

## Cow poo grocery bags

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On the face of it, a cow poo carrybag or a food scrap grocery sack might not be the most appealing way for Australians to cart home their shopping.

But clean, green biodegradable plastic bags made from animal excrement or food waste could replace traditional plastic at Australian supermarket checkouts if a Sydney-based company has its way.

The bags were among dozens of ideas discussed at a national biotechnology conference in Melbourne this week.

Scientists with the Sydney-based Environmental Biotechnology Co-Operative Research Centre happened on a technique for turning organic waste into a green alternative to plastic bags quite by accident, the company's executive director, David Garman said.

Dr Garman said companies had long used high-value virgin products such as starch and sugar to produce naturally occurring plastic-like substances, called biopolymers, to make plastic bags.

"The breakthrough we've had was the while looking to control phosphorous in bioreactors, we found a whole group of organisms that thrive on this material in these waste reactors, whether it's sewerage or processing waste products from agriculture," Dr Garman said.

"We found out that one of the key ingredients that was being added by the operator suddenly completely changed the dynamics of the bacteria in the reactor, and that gave us the clue.

"Basically we end up with the same sorts of bacteria, the same sorts of material, which can then be quite readily translated into biodegradable plastics."

Dr Garman said the bags were as strong, clean and cheap as the non-biodegradable alternative, which he said could take hundreds of years to break down.

A 2002 Roy Morgan survey found 83 per cent of Australians were concerned about the effect plastic bags had on the environment and 80 per cent favoured banning the bags.

About 6.9 billion plastic shopping bags are used in Australia each year, according to figures from Clean Up Australia.

The Tasmanian town of Coles Bay; Anglesea, on Victoria's surf coast; Huskisson, Mogo and Kangaroo Valley on the NSW south coast, and the Sydney suburb of Alexandra Hills are among the first towns to ban the use of plastic bags.

Nine other Victorian locations - Cannons Creek, Tooradin, Olinda, Creswick, Cohuna, Murtoa, Timboon, Tallangatta and Queenscliff, the South Melbourne and Dandenong markets and the Elwood Village shopping centre - will progressively outlaw plastic bags.

Some retailers, including Bunnings and Ikea, have introduced charges for the use of plastic bags.

Dr Garman said the company was two years away from establishing a pilot plant to produce the biopolymer for the bags, with locations in Australia, China, Taiwan and South Korea under consideration.

"Once we've done that the second part - the processing of the raw material into plastic bags - is an established technology," Dr Garman said.

"We would probably set up the plant in Australia but we're having discussions now with some international research groups that have shown an interest in this."

Such recycling technology was the way of the future and a key component of the Sir Mark Oliphant Conference on Converging Technologies for Agriculture and Environment.

"The way we would like to see it is that farmer don't just produce one product and a lot of waste," Dr Garman said.

"They have started producing many products so that they become mini chemical factories, if you like.

"We would like to see two things - farmers producing material for sale and secondary products for sale, and recycling a lot of their waste material on the farm.

"I believe it's the only way to go in terms of environmental sustainability."

Other ideas showcased at the conference include tiny sensors, known as smart dust, that can be spread like seeds to monitor anything from crops to buildings in earthquake zones and a system of infrared sensors to provide early warning of bushfires in urban fringe areas.

Dr Garman said farmers were keen to use the latest technological breakthroughs.

"They are one of the most integrated industries and they have been one of the first to realise what new technologies can lead to in terms of increasing their productivity," he said.

"What this conference is doing is identifying where the next step is coming from by taking the best of microtechnology and nanotechnology and bringing that into the future management of agriculture.

"As we get more intensive, we also have to become more sustainable.

"That's where the other side of biotechnology comes into it - using natural processes harder and faster to make these intensive systems not only more cost effective, but environmentally more friendly."