The reality of FAKE MEAT

Are plant-based meats really the better choice? For the environment? For us? **Dee Pignéguy** investigates and says all is not what the hype would have us believe.

Some people choose plant-based diets in the belief that it is better for the environment. The idea that all we need to do is eat more plants and less, or no, meat is overly simplistic. Problems like biodiversity loss, soil erosion, deforestation, chemical run-offs in waterways, to name but a few, are not solved by eating plant-based meats instead of animals.

In Australia, research by the CSIRO tells us that as individuals the biggest thing we can do to improve our dietary environmental footprint is to reduce our food waste, and to eat more whole foods and less ultra-processed food. But the marketers of plant-based meats would have you think otherwise.

The industry has succeeded in creating ultra-processed foods, and while plant-based meat is marketed as plant-based protein, there is very little in terms of real plants in this conglomeration of already-processed ingredients. A food extrusion machine uses heat and pressure to force plant proteins into a fibrous, meat-like texture that resembles muscle fibres. Soy leghemoglobin from the root of soy plants replicates the bleeding while coconut oil (a saturated fat) and cocoa butter are used to provide marbling to mimic the mouth feel of real meat.

Ingredients

This fake meat is unrecognizable to our bodies as we have not evolved to properly digest and obtain nutrients from these processed ingredients and chemicals. The five lurking chemicals are TBHQ tertiary butylhydroquinone, (a synthetic preservative), magnesium carbonate, erythrosine (Red#3), propylene glycol, and ferric orthophosphate. Along with the heavily processed ingredients like pea protein isolate, soy protein concentrate, yeast extract, canola oil, 'natural' flavours, potassium chloride dextrose and synthetic vitamins, many of these ingredients are toxic to our bodies.

Though the base of plant-based meat is a plant – usually soybeans, peas and/or wheat – these ingredients have been highly processed. In most cases, the main ingredient is stripped down to high-protein, low-fibre, colourless powders mixed with preservatives, oils, artificial colourings, gums, and seasonings.

Consequences

GMO soy is a primary ingredient in most plant-based meats, and industrially produced soy displaces and disrupts not only the ecosystems but also the indigenous people of the Amazon rainforest. Will your immune system be affected? Will you develop new allergies from controversial additives like carrageenan and methylcellulose being used as bulking agents? Further research is obviously needed to determine the long-term effects of consuming fake meat over an extended period. For many health-conscious consumers, the long list of ingredients is truly shocking.

Industrially produced alternative protein

Soy has been the early leader in plant-based alternative protein products, but pea proteins are rising fast, in part because of public concerns about allergens and hormones, as soy contains isoflavones, a type of plant oestrogen that mimics the human form. Currently, the demand for pea protein isolate is already outstripping supply.

The marketing spiel is that plant-based meat emits fewer greenhouse gases than conventional meat production, making it an environmentally friendly choice for your next meal. But let's look at the chemically intensive, fossil fuel-based industrial agriculture which will be necessary to grow all the wheat, soy, and peas required to feed the vast factories needed to produce enough ultra-processed food for a hungry population.

Industrial agriculture churns out enormous amounts of calorie-dense foods such as refined wheat, sugar, and vegetable fats, leading to a pandemic of obesity, while doing untold damage to biodiversity. As industrial farming increased, we drove out nature and increased carbon emissions. The fossil-fuel-based warfare on the land includes monocropping, heavy machinery, herbicides and pesticides, fertilisers, and now, GMO technology. All this has proved disastrous for soil microbes, insects, birds, diversity of plant species and animals, including the human animals eating plants that lack nutrient density.

Fossil fuels, such as natural gas or coal, are used to supply hydrogen for creating ammonia. As a result, the production of nitrogen fertiliser alone is responsible for two percent of global energy consumption and emits about 310 megatons of carbon dioxide pollution each year.

The case for livestock

Globally, livestock consume a lot of food waste. Plant agriculture already produces many human-inedible crop residue materials: chaff, stems, leaves, and cellulose. Livestock's ability to upcycle plants inedible for humans to high-quality protein places them clearly in the super-cow category!

Livestock play an important part in the ecosystem; non-arable land, terrain unsuitable for human use or growing crops, with thin soil, numerous rocks, lack of water or too steep, is used for grazing cattle, sheep, goats, and other ruminants. These grass-fed animals produce meat that offer excellent levels of nutrients, essential amino acids, and proteins, and is the only perfect plant-based meat available. It is superior to industrially processed alternatives which are being marketed as plant-based meat, most of which fall below our daily requirements for calcium, potassium, magnesium, zinc and vitamin B12.

Definitions

Meat – flesh from an animal when it is used for food.

Plant-based protein – tofu, lentils, nuts, soy, peas.

First generation plant-based meat alternatives include tofu and tempeh.

Second generation plant-based meat substitutes use heat and pressure to force plant proteins into a fibrous meat-like texture through extrusion machines.

Next generation plant-based meats are produced from animal cells using a combination of biotechnology, tissue engineering, molecular biology, and synthetic processes also called cell culture technology.

Bioreactors in action

Meanwhile, back at the lab's bioreactors, the fake meat growing process is underway. A wide variety of starter cells that can grow at different speeds and produce different textures or nutrition profiles are part of production. Some companies take muscle stem cells from cow biopsies (trialling different parts of the cow's body) and grow them into mature muscle fibres in a soup of amino acids, proteins called growth factors, sugars, salts, and vitamins. These cells can only divide around 30-50 times before they halt, requiring frequent fresh supplies.

