

Waste not: Exploring avocado's untapped potential

Avocados have a waste problem, with about 5-10% deemed too small or misshapen for retail sale – and another 40% thrown out due to spoilage. New Zealand-based Ovävo has a plan to transform process grade fruit and waste from the avocado industry into value-added ingredients. By CAROLINE MACDONALD.

Ovävo was founded about 18 months ago, and is looking into three potential paths for product development: the flesh of undersized or unattractive avocados; the skin; and the pit. A sizeable research base already exists for the use of avocado ingredients for skincare, mainly extracted from the pit and skin. However, food industry interest in its freeze-dried powder made from avocado flesh has been high, according to Andrew Vivian, the company's general manager and 'Avocado Innovator'.

The company is talking about taking its ingredients to the world – places like Europe, the United States and Japan, where avocados are popular but not always easy to source year-round. New Zealand is a long way away, and that's precisely why freeze-dried powder makes sense. Two tablespoons of powder are equivalent to a whole avocado, and can be shipped and stored far more easily and cheaply than the fruit. What is more, the powder retains all the nutritional and functional properties of avocado, including its mouthfeel and colour, and has a shelf-life of 12 to 24 months.

Vivian told *New Nutrition Business*, "Avocado is the most nutritionally complete fruit; it has carbohydrates, protein and fat. And consumers have a strange kind of love for them."

He noted that avocado fans usually know the approximate price of a single avocado at any given time of the year – something that

applies to few other fruits.

Demand for avocados in general is on the rise. In Europe, for instance, avocado imports more than doubled in value from €672m (\$789m) in 2015 to €1.6bn (\$1.9bn) in 2019, according to Eurostat figures. The number of global food and drink launches containing avocado ingredients remains low, but it also has

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doubled in the past five years, from about 300 to 600 worldwide. However, most of these foods use avocado oil, which means the fibre and many of the

nutrients are lost, and the oil is susceptible to oxidation.

Vivian's background is in international sales and marketing roles for the likes of P&G, Danone and Innocent in the UK. He sees a host of opportunities to tap into consumers' love for whole avocados by using freeze-dried powder in foods and drinks like baked goods, chocolate, cereal, ice cream, smoothies and more.

When considering how avocado might be used in various foods, the company took inspiration from the versatility of blueberries and almonds, which appear in everything from yoghurt and confectionery to cereal and baked items.

"We thought, 'why can't we do that for avocado?'" said Vivian. "It's got that unique difference to it but it also has that mainstream appeal."

With that in mind, the company took initial ideas for about 40 different food products and, in partnership with Massey University's Food Technology department in New Zealand, pared it down to six. Researchers there developed product prototypes using the powdered ingredient, testing its functionality under different processing conditions, namely baking, extrusion and UHT for beverages. They developed ice-cream, a muesli bar, tortilla wraps, chocolate, a hummus dip and a breakfast drink/oat milk.

The results were even better than expected. According to Vivian, the fat content of the avocados made everything taste better – even when pasteurised, which they had feared might produce rancid notes. The

ingredient also improved the melting point of ice cream.

"The more we look into it, it seems the more there is about the functionality of avocado. The only limitation is putting too much in," he said, adding that they had found some bitter notes at higher usage levels.

"Because of the high fat content, it is very similar to butter," he said. "If you think about the possibilities around that as a plant-based alternative to butter, it's pretty exciting."

The powder currently has a list price of NZ\$60 per kilogram (\$42.57/€36.21/£30.83), based on the pricing of other freeze-dried fruit products on the market. However, the price could be significantly lower for bulk orders.

Ovävo has some big investors behind it in the agriculture and life sciences sector – and one of its main investors owns New Zealand's biggest avocado producer, Valic NZ, the company behind the King Avocado brand. In New Zealand, 95% of suppliers have fewer than 1000 trees, making it a co-op-driven industry, but Valic owns 200 hectares of avocado plantations in the north of the country, with a total of about 100,000 avocado trees. "For us, we have that single source and provenance is really important," Vivian said.

Provenance is crucial to ensure the quality of the fruit, as well as to benefit from New Zealand's pristine image. But upcycling high-quality process grade avocados is just one part of Ovävo's sustainability story. Its location also allows for much lower water use than for avocados elsewhere, with 80% coming from rainfall, and the other 20% from a naturally replenishing underground aquifer.

"In other parts of the world, water is being prioritised for avocado so there are some ethical dilemmas going on there," Vivian said. "We are in a part of the world with a lot of natural rainfall."

So why has it taken the industry this long to find better uses for its process grade fruit?

The major players in avocados are in South America, and consumption habits there may provide a clue. Ovävo has employed a Chilean woman, Claudia Madrid, dubbed the "avocado whisperer", to help boost its crops.

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"It requires a commitment of time," explained Vivian. "She said in Chile they will eat an avocado even if it is small or has sunburn on the skin." The implication is that there is simply less fruit that is considered 'process grade' in major producing regions.

AVOCADO POWDER WORKS WELL IN A VARIETY OF PRODUCT FORMATS

Together, Ovävo and researchers at Massey University's Food Technology department developed product prototypes using the powdered avocado ingredient, coming up with ice-cream, a muesli bar, tortilla wraps, chocolate, a hummus dip and a breakfast drink/oatmilk. Avocado's fat content made everything taste better than expected – even when pasteurised. The powder was tested under various processing conditions, namely baking, extrusion and UHT for beverages.



Alongside its freeze-dried powder, Ovävo also is looking into nutraceuticals, skincare and even a clean label food preservative from avocado pits and skin, which are known to have powerful antioxidant properties. "People pay to put that into landfill," Vivian said.

He suggested that there's a certain logic to the antioxidant potential, considering how well the skin protects the fruit – as well as how the fruit remains green for longer in a cut avocado if the pit is left in. However, developing ingredients from the pit and skin comes with additional regulatory challenges, particularly in the European market, because these components are not usually consumed.

The company is already planning its applications for novel foods approval and US GRAS, but Vivian is aware that time is of the essence. "It would be remiss of us to think that no one else is looking at this – or at least they will be soon," he said.

Going forward, he said, "We will be trying to find the right partners who have the expertise that we don't so we can leverage and scale."