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Edmonton tech firm develops natural alternative to plastic microbeads

BY DAVID HOWELL, EDMONTON JOURNAL JUNE 18, 2015

William Bardosh, president and chief executive of TerraVerdae BioWorks, an Edmonton-based industrial biotechnology company developing advanced bioplastics and biomaterials. Bardosh is pictured with a 2,000-litre fermenter in a laboratory the company is using at the Agri-Food Discovery Place on the University of Alberta's South Campus.

Photograph by: David Howell, Edmonton Journal



EDMONTON - An Edmonton biotechnology company has developed a natural, biodegradable alternative to controversial plastic microbeads used in personal care and cosmetic products.

TerraVerdae BioWorks makes value-added products from microbiological sources and waste-derived methanol.

Its MicroSpheres line is the first of four products TerraVerdae plans to bring to market in the next six to nine months as it scales up its operations.

“Our biopolymer can be used as a very good substitute material for a range of plastics, and it’s absolutely biodegradable,” William Bardosh, TerraVerdae’s president and chief executive, said Wednesday.

“It literally gets consumed by native microorganisms at the bottom of the waters, or on land.”

Non-degradable synthetic plastic microbeads, used as abrasives in facial and body scrubs since the 1990s, are small enough to pass through water treatment plants.

They end up in lakes, rivers and oceans, where they pick up toxic pollutants and can be consumed by fish and birds.

In the United States and elsewhere, efforts are being made to phase out the manufacturing and sale of plastic microbeads in household products. In Canada, Loblaw's has promised that by the end of 2018 it will stop making household and cosmetic products that contain them.

TerraVerdae's MicroSpheres, which can be made in a range of sizes according to need, break down quickly and safely in marine environments and don't pick up toxins.

Bardosh said the company is working with Alberta cosmetics formulators who have shown interest in the product.

"You provide them the material and then they test it to see how it works in their formulations, and if it works well, then they start buying it," he said. "We have a couple of those. The whole process of working with them also allows us to figure out and optimize our manufacturing process."

The 13-employee company works out of laboratory and office space at Agri-Food Discovery Place on the University of Alberta's South Campus.

Bardosh said it will need a larger facility to go into commercial production of products for various markets, including agriculture, industrial materials and personal care.

The manufacturing process starts with single-celled organisms that consume methanol derived from natural sources, such as forestry residue or waste biomass.

Fermented under strict lab conditions, the organisms multiply and produce a range of products including a biopolymer.

Bardosh, who founded the company, said MicroSpheres were "low-hanging fruit" as TerraVerdae started to look for products it could develop with its technology.

"We basically feed the organisms methanol, grow them up in the tank, and they'll accumulate this biopolymer and all we do is break the cells open and there you have it.

"To bring it to market we had to develop a process so we could fractionate the actual bead sizes and do quality control things, but the actual production was the easier of the different products that we're developing."

Other products include films and coatings, he said.

The company started operations in 2011. In the past two years it has spent more than \$3 million developing its process and products. It has earned revenue for the past three years.

TerraVerdae has benefited from financial assistance from a range of sources. The biggest funder has been Alberta Innovates — Bio Solutions, which provided a \$1.2-million grant at a critical stage. "Pivotal, I think, is a good way to say it," Bardosh said.

TerraVerdae is now looking for more investment to help it commercialize its technology.

"We're pulling all the pieces of the puzzle together so we can really execute on that in the next 18 to 24 months," Bardosh said.

If all goes as planned, "in two years we would transition from just being a development company to being a full product commercialization company."

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