By far the most expensive part of the process is the food required by the cells. The classic feed for cell lines in the lab is based on a cattle-blood derivative called foetal bovine serum, a liquid from the blood of unborn calves, taken from pregnant cows during slaughter, harvested by means of a cardiac puncture, considered by many to be inhumane.

To replace just ten percent of the global meat market with fake meat would require hundreds of thousands of bioreactors, begging the question of energy use, technology development, and global emissions.

A range of emerging technologies, including recombinant technology to insert DNA sequences into microflora such as yeast, bacteria, and fungi, that carry the

instructions for producing proteins, are already here. New Start-Ups are already exploring the use of 3D printing to create structured plant-based meat products with intricate shapes and textures. And the industry has barely scratched the surface of what can be achieved through genetic engineering which has the potential for producing new proteins.

Is fake meat really greener?

You will have to do your own lifecycle analysis as, despite the marketing claims, no one has published the environmental cost of fake meat production against grass-fed animals, let alone organically and locally raised animals. This will involve taking each ingredient in the final product and tracing it back to its origin, logging all the environmental costs involved: fossil fuels, water, land needed to grow the plants, fossil fuel emissions from the fertilisers, pesticides, and transportation to the processing plant. Now add in the energy and water consumed in milling, defatting, protein extraction, and drying. Similar calculations will need to be done before the final process of assembly, packaging, and transportation to the point of sale.

Every morsel of food takes a small bite from the earth's resources. The human diet places a strain on the environment, water resources, biodiversity, and just about every other measure of planetary health.

So, what can you do?

Don't fall for the advertising hype that plant-based meat will save the planet. Cut down on sweets, sugars, refined carbohydrates, junk food, processed vegetable oils, and ultra-processed food with little or no nutritional value, all of which exact a heavy toll on planetary and human health. And remember, processed meat alternatives are not meant for infants.

PS: My research leads me to believe that fake meat stocks remain a poor choice for investors! ONZ

Welsh Glamorgan sausage

Should you need a plant-based sausage try the Welsh Glamorgan sausage popular during WWII when meat was rationed. The healthy choice is yours!

50g butter
Pinch of salt
2 large leeks, sliced
400g fresh soft white fine breadcrumbs
2 tsp thyme leaves
4 large eggs, separated
400g cheese*, finely grated
1 heaped tbsp wholegrain or Dijon mustard or 2 tsp English mustard
50g plain flour, for dusting
100ml vegetable oil for frying, plus a little extra if required

Fry the leeks and salt in the butter until soft (5-10mins).

Mix half (200g) breadcrumbs, thyme, egg yolks, cheese, mustard. Add leeks and any butter left. Season with salt and a generous grinding of pepper. Mix with damps hands and mould into 12 sausages. Lay on lined tray and freeze for 10 mins or chill for 30 mins until firm.

Whisk egg whites with a pinch of salt. Put flour and remaining breadcrumbs on separate plates. Dust the chilled sausage in the flour, egg white, then breadcrumbs. Chill for between 1 to 24 hours before cooking.

Fry the sausages over medium heat until golden and crisp (4-6 mins) turning every minute.

Transfer to a baking tray and cook 180°C for 10 mins.

(Can be frozen before baking. Freeze on a tray until solid, then transfer into containers. Will keep for up to three months. Cook from frozen in oven for 25 mins until hot.)

Serve with mustard or relish.

**Traditionally, Glamorgan sausages were made with Caerphilly cheese, a soft white cow's milk cheese from Wales that has a light, almost white colour and crumbly texture. The flavour is mild but it has a slight sour tanginess. A sharp, mature, cheddar combined with a mild harvarti is somewhere close.*

IMAGE FLICKR: JILL, JELLIDONUT. WHATEVER

For further information read *The Great Plant-Based Con* by Jayne Buxton.

Dee Pignéguy is an organic gardener in Manly, Auckland, and author, tutor, consultant, speaker, and promoter of all aspects regarding sustainability, organics, and health.

Eden Vegan

It is nice to have something simple, nutritious, economical, and delicious to take to those pre-Christmas socials. But your own, or others', dietary choices can sometimes make that challenging. Wellington-based Tess Eden's newly-released cookbook provides a mouth-watering range of options with budget-friendly common ingredients and simple instructions. She caters to a new vegan, a beginner cook, and with over 90 recipes, inspiration for the experienced. Some recipes you'll recognise as traditional dishes made vegan, some are temptingly new combinations. Here's a few to tempt Santa to drop in…

Macadamia cranberry rocky road

MAKES 8 SLICES | 10 MINUTES + 2 HOURS SETTING

⅓ cup macadamias, chopped
½ cup vegan marshmallows, chopped
⅓ cup dried cranberries
⅓ cup shredded coconut
⅓ cup freeze-dried raspberries, plus extra for topping
250g vegan dark chocolate
2 tbsp coconut oil

1. Line a 23cm x 13cm loaf tin with baking paper.
2. Put macadamias, vegan marshmallows, cranberries, coconut and raspberries in a large mixing bowl and stir to combine.
3. Put chocolate and coconut oil in a bowl over a saucepan of simmering water, making sure the bowl doesn't touch the water, and heat until melted. Stir to combine.
4. Pour chocolate mixture into the mixing bowl and fold all ingredients together.
5. Pour into prepared tin and pack down firmly with a spoon. Sprinkle extra raspberries on top. Place in the freezer to set for 2 hours before cutting into slices.
6. Store in the freezer.