

1. Mark your confusion.
2. Show evidence of a close reading.
3. Write a 1+ page reflection.

Taking the Beef Out of Burgers

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Sales are booming for alternative meats. Are plant-based burgers just a fad? Here's everything you need to know:

Why are meatless burgers so popular?

Food scientists believe they've achieved a kind of alchemy, making plants look and taste like meat. Global sales suggest they've largely succeeded. All-plant burgers, nuggets, meatballs, and sausage patties exploded in popularity last year, driven by California-based Beyond Meat and Impossible Foods. Beyond had 2019's most successful IPO and gained a presence in 20,000 U.S. grocery stores plus 53,000 fast-food restaurants such as Dunkin' Donuts and Carl's Jr., while McDonald's is testing a Beyond Burger in Canada. Burger King's Impossible Whopper and White Castle's Impossible Sliders were almost *too* successful, causing a supply crisis. Overall U.S. restaurant sales of plant-based meat grew by 400 percent last year; combine those with supermarket sales, and consumers spent nearly \$1 billion on these products in 2019. Plant-based burgers attract eaters who are health conscious and/or environmentally concerned but aren't willing to give up familiar tastes and textures for quinoa and seitan. Ninety-five percent of Impossible's customers eat meat; in taste tests, half of them can't tell Impossible Burgers from the real thing.

What's their secret?

"Meat analogues" such as tofu go back 2,000 years, but these are not your father's frozen veggie burgers. The new faux burgers are engineered to imitate the way ground meat sizzles on the grill, bleeds in the middle, and crumbles in your mouth. That's no small feat, considering cooked beef contains 4,000 different molecules, about 100 of which create its smell and umami-rich flavor. Impossible Foods simulates that pinkish color and savory flavor with heme, the iron-carrying molecule in blood and some plant roots. The heme is created by genetically modifying yeast with soy DNA in gigantic tanks.

What else are they made of?

The new burgers vary in composition, but are largely made of plant proteins — usually soy, but sometimes pea, bean, or wheat — and plant fats. These ingredients are cooked in big pressure cookers, which use low heat and compression to replicate the fibrous texture of meat. The first challenge in creating a plant-based burger is to make a tasteless patty, getting rid of so-called off-flavors. (Pea protein is said to taste of urine.) "Once we cracked the code on meat flavor," said Impossible Foods scientist Laura Kliman, "if you change a few of the ratios and ingredients, it's not that hard to get fish or pork or chicken." Impossible Burgers have 21 ingredients — mostly soy and potato proteins, plus coconut and sunflower oils. Beyond Burgers have 18 ingredients, a mixture of isolated pea protein, mung bean, and rice proteins. Beetroot juice provides the "bleeding" effect. The thickener methylcellulose, potato starch for texture, and the salt substitute potassium chloride are also used. Beyond Burgers get the marbled look of ground beef from coconut oil and cocoa butter whipped into tiny globules of fat.

Is that healthier than meat?

Yes and no. Consuming meat is believed to increase the risk of cardiovascular disease and colorectal cancer, and humans can develop unsafe resistance to antibiotics by eating animals fed those drugs. Commercial beef, pork, and poultry often carry bacteria and viruses from fecal matter and cause illness if not properly cooked or handled. Critics of alternative meat, however, say that companies are exploiting the healthy sound of "plant-based" while providing heavily engineered products. Whole Foods CEO John Mackey, for example, has warned customers that these burgers "are super, highly processed foods." Meatless burgers are cholesterol free and contain about the same calorie count as hamburgers but have more sodium: The Impossible Whopper has 1,240 milligrams of sodium, 260 more than the beef version. Coconut oil gives Beyond and Impossible Burgers saturated fat levels similar to beef, and their proteins are considered less nutritious. Impossible's recipe depends on soy, which can mimic estrogen in the body, but food scientists say it's safe to consume in moderate quantities.

Is the meat industry alarmed?

Stanford University biochemist Patrick Brown, who founded Impossible Foods/, says it should be. "We plan to take a double-digit portion of the beef market within five years," he said, "and then we can push that industry, which is fragile and has low margins, into a death spiral." That's unlikely. Americans on average eat three hamburgers a week, and the combined annual revenue of the three largest U.S. meatpacking companies is about \$200 billion. Still, the meat industry clearly feels threatened: Lobbyists convinced 12 state legislatures last year to ban products from using words such as "burger" and "meat" if they don't come from animals. But to hedge their bets and to take advantage of the boom, Perdue, Nestlé, Kellogg, and meat giant Tyson Foods are developing their own plant-based or hybrid burgers. As Tyson's former CEO Tom Hayes said, "If you can't beat 'em, join 'em, right?"

The environmental impact of livestock

Environmentalists estimate that eating 4 pounds of beef contributes as much to global warming as flying from New York to London, and the average American eats more than that each month. There are many ways of producing meat, but it's clear that the annual farming and slaughter of 50 billion animals for meat worldwide leaves a massive footprint in terms of land use, crop consumption, emissions, and water pollution. In the past 25 years, an area larger than South America has been razed for cattle grazing, and cows releasing methane from digesting grains and grass — mostly through burps — causes two-thirds of the livestock sector's greenhouse gas emissions. A landmark report in *Science* found that avoiding meat and dairy is the "single biggest way" to reduce one's environmental impact. A recent University of Michigan study found that a plant-based burger generates 90 percent less greenhouse gas, requires 46 percent less energy, and has 99 percent less impact on water scarcity than a quarter pound of U.S. beef. CEO Pat Brown says that's Impossible Foods' primary purpose. "We see our mission as the last chance to save the planet from environmental catastrophe," he says.

Possible Response Questions:

- What are your thoughts about taking the beef out of burgers? Explain.
- Pick a word/line/passage from the article and respond to it.
- Discuss a "move" made by the writer in this piece that you think is good/interesting. Explain.