CANOLA | PROCESSING BREAKTHROUGH

Canola crushing becomes cleaner with new process

Replacement for hexane | Current process adds dangerous solvent to oilseed and then distills mixture to remove the toxic substance

BY ED WHITE
WINNIPEG BUREAU

A chemist thinks he might have found a way to lift a hex from the oilseed crushing industry, potentially making it greener, safer, more efficient and less costly.

"The industry would rather not use volatile solvents, but distillation works pretty well," professor Philip Jessop of Queen's University in Kingston, Ont., said about why crushers use hexane despite its problems.

Jessop's replacement requires less energy, causes fewer human health risks and can be washed in with a version of club soda and washed out with regular water rather than requiring expensive distillation.

"Because we try to save energy and materials, it usually ends up being cheaper than the existing process, as well as being greener," said Jessop, who calls himself a "green chemist."

Hexane is a dangerous, gasoline-like solvent that is added to crushed oilseeds to separate the oil from the meal. Once the oil is separated, it has to be distilled to remove the solvent from the oil.

This is where the problems arise.

Distillation requires large amounts of energy and creates hazardous vapours that can injure plant workers.

Hexane is cheap, but the energy to distill it is not, and both the energy use and the hexane vapour cause greenhouse gas emissions.

Jessop said crushers face hefty insurance bills because of their use of volatile solvents such hexane that they distill, but they have not had any real options.

Jessop said he has found a way to create "switchable solvents," which can be easily flipped from one form to another at different parts of the process.

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>
> **PHILIP JESSOP**
> QUEEN'S UNIVERSITY

The solvents he is experimenting with are added to carbonated water and crushed meal, which causes the oil to absorb the solvent and separate from the meal.

However, instead of distilling the solvent-oil mix to remove the solvent, the carbon dioxide is removed from the water, which causes the two to separate when the solvent suddenly becomes intolerant of the oil.

This gets rid of what Jessop calls the "Murphy's law" of solvents: whatever is ideal in one stage of the process is terrible in the next stage.

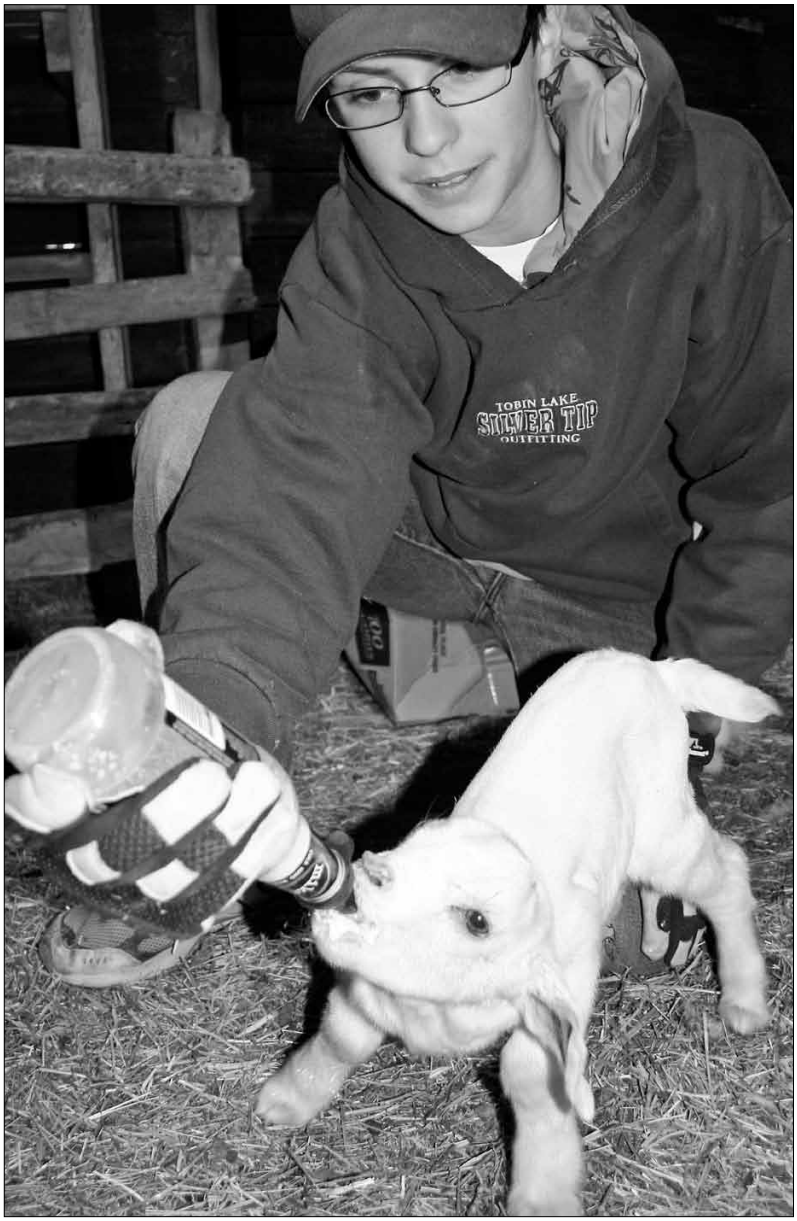
Jessop's more benign process still faces many hurdles before becoming commercially possible. The solvents he is using as replacements are not now used in food processing, so they would first need government health approvals and set standards.

