

Canadian Food System INSIGHTS

CELLULAR AGRICULTURE

We all want to make safe and informed decisions about the food we eat, but what information is credible? This report uses academic, government and industry research to provide a breakdown of complex information, as well as resources, if you wish to dive into additional research. It's Good, Canada's goal is to enable Canadians to make their own choices and feel confident about the food on their plates.

IMPORTANT FACTS:

1. Cellular agriculture can be split into cellular and acellular products, cultured meat is an example of this technology. Cellular products contain existing animal cells and acellular products contain the DNA that produces proteins and fats.
2. Globally, several companies are exploring cellular agriculture technology.
3. Currently, there are no products available to Canadians due to cost and scalability concerns.
4. Companies and researchers are suggesting that cellular agriculture will have positive environmental impacts, but there is limited research in this area and the long-term impacts are unknown.
5. There is currently no regulatory framework in Canada but as the technology becomes more prominent, it may be classified under 'Novel Foods'.



Let's Talk Cellular Agriculture

What is cellular protein?

Cellular agriculture can be split into cellular and acellular products, cultured meat is an example of this technology.

Cellular products contain existing animal cells that are used to make cellular meat. Technologies differ across businesses, but they generally follow this process:

1. Small tissue samples are collected from the animal under local anesthetic
2. The collected myocytes (muscle) and/or adipocytes (fat) cells are isolated and grown in a laboratory environment in a fluid medium of proteins, sugars, and vitamins
3. Inside a bioreactor, which resembles an alcohol fermentation tank, the cells are stimulated using electrical current or mechanical movement, and they grow and fuse on a 3D model called a scaffold to build a specific shape, such as a burger (1)

Other techniques involve growing paper-thin sheets of tissue and stacking or folding the sheets to form a product (2). The process takes several weeks in total (3).

Acellular products do not include animal cells, but rather the DNA that produces these proteins and fats. The DNA can be inserted into an organism, such as yeast, and the microorganism produces these animal-free products like casein (4).

Who regulates cellular agriculture?

In Canada, there is no regulatory framework for cellular agriculture, however, there is a possibility that products could be classified under Novel Foods (5,6). In 2019, the FDA and USDA announced they would create a joint regulatory framework for cellular meat, but currently, there are no formal regulations in place (7). The FDA will oversee cell collection and growth while the USDA will oversee the production and labelling (4). In the EU, there is no formal cellular agricultural product regulation; currently, the products would have to pass the novel food regulations (8). Singapore is the first country globally to approve cellular meat (8).

Are there benefits to cellular protein?

Cellular agriculture companies and some researchers are suggesting that cellular agriculture will have positive environmental impacts, although the long-term impacts are unknown. Among the claims being brought forward are:

- Fewer animal welfare concerns
- 80% fewer greenhouse gas emissions, 99% less land use, 96% less freshwater use (9)
- 78% to 96% reduction in greenhouse gas emissions; 7% to 45% less energy; and 82% to 96% less water (10)
- Cultured meat still requires significant amounts of energy and short-term gains might not outweigh the long-term benefits of traditional agriculture (11)

WHAT DO CANADIANS THINK?

Limited research has been conducted to understand if Canadians are interested in cellular agriculture, but global studies help identify general acceptance towards cellular meat.

- A survey conducted in three countries indicated that cellular meat was generally accepted by 93.3% of Chinese respondents, 89.3% of Indian respondents, and 76.4% of American respondents (12).
- Two-thirds of American consumers were willing to try cultured meat, although only one-third would be willing to purchase it regularly (13,14). Individuals in the male, politically liberal, or lower-income demographics were more likely to try the product (14).
- Consumer concerns with cellular meat are high prices, perceived poor taste, and unnaturalness (14).

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