as a cautionary example of what could occur in meat substitute labeling. When states act on a labeling issue, the federal government may be pressured into making suboptimal policy in order to preempt state laws.<sup>137</sup> Since states are likely to act out of self-interest in regulating meat

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131. See 7 U.S.C. § 6524 (2018) (stating that organic certification is sufficient to allow a product to identify itself as “non-GMO” or “not bioengineered”); see also 7 U.S.C. § 1639c(c) (2018) (stating that a food may not claim to be “non-GMO” or “not bioengineered” just because it is not required to disclose that it is bioengineered under 7 U.S.C. § 1639b); U.S. Food & Drug Admin., Guidance for Industry: Voluntary Labeling Indicating Whether Foods Have or Have Not Been Derived from Genetically Engineered Plants, No. FDA-2000-D-0075 (Mar. 2019), <https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-voluntary-labeling-indicating-whether-foods-have-or-have-not-been-derived> [<https://perma.cc/9CUW-S8UX>].

132. See Sunstein, *supra* note 91, at 1069.

133. See *supra* part III.A.

134. See Sunstein, *supra* note 91, at 1072–75. While there is a scientific consensus that GMOs are safe to consume, the question of whether they may cause environmental harm is somewhat more up in the air. *Id.*

135. See 2018 FOOD & HEALTH SURVEY, *supra* note 92, at 43 (showing that 40 percent of survey respondents thought that lack of GMO ingredients in a product meant that the product was healthier).

136. *Id.*

137. See Begley, *supra* note 122, at 704.

substitutes, state labeling policy is unlikely to be made according to the proper regulatory considerations. If the federal government feels pressured to preempt state labeling of meat substitutes there is a risk that, just like with GMOs, the federal government will again adopt suboptimal labeling requirements.

### *B. Plant-Based Dairy Substitutes*

The market for plant-based dairy substitutes has grown massively in the past few years.<sup>138</sup> The most common of these products, plant-based milk, had yearly sales of \$1.6 billion in 2018.<sup>139</sup> And, in 2018, plant-based milk comprised 15 percent of total “milk” sales and continues to grow in popularity as cow milk sales decrease.<sup>140</sup> Between plant-based milks, creamers, cheeses, and yogurts, plant-based dairy products have almost two billion dollars in yearly U.S. sales.<sup>141</sup>

Plant-based milk products are generally referred to by the name of the dairy product they are imitating, modified by the plant from which they are derived—most familiar in the cases of soy milk, almond milk, and coconut milk.<sup>142</sup> Despite this common labeling practice, the FDA defines milk as “the lacteal secretion . . . obtained by the complete milking of one or more healthy cows.”<sup>143</sup> This definition curiously excludes not only plant-based products but also milk obtained from other mammals, such as goats.<sup>144</sup> This narrow definition, encompassing only a portion of the ordinary understanding of milk, is perhaps the reason for the FDA’s longstanding policy of non-enforcement.<sup>145</sup> For decades, the FDA has known about the

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138. See Plant Based Foods Ass’n, *supra* note 7.

139. *Id.* at 1. Yearly sales here are calculated based on Nielsen data over a fifty-two-week period ending on June 16, 2018. *Id.* at 2.

140. In 2018, plant-based milk sales increased by 9 percent, while cow milk sales were down 6 percent. *Id.* at 1.

141. See *id.* at 1–2.

142. See Katie Gates Calderon et al., *Dairy vs. Plant-Based ‘Milks’: A Regulatory Standoff*, LAW360 (Aug. 24, 2017, 10:59 AM), <https://www.law360.com/articles/957097/dairy-vs-plant-based-milks-a-regulatory-standoff>.

143. 21 C.F.R. § 131.110(a) (2018).

144. Physicians Comm. for Responsible Med., Comment Letter on Proposed Nutrition Innovation Strategy 2 (Aug. 24, 2018), <https://www.regulations.gov/contentStreamer?documentId=FDA-2018-N-2381-0723&attachmentNumber=1&contentType=pdf> [<https://perma.cc/7WER-MAJ9>] (“By focusing solely on cows, this standard excludes more than 13 percent of the animal milk—such as that from goats, sheep, and buffalo—sold worldwide for human consumption.”).

