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Student finds way to decompose plastic bags in months

By Kristine Owram, THE CANADIAN PRESS

TORONTO - As jurisdictions across Canada take action to ban the use of landfill-clogging plastic bags, which can take up to 1,000 years to decompose, an Ontario high school student has discovered a way to break down the pesky plastic in a matter of months.

Daniel Burd, a 17-year-old student at Waterloo Collegiate Institute, took home the top prize at the Canada-Wide Science Fair in Ottawa for his project.



The prize earned him \$10,000, as well as several other awards and entrance scholarships to various universities equalling tens of thousands of dollars.

DAVID BEBEE/THE CANADIAN PRESS
Waterloo Collegiate Institute student Daniel Burd, 17, holds his trophy he won for top prize in a Canada-wide science fair, in Waterloo, Ont., May 21, 2008. As jurisdictions across Canada take action to ban the use of landfill-clogging plastic bags, which can take up to 1,000 years to decompose, Burd has found a way to break down the pesky plastic in a matter of months.

But Burd, who will start Grade 12 in the fall, is modest about his idea, saying it literally hit him on the head one day.

"At home I have to do chores if I follow my mom's instructions," Burd said in a telephone interview from his home in Waterloo, Ont. "Each time I open the closet where we keep our cleaning supplies and things like that, the plastic bags are on the top shelf and they always fall down like an avalanche onto my head.

"One day I just got so tired of it and I began to research it to find out what other people are doing with these plastic bags, and through my research I found out that we're not doing too much."

Burd discovered that approximately 500 billion plastic bags are used worldwide each year. Billions of these end up in the oceans, where they are ingested by animals that often die as a result.

He also learned that plastic bags can take anywhere between 20 and 1,000 years to decompose - numbers in which Burd found unlikely inspiration.

Burd's hypothesis was that if plastic bags do eventually break down, it should be possible to isolate and concentrate the micro-organism responsible for the decomposition, thus speeding up the process.

To test his hypothesis, Burd took a few soil samples from a local landfill and mixed them with polyethylene, the substance used to make plastic bags, as well as a solution to encourage bacterial growth. After concentrating the solution several times and incubating it for 12 weeks, Burd took the resulting bacterial culture and tested it on strips of polyethylene.

After six weeks, the strips had lost more than 17 per cent of their weight compared to a set of control strips.

Burd concluded that a combination of two types of bacteria - Sphingomonas and Pseudomonas - was most effective at breaking down the polyethylene. After isolating these two bacteria, combining them with some sodium acetate and incubating the solution at 37 C, Burd was able to degrade the plastic by 43 per cent in six weeks. He figures the solution would entirely break down plastic bags in a matter of three months.

Burd said his findings could have a real impact on the amount of garbage that ends up in landfills - or as litter in our oceans and on our streets.

He envisions what he calls "recycling stations" for plastic bags, which would essentially act as large composters.

"It's like a container with constant temperatures and conditions in which you would have your liquid solution, your microbes and your plastic bags," he said.

Burd said he plans to keep working on his project to further reduce the time it takes to decompose the plastic bags, and he's thinking big when it comes to the future.

"To do that, it would be necessary to do more work in the laboratory with sequencing and things like that, and then after that, you can take it to the patent level," he said.

He acknowledges his discovery is a "very big step," but says there's a lot more work to do before it's marketable.

In the meantime, the ever-modest Burd says he will continue to work towards getting into a good university to study science.

"I hope I will go to university. I plan to apply."