IS THIS THE FUTURE OF FOOD?

A 3D burger, a bowl of oat noodles and cricket tacos all washed down with a nice camel milk latte – it may sound a bit strange, but it's all part of the increasing appetite for sustainable and nutritious cuisine, writes Jenne Brammer

"Hello and welcome to the future of food. Can I take your order?"

"Yes, I'll have a 3D-printed burger with a side of crickets and a camel milk shake please. Oh, and give me one of those mealworm muesli bars for later."

Such a transaction at the local takeaway or fast food joint would have been inconceivable not so long ago. It still sounds weird, but maybe not for much longer.

There's a revolution bubbling away in the food industry. Everything from what we eat, how it is produced, down to the very definition of food, seems about to be turned on its head.

Environmental concerns, population growth, advanced technology, health consciousness and evolving ethical considerations are the ingredients fermenting change.

Thrown into the same pot, they're being stirred together by time and circumstance, and the result is a strange stew indeed. Insects, plant-based meat, camel milk, lupins and vegetables grown in towers – all are among vanguard of the "foods of the future" as consumers change their diets in pursuit of sustainability and health.

The UN's Intergovernmental Panel on Climate Change's recent warning that the world is warming more quickly than initially thought is only expected to accelerate changing food consumption habits.

Chris Vas, general manager of the WA Food Innovation precinct at Peel, said the warming climate and limited resources was driving change.

"Globally there is more attention being paid to the environmental footprint and sustainability issues, given the increasing population and scarce natural resources such as water," he said.

Red meat consumption is declining

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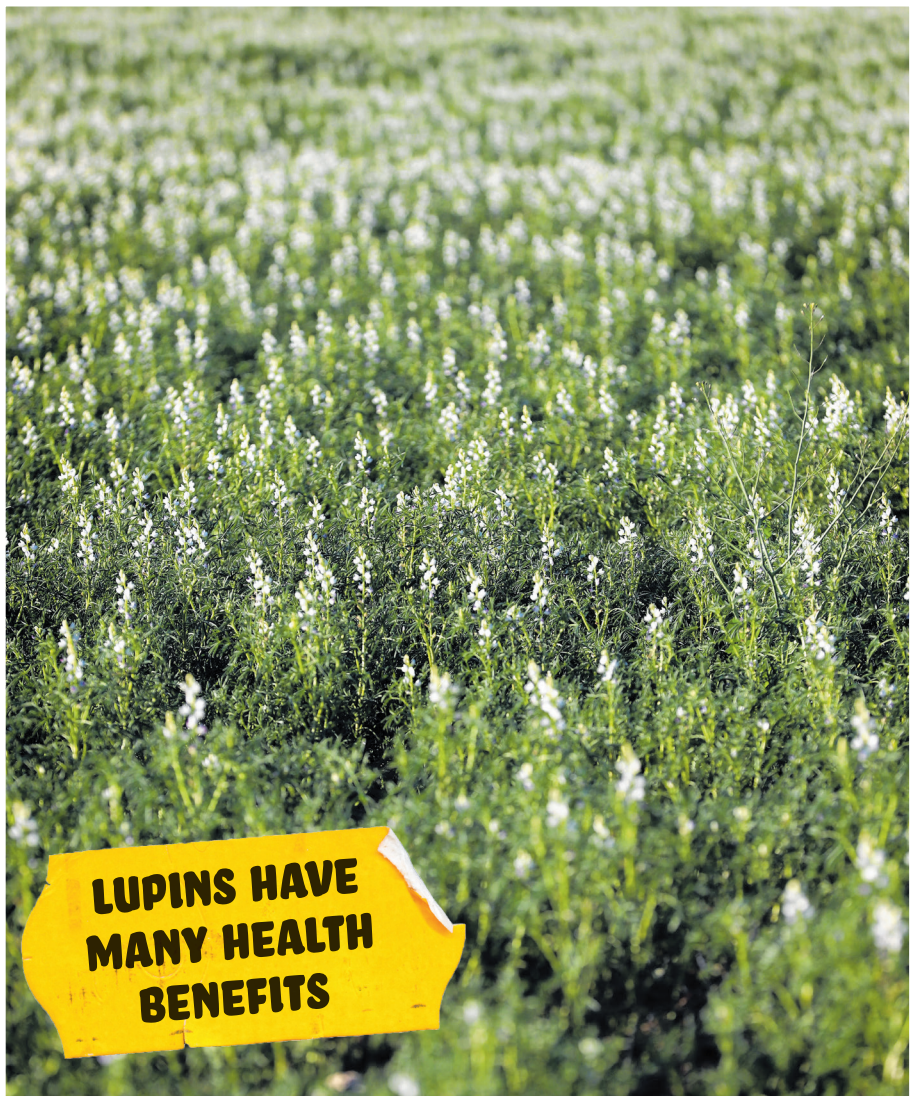
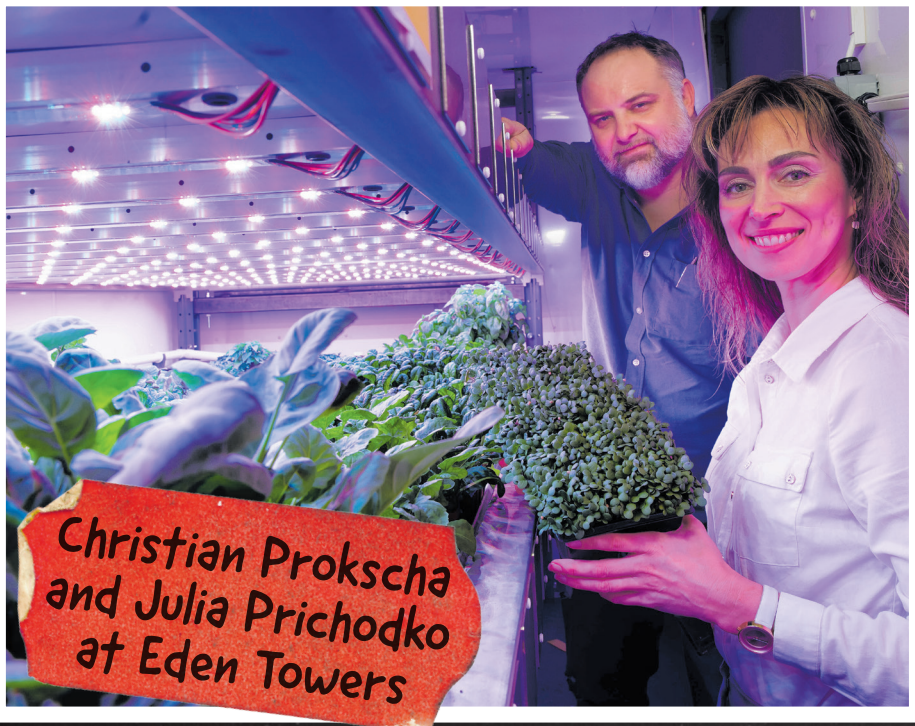