145. See Calderon et al., *supra* note 142 (explaining that, despite pressure from the dairy and dairy-substitute industries to either enforce or change the definition of milk, the FDA has refused to take either course of action).

labeling practices for plant-based milk but has opted not to enforce its definition of milk.<sup>146</sup>

However, this policy of non-enforcement may soon end. In July 2018, the Commissioner of the FDA, Scott Gottlieb, announced that the agency would reevaluate its stance on labeling enforcement and its definition of milk.<sup>147</sup> Gottlieb stressed the importance of informing consumers, particularly on the matter of nutritional differences.<sup>148</sup> Given how entrenched plant-based milk and its labeling practices have become,<sup>149</sup> it is possible that the FDA will opt to revise its regulations to fit the current norms. However, the agency could just as easily decide to fight the norms and institute new mandatory labeling practices. With over a year passing since the beginning of the reevaluation process, the future of plant-based milk labeling remains uncertain.

Plant-based milk is fundamentally different from traditional milk in its content—it differs in both taste and nutrition.<sup>150</sup> However, since plant-based milk does somewhat resemble milk in flavor, the nutritional difference is more important.<sup>151</sup> There is no obvious argument for plant-based milk being ethically inferior to traditional milk—in fact, the opposite is likely true.<sup>152</sup> Given the content difference, the next question is whether there is a market failure wherein differences between the products are not being disclosed.<sup>153</sup> Labeling conventions for plant-based milk explicitly disclose that the product is different from traditional milk,<sup>154</sup> so to the extent that consumers take that disclosure to imply differences in nutrition there is no market

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146. *See id.* The FDA can enforce its definitions against products which are misbranded, meaning they are: (1) an imitation of a defined food, (2) not explicitly labeled as an “imitation,” and (3) “nutritionally inferior” to the defined food or misleadingly labeled. 21 C.F.R. § 101.3(e) (2018). The FDA has stated that it believes plant-based milk products are mislabeled under this standard but has not gone beyond warning producers. *See* Warning Letter from U.S. Food & Drug Admin. to Long H. Lai, Lifesoy, Inc. (Aug. 8, 2008) [hereinafter Lifesoy Warning Letter], <https://www.fdalabelcompliance.com/letters/ucm1048184> [<https://perma.cc/W6LZ-3DNH>].

147. Press Statement, Scott Gottlieb, Comm’r, Food & Drug Admin., On the Process FDA Is Undertaking for Reviewing and Modernizing the Agency’s Standards of Identity for Dairy Products (July 26, 2018) [hereinafter Gottlieb Statement], <https://www.fda.gov/newsevents/newsroom/pressannouncements/ucm614851.htm> [<https://perma.cc/C2LX-VEZ5>].

148. *Id.*

149. *See* Calderon et al., *supra* note 142.

150. *See* Katie Kindelan, *Pros and Cons of Plant-Based Milks: Is a Plant-Based Milk Right for You?*, ABC NEWS (Feb. 15, 2018, 2:56 PM), <https://abcnews.go.com/GMA/Wellness/pros-cons-plant-based-milks-plant-based-milk/story?id=53080449> [<https://perma.cc/57XV-WT6C>] (examining the nutritional and flavor differences between traditional milk and plant-based milk, as well as the differences between seven plant-based milks).

151. *See id.* (stating that plant-based milks are made from ground nuts or other plants mixed with water to sufficiently approximate cow milk and to act as a substitute for it).

152. *See* Reese, *supra* note 10 (showing the widespread sentiment that factory farming and the treatment of farm animals, including dairy cows, are unethical).

153. *See* Sunstein, *supra* note 91, at 1050–52.

