

Beware of the Hype: Meat Alternatives

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Meat alternatives – non-traditional protein sources intended to be consumed in lieu of meat – have been available for quite some time. Interest, innovations, and investments have recently surged in both plant-based meat products and cell-based meat (also known as “cultured”, “clean”, or “in vitro” meat). With growing concerns about sustainable meat consumption, market potential for meat alternatives is robust.¹ This briefing provides an overview of the meat alternatives industry, regulatory challenges, and its potential impact on international trade.

Meat Alternatives: Plant vs. Cell

Plant-based meat and cell-based meat are two types of meat alternatives, which are drawing strong interest from both the consumer side and the producer side. For consumers, the appeal is a promise of a taste and texture similar to conventional meat without the environmental or welfare concerns.² For producers, while increased demand for alternative meats could pull consumers away from conventional meat, this new sector provides an opportunity in revenue and risk diversification for larger players in the meat industry.³ As such, major players in the meat and food industries have already invested in both plant-based and cell-based companies, as well as high-profile high-net-worth individuals, like Bill Gates and Richard Branson.⁴ However, the production technology that plant-based meat and cell-based meat employs, and the surrounding regulatory environment each approach faces, is very different.

Plant-based meat: Already available

Plant-based meat uses ingredients derived from plant-based sources, such as soy flour, to mimic the texture of animal-based meat. Recent innovations claim to provide the same cooking and eating experience of traditional meat, and now are indistinguishable from traditional meat products from the consumer perspective. Some traditional hamburger outlets have recently introduced plant-based burger patties that emulate the texture of ground beef, turn brown when cooked, and “bleed” when eaten.⁵ Despite general concerns about GMO use and sodium content of the ingredients, the perceived environmental and health benefits from consuming plant-based meat continues to attract a portion of conventional meat consumers. Ingredients of plant-based meat products are widely accepted and approved, and has already been commercially available to the public for several years. As such, there is no regulatory approval process and products are easily traded to other countries.⁶

Cell-Based meat: Getting ready to launch

On the other hand, cell-based meat directly grows animal protein, using stem cells from the muscles of cattle, hogs, poultry, and aquaculture in a laboratory. The cells are grown using a liquid medium (i.e. artificial “blood”) that provides nutrients and other organic and inorganic components, and are cultivated on a “scaffolding” to emulate

¹ According to recent Chatham House Report, the global livestock industry is estimated to account for 40 percent of all arable land, 36 percent of crop calories produced, and 29 percent of agricultural fresh water use. Reportedly, meeting global climate targets would require that western hemisphere consumers reduce meat consumption by 90 percent.

² Alternative “meat” producers currently face strong pushback to distinguish them from animal-based products ([New York Times, 2019](#)). Despite this, we use the term “meat” in this briefing interchangeably for brevity and consistency.

³ Meat alternative prices project to be more stable, as they are less reliant on seasonal prices, and controlled production reduces the risk for food-borne illnesses. Long term, both types of products claim to reduce the environmental burden of meat production, as well as limit public health hazards such as salmonella or *E.coli*.

⁴ For instance, Tyson Food Ventures, the investment arm of poultry giant Tyson, was invested in Beyond Meat, an alternative protein company, until recently. Tyson Ventures is also an investor in Memphis Meats, a cell-based meat company. Tyson Foods has also recently launched their own alternative protein brand. ([Press Release](#), June 2019)

⁵ Burger King, Cheesecake Factory, and White Castle have partnered with Impossible Meats, while Carl’s Jr. offers a veggie burger from Beyond Meat. Canadian coffee chain Tim Horton’s also announced its partnership with Beyond Meat recently.

⁶ According to industry, plant-based products are exported under HTS 2106.90.9895 and 2106.90.9898 (if frozen).

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tissue (i.e., muscle). Such products are then processed into the desired form, such as ground beef or a steak, and are anticipated to be indistinguishable from conventional meat products. Cell-based meat products are not yet available to the general public at the moment, as the U.S. regulatory framework surrounding cell-based meats is still in the nascent stages and remains a significant hurdle for commercialization. In addition, the labor-intensive nature of current production technology and the shortage of affordable, food-grade amino acids also limit the industry from scaling up at an industrial level. Thus, large-scale production of cell-based meat is currently not economically viable.

What's Next for Cell Based Meat

The path to widespread commercialization of cell-based meat faces some hurdles.⁷ First, even with affordable prices, consumer unfamiliarity and consumer safety concerns remain a major challenge for broader adoption.⁸ Second, while the Department of Agriculture (USDA) and the Food and Drug Administration (FDA) have announced a joint framework to regulate cell-based meat, there still exists a long list of issues that need to be addressed in both the public and private sphere.⁹ Remaining key issues include determining the safety of consuming cell-based meat over time, and creating a robust regulatory environment, including production facility regulation, waste removal strategies, and dealing with fraudulent practices. Finally, labeling issues surrounding the word “meat” as well as determining the religious status of these products may also require extended time as well.

Trade Issues Are Likely Farther Down the Road

Despite bullish market sentiment and public excitement about a potential market worth billions, it may take longer than expected before cell-based meat is available to the U.S. general public, and even longer for foreign markets.¹⁰ Unlike plant-based meat, where most of the ingredients are widely accepted and traded, cell-based meat products need to develop consumer confidence and public belief in the safety of such products. This acceptance may differ across trading partners, and may create asynchronous trade barriers in different destinations. The European Union, a potential key trading partner and competitor of meat alternatives, is already addressing potential issues such as labeling and approvals. Competing firms in China, Israel, Singapore, and Japan reportedly are also developing cell-based meat regulations, pushing regulators to develop a framework sooner than the US and EU regulators. Nonetheless, other countries will be closely monitoring and taking into account the findings of FDA and USDA. Additionally, per WTO SPS Agreement, international standards regarding meat alternatives or the prospect of such work as that would also affect the regulatory approval of such products. As such, it will take longer before any trade issues or barriers emerge.

Sources: Froggat and Wellesley, [Meat Analogues: Considerations for the EU](#), Chatham House, 2019; Stephens, Silvio, et al., [Bringing Cultured Meat to Market](#), Trends in Food Science and Technology, 2018; Piper, [The lab-grown meat industry just got the regulatory oversight](#), Vox.com, 2019; Black, [How meat producers are trying to avoid becoming like dairy farmers](#), Washington Post, 2019; CBInsights, [Our Meatless Future](#), Research Briefs, 2019

⁷ Leading companies of the cell based meat industry reportedly have a target date of 2021 to launch products for the public. [JUST cell-based meat is ready](#), Sentient Media, November 2018

⁸ In 2013, the first lab-grown hamburger cost an estimate of \$330,000. Recently firms have offered a burger patty for \$11, and a thin steak for \$50. Cell-based products

⁹ According to the statement, FDA will oversee cell collection, cell banks, and cell growth and differentiation, while USDA will oversee the production of cell-based meat and the labeling aspect of such products.

¹⁰ Recent IPO filings with the Securities and Exchange Commission show that Beyond Meat's self-valuation at \$1.2 billion. Estimates of potential plant based meat markets are around \$10 billion, based on a 13% market share of a \$90 billion sector

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