LUPINS HAVE MANY HEALTH BENEFITS



Christian Prokscha and Julia Prichodko at Eden Towers

From P15

despite the desire for protein rich diets. By 2027 the amount of red meat eaten by Australians annually is projected to drop from 25kg to 21kg per capita.

Worldwide, companies are furiously developing alternatives. They include meat and seafood in labs grown from stem cells from cattle and fish and produced by a 3D printer. Then there's those already carving out a niche in supermarkets with plant-based meat products. Another company has produced a prawn made out of soy protein and algae.

And there has been major investment, including in Australia, in insect farming, which aims to replace carbon-intensive protein from cattle, sheep and pigs with low-impact crickets and worms.

Biotechnology expert Dr Simon Carroll, chairman of the WA co-ordinating committee for National Science Week, said it takes about 37,000 litres of water to create 1kg of beef.

"That's not just the water the cow drinks but includes all the other water to produce its food, such as grains, pastures and silages," the former head of science at Boola Bardip museum said. "Water is scarce, yet we're growing beef which is an inefficient use of this resource."

Better nutrition, food intolerances and animal welfare concerns are also accelerating the trend towards alternatives to animal products.

Two prominent companies developing plant-based replacements for meat are US-based Impossible Foods and Australia's V2 Foods — a partnership between Hungry Jack's founder Jack Cowin's Competitive Foods and CSIRO's investment fund Main Sequence Ventures.

"These appeal to consumers who want plant-based diets but have a taste preference for meat," Dr Vas said.