154. *See* Calderon et al., *supra* note 142.

failure. However, if consumers take the word “milk” to imply not only something about the taste of a product but also something about its nutritional value, then a market failure of consumer misinformation is occurring.<sup>155</sup> As Gottlieb correctly asserts, the fundamental issue with plant-based milk is the potential nutritional misinformation.<sup>156</sup> Since plant-based milk is a more established, but largely analogous product to plant-based meat, its economic success and regulatory history potentially give insight into the future of plant-based meat.

## V. RECOMMENDED LABELING REGULATION

### A. Plant-Based Meat

Consumers have an interest in knowing the content of plant-based meats.<sup>157</sup> The primary content labeling issue for plant-based meats is what the product can or must be called. Some, like lawmakers in Missouri, argue that plant-based products cannot be identified as “meat” because that identification causes content confusion.<sup>158</sup> This confusion allegedly results since plant-based meat does not contain animal products.<sup>159</sup> This mistaken argument takes an overly formalistic view of content disclosure. Content disclosure is about ingredients, but it is also about nutrition and flavor.<sup>160</sup> Disallowing representation as “meat” would mean that consumers would have less accurate information about the flavor of plant-based meats.<sup>161</sup>

This is not to say that plant-based meats should be able to identify as “meat” without caveat. Such a practice would fail to satisfy the consumer interest in nutritional content information. Consumers should know that they are consuming plant and not animal products, and that as a result the food will have different nutritional consequences.<sup>162</sup> To convey nutritional content information, plant-based meats should be clearly identified as a plant product. There is some question as to whether labeling an item as a plant product is sufficient to communicate nutritional differences, but absent

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155. Even though products have to disclose nutrition information, consumers are less likely to look at that nutrition information when they think they already know it based on the name of a product. See Graham & Jeffery, *supra* note 95, at 196. This is what opens up the possibility of a product name alone causing consumer nutritional misinformation.

156. See Gottlieb Statement, *supra* note 147.

157. See 2018 FOOD & HEALTH SURVEY, *supra* note 92.

158. See Martyn, *supra* note 52; see also text accompanying *supra* notes 50–54.

159. See Martyn, *supra* note 52; see also text accompanying *supra* note 51.

160. See discussion *supra* Section III.A.

161. The best way to represent the flavor of plant-based meat is to call it meat because it both looks and tastes like meat. See Simon, *supra* note 4. This flavor similarity between plant-based and traditional meat even goes beyond that of plant-based and traditional milk. See Kindelan, *supra* note 150.

162. See discussion of consumer content interests *supra* Section III.A.

compelling evidence to the contrary it is a safe assumption.<sup>163</sup> Conveniently, the term “Plant-Based Meat” accurately conveys both nutritional and flavor information by identifying the product as being like meat in all but its physical contents.<sup>164</sup>

While ethical considerations are often a factor in decisions to consume plant-based meats, the ethics of the product are found in its content and not in its process of production alone.<sup>165</sup> Since there is no uniquely procedural ethical issue with plant-based meat, there are no ethics labels that might be mandated. On similar grounds, there is no case that plant-based meat production creates significant negative externalities.<sup>166</sup>

Labeling regulation is only necessary when there is a market failure to remedy and when labeling mandates will bring more benefit than harm.<sup>167</sup> The information insufficiency that often necessitates labeling is unlikely to be present in plant-based meat labeling.<sup>168</sup> Because of a growing aversion to traditional meat, consumers who purchase plant-based meats will do so because they do not contain animal products.<sup>169</sup> For this reason, and following in the footsteps of plant-based milks, the plant-based meat industry will likely adopt product names and labels which clearly identify the “meat” as a plant product.<sup>170</sup> However, if plant-based meat deviates in this regard, labeling regulation to standardize product descriptions may be

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163. The names of plant-based milks serve as obvious disclosures that the products are plant-based. However, the FDA is currently reviewing whether plant-based milks are confusing consumers into believing they are nutritionally comparable to traditional milk. *See* Gottlieb Statement, *supra* note 147. Until a definitive answer is provided, the FDA policy of non-enforcement against plant-based milk labels supports the assertion that such labels accurately convey nutritional information.