Much fine-tuning would be required to establish specific amounts of carbonated water required to lower solvent levels to acceptable levels.

However, Jessop said this pioneering work demonstrates that one of the most negative elements of the oilseed crushing business can be replaced with a relatively harmless process.

"It proves that you can do this," he said.

HUNGRY FOR A DRINK



Tristan Hoffarth has become a surrogate mother for quadruplet goats who lost their mother. Here he bottle feeds one of the four-day-old kids on his farm near Montmartre, Sask. | CHRISTALEE FROESE PHOTO

RESEARCH | STUDENT WORK

Sask. high school student recognized for lentil research

BY SEAN PRATT
SASKATOON NEWSROOM

Saskatoon's expertise in agricultural biotechnology extends beyond the University of Saskatchewan and the adjacent research cluster at Innovation Place.

For the second year in a row, a Saskatoon high school student has won a national biotechnology research competition.

Rui Song, a Grade 9 student at Walter Murray Collegiate Institute, won first prize in the Sanofi-Aventis BioTalent Challenge, an annual competition intended to raise awareness of biotechnology.

The 14-year-old is the youngest finalist in the event's 17 year history.

She was attempting to find an early way to detect the difference between two strains of anthracnose, a deadly fungus that infects lentils.

In 2009, Walter Murray student Scott Adams won the contest. He researched a novel way to turn off a wheat gene, altering its starch elements.

One of the two strains of anthracnose Song investigated infects lentils with low levels of resistance but does not cause problems for varieties with medium or high disease resistance.

The other strain infects all lentils, causing yield losses of up to 50 percent in a crop that generated $600 million in farm cash receipts for Saskatchewan farmers in 2008.

Song and her mentor, Sabine Banniza, associate professor at the University of Saskatchewan's Crop Development Centre, designed 2,000 genetic markers and tested 50 of them.

While they were unable to find a marker that could identify the two strains of the disease, the judges of the national competition were impressed with Song's presentation, her knowledge of the subject matter and ability to answer their questions and awarded her the $5,000 prize.

Song said she will probably use the money to start a college fund.

She said the competition opened her eyes to a career in biotechnology.

"It made me realize science is not instantaneous," said Song.

"Sometimes you don't even come up with answers, you come up with more questions."

Song isn't committing herself to a career in agricultural biotechnology. She has many other interests, including math, reading and piano.

But working with Banniza and her team did stir up something inside of her.

"It definitely made science and biotechnology in general one of my top interests," she said.

John McDougall, president of the National Research Council, which is a partner in the competition along with Sanofi-Aventis, Sanofi Pasteur Limited and BioTalent Canada, congratulated the youth participating in the event.

"We encourage you all to consider pursuing a career in science to push the frontiers of knowledge," he told the students during the award ceremony.