Among the emerging lab-grown meat producers is US company Eat Just which in 2020 received approval in Singapore to retail its cell cultured meats, including chicken nuggets. Singapore-based company Shiok Meats is developing cell based seafood.

Across the world, the edible insect market is expected to reach $6.34 billion by 2027.

Outside meat, alternatives to cow's milk, including soy, oat and camel milk, are coming to the fore with more people being lactose intolerant, Dr Vas said.

He said sales were exploding as increasingly alternative foods were accepted by mainstream consumers. At the same time, major investment is flowing into companies in this space — in 2020, corporate venture capital arms invested about $1 billion into the global segment. In WA, several start-up businesses are at the forefront of farming and producing foods of the future.

Paula Pownall is behind WA's first edible insect farm — Grubs Up. She started farming crickets for human consumption in the Peel region in 2016.

Grubs Up sells via its website and through local health food stores products including cricket powder, dukkhas and whole roasted crickets and mealworms.

Ms Pownall said there was strong Australian demand for insect-based foods as they are high in protein and Vitamin B12.

"At the moment we're concentrating on product development. That is, short term creating protein bars for the health food industry and longer term creating products potentially for the pharmaceutical and nutraceutical industries," she said.

She hopes the business will soon gear up after recently being announced as a successful applicant through the Peel-based food innovation precinct's X Protein Lab incubator program.

> "CAMELS PRODUCE SIGNIFICANTLY LESS METHANE THAN COWS"
>
> MARCEL STEINGIESSER, GOOD EARTH DAIRY

While considered more climate friendly than producing traditional proteins, Ms Pownall cautioned it all came down to the farmer.

"It's not sustainable if you need the reverse cycle air conditioning running 24/7 to keep the crickets in the right climate," she said.

Good Earth Dairy chief executive Marcel Steingiesser expects camel milk will become a staple in Australian households by next year. It has been capturing feral camels in the desert as part of its plan to breed up its herd and expand its dairy at Dandaragan, north of Perth.

For several years the business has been selling pasteurised bottled camel milk, but is using funds sourced through a successful crowd fund raising in 2020 to increase its herd and build a new facility for non-powdered products. "We hope with this new facility that by sometime early next year we will launch products that will become a household staple," Mr Steingiesser said. "They will be unbelievably flavoursome, nutritious and affordable — and superior to anything on the market from a nutrition and digestibility perspective."

Camel milk is already proving popular, he

IT'S HOPED CAMEL MILK WILL BECOME A HOUSEHOLD STAPLE

Crispy Cricket Snacks

Ingredients

- *1 bag edible crickets*
- *1/2 teaspoon ground cumin*
- *1 teaspoon sweet paprika*
- *1/2 teaspoon dried oregano*
- *1 pinch ground cinnamon*
- *1 teaspoon sugar*
- *1 tablespoon salt*
- *1/8 teaspoon black pepper*

Preparation

1. *Preheat oven to 180°C and line a baking tray.*
2. *Mix all other ingredients together to make spice mix.*
3. *Toss crickets in vegetable oil and sprinkle with spice mix, place on baking tray.*
4. *Bake for 12 -15 minutes until crispy.*

said, because it doesn't have the allergens in the whey protein present in other dairy products. "And when you get into the micro-nutrition, camel milk is richer in copper and zinc, supporting the immune system, which is on everyone's minds today."

And as well as its superior nutrition, camel milk also addresses sustainability. "Camels produce significantly less methane than cows," Mr Steingiesser said.

There is also Fancy Plants, plant-based chilled snacks launched by Perth resident John Foss. Its snacks are sold in Coles and Woolworths in Australia, and Tesco and Wholefoods in the UK. "These are not just for vegans but the big number of people wanting to eat more plant-based foods, given the health benefits and because it's better for the planet," he said.

Soon West Australians will be able to buy salads and vegetables grown in towers with minimal impact on the planet.

Eden Towers, founded by husband and wife duo Christian Prokscha and Julia Prichodko, has been growing leafy greens in a pilot vertical farm in Malaga, but is about to go bigger. It recently bought a site at the Food Innovation Precinct in the Peel district. Following recent successful crowd funding, it will build six towers, each 12m high and housing two columns of 36 trays of greens.

That means Eden Towers will have internal growing space of 2.6ha, with a farm footprint of just 240sqm. That small amount of land is expected to produce about 180 tonnes a year of greens. Mr Prokscha said climate change and global population growth had increased demand for food and put pressure on availability of arable land.