164. “Plant-Based” gives nutritional content information pertaining to ingredients and physical composition. “Meat” gives content information regarding flavor and nutrition. *See* discussion of what “meat” means *infra* Section V.B. When these terms are combined, the nutritional information supplied by “Plant-Based” negates the nutritional information that the term “Meat” typically provides.

165. The primary ethical reasons to eat plant-based meats are to avoid animal suffering and the environmental costs of traditional meat production. *See* discussion *supra* Section I.A. These ethical differences occur because traditional meat involves raising animals while plant-based meat involves growing plants. Despite involving the production process, these production differences result in fundamentally different contents of the two products, meaning specific ethical disclosures are unnecessary if consumers are adequately informed about content. *See* discussion *supra* Section III.B.

166. Assuming that when consumers choose plant-based meats they are doing so as a substitute for consuming traditional meat, then what matters is not whether plant-based meats produce any negative externalities, but whether they produce more negative externalities than traditional meat. Plant-based meats do not produce more negative externalities than traditional meat, the production of which creates a massive amount of negative externalities. *See* discussion of the externalities of traditional meat production *infra* Section V.C.

167. *See* discussion *supra* Section III.B.

168. For a discussion of the market failure of information insufficiency, see discussion *supra* Section III.C.

169. *See supra* notes 8–11 and accompanying text.

170. *See* Calderon et al., *supra* note 142 (describing how plant-based companies label their products as “milk” modified by the name of the plant from which the product is produced).

required.<sup>171</sup> Alternatively, if the FDA finds that the product names in the plant-based milk industry have caused nutritional confusion, it would follow that names of a similar style in the plant-based meat industry would cause nutritional confusion as well. Under such circumstances, it may be proper to mandate that plant-based meats be identified as “imitation” meat.<sup>172</sup>

### B. *In Vitro Meat*

Because in vitro meat is in its infancy and is likely to become indistinguishable from traditional meat in its composition and flavor,<sup>173</sup> for the purpose of this analysis I will assume that in vitro meat is in fact indistinguishable in content from traditional meat.<sup>174</sup> Given this content indistinguishability, the issue of whether in vitro meat should be able to identify as “meat” is clear—it should. “Meat” as a term conveys information about flavor and about a composition of animal fat and muscle cells. To argue that “meat” is a process term indicating whether a product came out of an animal carcass, as Missouri does,<sup>175</sup> is to ignore the consumer perspective. To illustrate this point, one need only consider the outcome of a blind taste test. If a person eats in vitro meat with no knowledge of what it is or how it was produced, the consumer would clearly call it meat because it looks, tastes, and feels like meat.<sup>176</sup> The process of production would probably never cross the consumer’s mind. Since in vitro meat fits the

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171. If a plant-based product is only identified as “meat,” it will fail to provide consumers with important content information necessary for informed consumer decision making. *See* discussion *supra* Section III.A.

172. *See* 21 C.F.R. § 101.3(e) (2018); Lifesoy Warning Letter, *supra* note 146.

173. *See* Mattick & Allenby, *supra* note 2, at 68–70.

174. Beyond becoming indistinguishable in content from traditional meat, in vitro meat also has the potential to become superior to traditional meat in both nutrition and flavor. *See id.*; *see also* discussion accompanying *supra* note 34. This presents interesting regulatory issues which an application of basic principles can shed some light on. Fundamental principles say content differences must be disclosed to consumers. *See* discussion *supra* Section III.A. Regulation is necessary where the market is not supplying information needed for informed decision making. *See* discussion *supra* Section III.C. If an in vitro meat producer sells a meat product which is superior in content to traditional meat, that producer has an economic interest in disclosing this superiority to consumers. Therefore, a market failure of information insufficiency would not be likely to occur, and regulation would not be necessary.

175. The new Missouri law aimed at avoiding consumer confusion defines meat based solely on the process of production, specifically whether meat is “derived from harvested production livestock or poultry.” MO. REV. STAT. § 265.494(7) (2018).

