



FARMING

# THE BIGGEST VERTICAL FARM IN THE WORLD

AeroFarms' headquarters in Newark, New Jersey, is a former steel factory that's been converted into the world's largest vertical farm. Throughout the 6,410m<sup>2</sup> of growing space, plant beds are stacked on top of each other in 12 layers between floor and ceiling. LEDs provide lighting and the roots of leafy greens, herbs and salads are kept nourished using an "aeroponic" mist claimed to use 95 per cent less water than outdoor agriculture.

"This is game-changing in terms of productivity," explains Marc Oshima, AeroFarms' co-founder. "We can take the same seed that might take 30-35 days to grow outside, and it will have a 12-16 day crop cycle in our system, so we can have 20 crop cycles a year."

AeroFarms' agricultural optimisation relies on algorithms that continually monitor nutrients and lighting at different points in the plants' growth cycles. By optimising light wavelengths and the nutrient-filled mist, operators can endow plants with different tastes, textures, colours and yield. "For example, we can make watercress spicier and lettuce sweeter," he says.

The flagship facility, in partnership with RBH, Prudential and Goldman Sachs, will be able to produce 900,000kg of vegetables – which will be distributed to local buyers – annually when it reaches full capacity, predicted for midway through 2016.

PHOTOGRAPHY: FLOTO + WARNER

FISH FOOD

INSECTS INSIDE

Can insects make fish happier? Ynsect thinks so. The French company believes that the current practice of feeding seafood-based meal to farmed fish is critically depleting the world's marine life and disrupting the food chain by removing smaller fish that are the basis for the feed. Instead, Ynsect is farming beetles and flies fed with bioconverted organic substrates, such as cereal by-products, and then transforming them into fish food. Other by-product substances that make up the insect bodies – such as chitin – are then channelled into the cosmetic industry; insect manure can be recycled as fertiliser. [ynsect.com](http://ynsect.com)



Ynsects' beetles are fed with organic matter, such as food waste.



The larvae they produce are fed until they're grown enough to harvest.



The insect parts (protein, lipid and chitin) are extracted and purified.



Proteins and lipids go to the nutrition market, chitin to cosmetics.

## FOOD WASTE? NOT SO LONG AS MICROBES ARE HUNGRY

RECYCLING

This composting machine reduces the volume of food waste by 90 per cent in 24 hours. The self-contained aerobic food-waste composter uses a microbe that thrives in high heat and saline conditions. Large pedals churn the material to introduce air, and a heat jacket keeps the temperature up.

"The key is the microbial culture so that you never fully empty the machine. It's akin to making sourdough," explains Peter Goodwin, director of Closed Loop in the UK.

But the loop doesn't close until the compost is put to good use. The City Harvest programme in Melbourne starts with Closed Loop installing composting units in restaurants. The compost is then given to local growers who in turn sell their produce back to the restaurants.

The machines themselves are evolving, with touchscreen, heat controls, sensors and diagnostic tools.



BIOTECH

## THE NON-BROWNING APPLE

Apple aesthetes, rejoice! Canadian biotechnology company Okanagan Specialty Fruits has edited a potato gene into apple trees, creating fruit that never browns. Its first product is the Arctic apple (*below right*). It hopes to extend its technology to other fruit such as peaches, cherries and pears. [okspecialtyfruits.com](http://okspecialtyfruits.com)



After four hours' exposure to the air, the Granny Smith (*left*) has browned more than the Arctic apple