

## The “Impossible” Plant Blood

In the past couple of years a hamburger company, Impossible Foods, has gotten close to imitating the taste of beef through its “Impossible Burger”. You may have seen it advertised at a Burger King or certain grocery stores. This plant-based hamburger is not marketed just towards vegetarians but also “flexitarians”. Flexitarians want to cut down on, but not remove meat from their dinner plate.

This Impossible Burger is not just a portabella mushroom between bread, millions of dollars were invested in it. To simulate the taste of beef without the “moo,” these new veggie burgers must be highly processed; B vitamins are added along with plant oil and a soy/potato protein mixture. Ironically, the amount of calories are also comparable to the thing it replaces. So, if you plan to eat Impossible Burgers every meal it may soon be “impossible” to fit into your jeans.

One of the ingredients used, leghemoglobin (LegH), was familiar to me as an agriculture educator. In legumes such as soybeans, this chemical helps control the amount of oxygen in their root nodules. These nodules contain bacteria known as rhizobia who provide nitrogen fertilizer to the plant. Rhizobia have a complicated relationship with oxygen. They need small amounts to live, but not too much. Excess oxygen can make rhizobia’s nitrogen producing system stop working and the soybean plant to yield poorly.

LegH is not just important to crops—we humans use a similar reddish protein called hemoglobin. Hemoglobin is an important chemical in our blood that also helps move oxygen, specifically from our lungs to our body. The Impossible Burger uses LegH as a type of “blood”, mimicking the visual and perhaps taste of meat juices.

To see for yourself what LegH looks like, pull a healthy plant from the legume/pea family next summer. Look for the knobby growths on the roots. Those knobs are the root nodules. If you cut one open with a fingernail or knife, you should see the pinkish-red color of LegH as it reacts to the oxygen in the air.

Impossible Foods have genetically engineered a yeast to produce this LegH in huge quantities, as getting them from plants was impractical. While the private sector has figured out that particular issue, there was another regarding its safety. Agronomists knew about LegH but never got the urge to pop root nodules into their mouths, so there was a lack of knowledge about how edible LegH is. What followed was a surge in research, and just this year the Food and Drug Administration cleared the chemical as safe, making it available to grocery stores.

Dietary choices of consumers have a powerful effect on agriculture. The popularity of the Impossible Burger has sparked a broader conversation in regards to meat consumption. I urge you to conduct your own research from non-biased sources. Ask questions and see who is funding what study. Keep an open mind, few solutions are clear cut, and almost all have tradeoffs. Food production is no exception.