176. This hypothetical illustrates that food names function practically as descriptions of the sensory experience of consuming that food. This experience is fundamentally one of flavor, as I have defined that term for the purposes of this analysis. *See* text accompanying *supra* note 98. While food names can imply other things, such as nutrition or the process of production, a definition of a food name that entirely ignores the experience of consumption is fundamentally flawed and is ill-suited to satisfy the consumer interest in content information.

content definition of “meat,” there is no reason to add a content-based caveat like there is with plant-based meat.<sup>177</sup>

While the consumer interest in content information is satisfied without additional labeling requirements, the same is not true for process information. In vitro meat is made through a very different process than traditional meat.<sup>178</sup> This different process raises positive and negative ethical issues depending on the individual, meaning that there is a consumer interest in knowing the process of in vitro meat production.<sup>179</sup> For example, some consumers may believe that in vitro meat is unnatural, while others may believe that in vitro meat is ethically superior to traditional meat because it does not require the slaughter of an animal. Therefore, if there is a market failure in providing information about the ethics of production, ethics labeling of in vitro meat should be mandated.<sup>180</sup>

In vitro meat produces no significant externalities but could raise an issue of information insufficiency.<sup>181</sup> As long as in vitro meat is more expensive than traditional meat, there will be a strong financial incentive for in vitro meat labeling to disclose its ethical differences in order to sell an otherwise identical product at a higher price. Therefore, in the near future there will be no information insufficiency to remedy. However, if and when in vitro meat can outcompete traditional meat on price alone, the incentive to disclose ethical differences will diminish.<sup>182</sup> At that point, mandated ethics labeling could serve to remedy the resulting information insufficiency.

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177. The “Plant-Based” caveat to use of the word “Meat,” I argue, is necessary to inform consumers of content differences as compared to traditional meat. *See* discussion *supra* Section V.A. A similar “In Vitro” caveat to the word “Meat” in the labeling of in vitro meat would provide no valuable content differentiation because the content of in vitro and traditional meat is assumed to be the same for purposes of analysis.

178. *See supra* notes 23–27 and accompanying text.

179. Some people will have ethical qualms about consuming in vitro meat, and will therefore have a strong interest in knowing whether or not the meat they consume was produced in vitro. *See* Bryant et al., *supra* note 42, at 12–14 (discussing ethical qualms some consumers have with in vitro meat, ranging from its perceived unnaturalness to the effect it could have on the livelihood of traditional farmers). Others will have a strong interest in consuming in vitro meat to avoid contributing to the ethical issues associated with the production of traditional meat. *Id.* at 14 (stating that consumers with positive perceptions of in vitro meat are particularly interested in the potential for in vitro meat to “improve animal welfare” and “be more environmentally friendly than conventional meat”).

180. *See* discussion of information insufficiency *supra* Section III.C.

181. Because in vitro meat is a substitute for traditional meat, its negative externalities must be greater than those of traditional meat for a labeling mandate to be justified on the basis of reducing negative externalities. Externality labels aim to use consumer ethics to shift consumption to products which are produced with fewer negative externalities, hence a more efficiently produced substitute should not bear a label based on externalities. *See* discussion of externalities *supra* Section III.C. Since traditional meat produces substantial negative externalities, it is acceptable to assume in vitro meat will produce fewer. *See* discussion of traditional meat externalities *infra* Section V.C.

182. A substantial group of people will not want to consume in vitro meat, even if it is cheaper. *See* Bryant et al., *supra* note 42, at 12–14 (explaining that many people have a negative view of in vitro meat). When in vitro meat companies can choose between appealing to only their supporters on ethics



Such labeling would only make sense if the benefits of labeling outweigh the costs. One potentially significant cost would be consumer misinformation about the content of in vitro meat. Process labels are often confused for content labels,<sup>183</sup> and this confusion imposes the cost of consumer content misinformation and the inefficient consumption choices that result.<sup>184</sup> The benefits of labeling would be consumers having greater access to desired ethics information and the resulting efficient consumption.<sup>185</sup> But without knowing how consumers at large will view terms like “in vitro meat” in the future, it is impossible to say whether the costs or benefits will be more significant. As a result, it is impossible to say whether ethics labeling should be mandated at that future date.<sup>186</sup>

### C. Traditional Meat

Having considered the labeling of the two primary substitutes for traditional meat, one can also consider a hypothetical future where these substitutes have achieved cost and quality parity with traditional meat. In such a future, it would make sense to flip the regulatory focus and consider how traditional meat should be labeled.<sup>187</sup> While it does not raise content labeling issues,<sup>188</sup> the production of traditional meat is ethically troubling.