"As well as needing far less land, vertical farming uses a fraction of the water that would normally be required," he said. "Eden Towers uses one litre of water to grow a kilo of lettuce, compared with 250 litres in an open field, and about 60kg-80kg can be grown per square metre, compared with 3.9kg in the open."

The new farm will use almost 100 per cent renewable energy and focus heavily on its sustainability credentials, with a goal to be carbon neutral. The tightly controlled environment without soil also means pests and disease are kept at bay, eliminating a need for chemicals.

Lupins have traditionally been used as stockfeed but are increasingly making their mark as a nutritious human food.

In WA, several companies are capturing the benefits. The Lupin Co sells flakes and flours from lupins grown in Coorow, and plans to launch ready-to-eat products by early next year. My Provincial Kitchen, in Mullewa, has an offering including cake and brownie mixes. Perth's Pinarie Foods is making lupin-based crisps as snacks.

The Lupin Co managing director David Fienberg said lupin products were good for the earth and a super nutritious source of protein. "Being legumes, lupin crops fix nitrogen into the soil, reducing the need for synthetic nitrogen (fertiliser)," he said. "And as for water use, they're a very efficient source of protein. Data from our farms show it takes five litres of water to produce one kilogram of protein — which is astonishingly low compared to animal farming."

Lupins are also high in fibre and low in carbohydrates, and gluten free, he said.

Also eying lupins as a major opportunity is Wide Open Agriculture, which is working with Curtin University to commercialise a lupin protein with gelatin qualities for a plant-based burger.

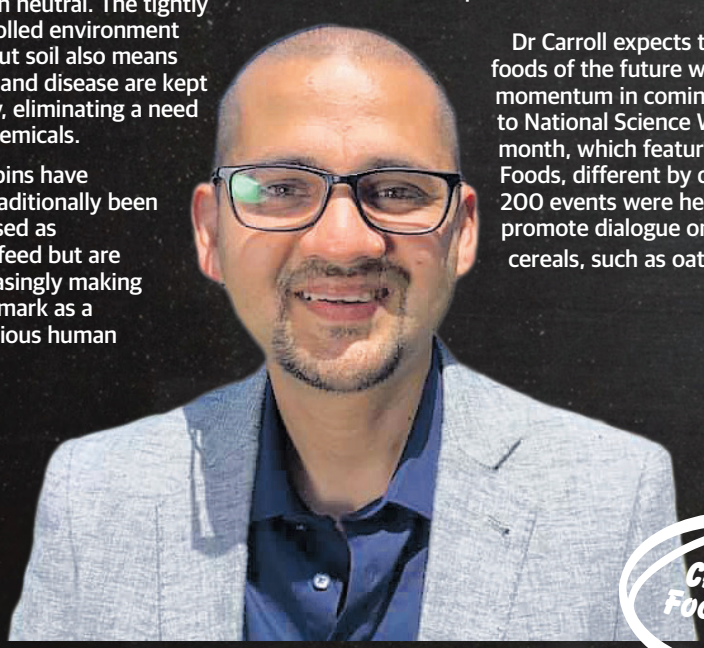
Managing director Ben Cole said a recently completed nutritional analysis by WOA showed a 76 per cent protein content was achieved and the nutritional quality and gelatin was retained during lupin processing.

Lupin protein is also being investigated by the company to potentially produce a protein enriched version of its recently released OatUp oat milk, gluten-free pasta and protein supplements.

Oat-based rice and noodles could soon capture the trend of lower-carb diets. In WA, Australian Export Grain Innovation Centre, funded by the WA and Federal governments, has developed a manufacturing process and is looking for the right commercial partners.

Richard Simonaitis, chief executive of AEGIC, said demand for whole grain products was growing rapidly around the world, especially in Australia's key export markets. "Awareness of the health benefits of whole grains is increasing among Asian consumers. Health authorities and governments are increasingly recommending that consumers substitute refined grain staples like white rice with whole grain cereals, such as oats," he said.

Dr Carroll expects the drive towards foods of the future will gather momentum in coming years. He points to National Science Week, held this month, which featured the theme: Foods, different by design. More than 200 events were held across WA to promote dialogue on the subject.



Chris Vas, WA Food Innovation Precinct