



Overview of the Meatless Meat Industry

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This is the first in a series of six articles from the author’s master’s thesis about plant-based meat.

Introduction

The emergent “meatless meat” industry has sparked interest among consumers, investors, farmers, and meat companies alike. The question many are asking is, to what extent will meatless meat replace animal meat in the American diet? This first installment of a six weekly series will describe the meatless meat industry, its products, and its current position in the U.S. market.

What is Meatless Meat?

The meatless meat industry produces two categories of products: plant-based meat and lab-grown meat. Both of these products are distinct from alternative meat products such as veggie burgers or tofurkey because they are formulated to look, smell, and taste like animal meat. Their nutritional profiles also are designed to resemble that of meat. Plant-based meat products, true to their name, are processed using only ingredients derived from plants. Formulations vary by brand – the brand “Impossible Burger” is made mostly of soy protein concentrate, coconut oil, and sunflower oil. It uses soy leghemoglobin, a compound derived from soybean, to imitate meat’s bloodiness and juiciness (Impossible Foods, 2020). Another brand, “Beyond Meat”, uses a pea-rice-mung bean formula, along with coconut oil, pomegranate juice, and beet juice. Lab-grown meat, meanwhile, is created taking starter cells from an animal biopsy or embryo and cultivating them into myocytes, muscle cells, along with fat and tissue cells. These are then proliferated in a liquid media in a piece of equipment called a bioreactor, and these cells are grown around micro-scaffolding in order to form cuts of meat. There is also an ‘animal-free’ method which involves creating a piece of animal DNA (using DNA code stored in genome databases) and inserting it into a non-animal host organism (Waschulin & Specht, 2018). Similarly, the media in which the cells grow typically has been fetal bovine serum, but formulations without animal components are also under development (2018).

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State of the Industry

The Good Food Institute estimates that meatless meat sales comprise 1.4% of total meat sales in the U.S. (2021). The market for these products is valued at \$14 billion (Theurer et al., 2019) and Barclays predicted that the market would expand to \$140 billion in the next decade, capturing 10% of the globe's \$1.4 trillion meat industry (2019). The consulting firm A.T. Kearney projects that meatless meat will supply 33% of global meat demand in the next ten years (Kearney 2021).

The plant-based meat products are currently on the market in the U.S. and Europe and Asia, where they are sold in restaurants and grocery stores. Lab-grown meat is still in its R&D phase and has not yet entered the market in the U.S. Singapore is the first country to certify commercial sale of the product, with a lab-grown chicken product made by the American company Eat Just (Gilchrist 2021). Although currently the plant-based meat industry is more developed than the lab-grown meat industry, lab-grown meat has demonstrated greater capabilities at mimicking a greater variety of meat cuts.

The market for plant-based meat is populated by both start-ups and large meat companies.¹ Of the start-ups, there are three main competitors in the U.S. market. The first is Beyond Meat, a U.S.-based public company founded in 2009 and valued at \$4.8 billion (Franklin & Sen, 2019). Beyond Burger currently offers five meatless meat products: Beyond Burger, Beyond Beef, Beyond Sausage, and Beyond Beef Crumbles. It also is in the process of developing a chicken product, which it piloted with Kentucky Fried Chicken (KFC, 2019). Beyond Burger's products are sold at more than 58,000 locations in the U.S., including fast-food franchises: Dunkin', Carl's Jr., Subway, A&W, Denny's, Hardee's, TGI Friday's, and Epic Burger. Its other outlets include grocery stores, hotels, movie theaters, bars, amusement parks, research institutes, and universities.

Impossible Meat is the second company which sells plant-based meat products. It is a private company founded in 2011, and the company was valued at \$777 million as of November 2019 (Franklin & Sen, 2019). Impossible Meat currently has two products on the market (Impossible Burger and Impossible Sausage) and one product in the R&D phase (Impossible Pork). Impossible Meat sells its products at more than 17,000 locations in the U.S., which include more than 7,200 Burger King locations. The company started selling its products in grocery stores in California and the East Coast in 2019 and currently sells at 150 retail locations (Watson, 2020). It intends to have its products available at grocery stores in all regions of the U.S. by mid-2020. Its products are also sold in Hong Kong, Singapore, and Macau.

The third plant-based meat start-up is The Meatless Farm Company. Based in the U.K., its formula and product offerings are similar to that of Beyond Meat. It is the exclusive provider of plant-based meat to Whole Foods, and its products are also available in the United Arab Emirates, Canada, China, and Europe (Meatless Farm, 2020).

Large, established meat companies are also entering the plant-based meat market. Companies such as Tyson, ADM, JBS, Kellogg's, and Nestlé have developed brands for their plant-based products: Raised and Rooted (Tyson), MorningStar Farms and Ozo (JBS), Marfrig (ADM), Gardein (Conagra Brands), Boca (acquired by Kraft-Heinz), Sweet Earth and Awesome Burger (Nestlé) (Good Food Institute, 2019).

For lab-grown meat, the Good Food Institute reports that there are nearly fifty start-ups globally working on cultivated meat products, 19 of which are in the U.S., the rest in 15 other countries (Good Food Institute, 2019). The largest lab-grown meat company in the U.S. is Memphis Meats, which has raised \$180 million from investors (Weiner-Bronner, 2020). Memphis Meats has successfully grown beef meatballs and cuts of chicken and duck from cell culture. Another prominent one is Aleph Farms, an Israeli company that specializes in growing steaks currently valued at \$14 million (Lewis, 2020). It garnered attention in 2019 when it successfully grew a steak on the international space station, to demonstrate how its production process uses few natural resources (Yeung, 2019). Mosa Meats, a Dutch start-up, grew the world's first piece of meat from steer cells in 2013, based on research funded by Google at Maastricht University (Mosa Meat, 2020).

Policy and Advocacy Support

In addition to these companies, many independent research institutes and lobbyist groups have been founded to build a research foundation, curry government regulatory favor, capture investors' attention, and sway public opinion for the meatless meat industry. These include the Cellular Agriculture Society, New Harvest, the Good Food Institute, the Modern Agriculture Foundation, and Food Frontier. Moreover, the Good Food Institute identifies Brazil, Canada, Germany, Israel, the Netherlands, the U.K., and the U.S. as the leaders in meatless meat innovation (2019).

The next installment of this article series will discuss the consumer preferences that led to the development of meatless meat products, as well as the social issues that the industry claims to address.

Data Note

1. The Good Food Institute published a comprehensive chart of plant-based meat companies and their products in its 2019 report, *Plant-Based Meat, Eggs, and Dairy: U.S. State of the Industry Report*.

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