Production of traditional meat is also economically inefficient—it creates many negative externalities, all of which raise ethical issues. One major externality is the environmental impact of traditional meat production.<sup>189</sup> Traditional meat production results in substantial greenhouse

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and price, or appealing to the entire population on price alone, these companies will likely decide to appeal to the broader audience: the entire population.

183. See discussion of content versus process confusion *supra* Section III.B.

184. See Sunstein, *supra* note 91, at 1051 (describing the need for informed consumers in order for a market to work efficiently).

185. See *id.* (explaining that the information consumers want to know often includes the ethics of production).

186. If, for instance, consumers have come to understand that traditional meat and in vitro meat are identical in content, mandatory ethics labeling would be unlikely to cause confusion and as a result would likely be appropriate. However, if a substantial group continue to view in vitro meat with suspicion regarding its content and nutrition, then ethics labeling may be confused for content labels and as a result be inappropriate.

187. While an application of labeling regulation analysis to traditional meat could be performed today, it would not make much sense to do so because meat substitutes are not yet commercially viable alternatives. For instance, an ethics label disclosing that a particular meat product comes from killing animals would be laughable since that proposition is currently a given. Furthermore, without substantially similar alternatives, consumers are unlikely to change their behavior away from traditional meat consumption as a result of ethics labeling.

188. The content definition for “meat” is, for the time being, built around the concept of traditional meat. See discussion of content *supra* Section V.A–B. Therefore, traditional meat is necessarily identical in content to “meat.”

189. See *supra* notes 12–17 and accompanying text.

gas emissions, deforestation, and decreases in biodiversity.<sup>190</sup> These and other environmental effects come with substantial costs.<sup>191</sup> Traditional meat production also creates a darker externality—intentionally inflicted animal suffering. Each year in the United States, over nine billion animals are slaughtered for human consumption.<sup>192</sup> While putting a value on life and suffering is difficult, many people think animal suffering is bad, and some are willing to radically change their behavior to avoid it.<sup>193</sup> Given these substantial externalities, a more economically efficient system would try to make traditional meat producers internalize these externalized costs.<sup>194</sup> One way to do this via labeling regulation would be to mandate that traditional meat disclose its externalities on its packaging. People like the environment and do not like death;<sup>195</sup> if traditional meat producers were to disclose that their production methods are bad on both counts, consumers might be less willing to purchase traditional meat at the same price as meat products that were produced more ethically. This financial “punishment” for unethical externalities would impose costs for economically inefficient production, encouraging a shift to more economically efficient production methods.<sup>196</sup>

Consumers also have an interest in being informed about the ethical issues with traditional meat production.<sup>197</sup> Consumers largely oppose production practices that harm animals,<sup>198</sup> and favor environmental

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190. See *supra* notes 13–16 and accompanying text.

191. The costs of climate change as a result of greenhouse gas emissions alone could climb into the multiple trillions of dollars by 2100. FRANK ACKERMAN & ELIZABETH A. STANTON, NAT'L RES. DEF. COUNCIL, THE COST OF CLIMATE CHANGE: WHAT WE'LL PAY IF GLOBAL WARMING CONTINUES UNCHECKED, at iv (2008), <https://www.nrdc.org/sites/default/files/cost.pdf> [<https://perma.cc/3BC3-J9EU>].

192. U.S. DEP'T OF AGRIC., NAT'L AGRIC. STATISTICS SERV., POULTRY SLAUGHTER: 2017 SUMMARY 4–5 (2018) (9.3 billion poultry slaughtered); U.S. DEP'T OF AGRIC., NAT'L AGRIC. STATISTICS SERV., LIVESTOCK SLAUGHTER: 2017 SUMMARY 6 (2018) (156 million livestock slaughtered).

193. Many people choose to abstain from consuming animals on moral grounds. See *supra* notes 8–11 and accompanying text. Many more are uncomfortable with animal suffering in the production of meat. See Reese, *supra* note 10 (presenting survey data showing widespread discomfort with animal treatment in food production as well as factory farming more broadly).

194. See discussion of externalities *supra* Section III.C.

195. A majority of Americans prioritize environmental protection over economic growth, and commanding majorities also favor environmentally friendly policies like emission caps, stricter pollution standards, and increased government funding for developing renewable energy infrastructure. *In Depth: Topics A to Z: Environment*, GALLUP, <https://news.gallup.com/poll/1615/environment.aspx> [<https://perma.cc/EF93-M8NF>] (with the exception of a brief period following the Great Recession, when polled, people preferred protection of the environment over economic growth).

196. It should be noted that labeling regulation is not the most efficient way to force internalization of costs. For instance, many externalities can be entirely internalized via taxes implemented solely to serve that purpose. See Lewin, *supra* note 118, at 345–46. Other externalities, like animal suffering, are not so easily quantifiable into a tax and may be partly internalized via labeling regulation to avoid tough questions of valuation.

197. See discussion of the consumer interest in ethics information *supra* Section III.B.

198. See Reese, *supra* note 10.

protection.<sup>199</sup> Traditional meat producers therefore have an economic incentive not to tell consumers about their problematic production practices. This results in a market failure of insufficient information, where the producers refuse to provide information which consumers would value.<sup>200</sup> Mandated disclosure of the environmental impact and animal suffering that result from traditional meat production is therefore justified by both market failures.

Such disclosure requirements would likely produce vastly more benefits than harms. The externalities of traditional meat are extensive and harmful. While an exact valuation of the reduction of such externalities and the increased economic efficiency that would result from labeling is impossible, a significant benefit can be assumed based on the extent of the current harm and consumer sentiment. Similarly, the benefit to consumers of increased information would be significant. The cost of implementing and administering the labeling regulation would therefore be small in comparison to the potential benefits.

#### CONCLUSION

As global meat consumption continues to rise, the substantial issues caused by current meat production techniques are only going to get worse if nothing changes.<sup>201</sup> Plant-based and in vitro meat are an answer to this problem. These products offer an alternative to traditional meat which might drastically reduce animal suffering and environmental harm without requiring humanity to change its food preferences. It is this potential that makes well-considered labeling regulation important.

Fortunately, meat substitutes do not need to be given special treatment to avoid onerous labels. The federal government already mandates food labeling, and usually does so with rational consideration of the important interests at stake. If meat substitutes are allowed labels which best satisfy consumer informational interests and remedy likely market failures, then meat substitutes will be able to compete fairly against traditional meat.<sup>202</sup> However, there is a danger that the federal government will not rationally regulate meat substitutes.<sup>203</sup> State legislation pushed by the traditional meat industry is already being enacted to prevent inevitable competition by

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199. See *In Depth: Topics A to Z: Environment*, *supra* note 195.

200. See discussion of information insufficiency *supra* Section III.C.

201. See *LIVESTOCK'S LONG SHADOW*, *supra* note 13.

202. See discussion of meat substitute labeling *supra* Section V.A–B.

203. See discussion of GMO labeling as an example of how the federal government can be pressured into mandating suboptimal labels *supra* Section IV.A.

ethically superior meat products.<sup>204</sup> Ultimately, the future of meat substitutes depends on federal regulators acting according to principles rather than succumbing to the pressure of entrenched economic interests. If this can be accomplished, humanity will be one step closer to solving some of its most consequential environmental and ethical problems.

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204. See discussion of Missouri's labeling law *supra* Section II.A; see also Selyukh, *supra* note 68.

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