

Media Release
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Biotech tools promise safer foods and disease-preventing diets

SEPTEMBER 14, 2010: In a world expected to be home to more than nine billion people by the middle of this century, it will take more than small tweaks to our agricultural systems to feed us all, says Dr. Karl Dawson, director of worldwide research for U.S.-based Alltech Inc.

“We are now in a situation where we have to look for quantum leaps,” he says. “We’re going to have to change our base technology, and biotech is probably the way to go.”

Dawson was the second of two keynote speakers at the second day of the Agricultural Biotechnology International Conference (ABIC 2010) in Saskatoon.

Biotechnology has already yielded pest and drought resistance, as well as improved quality. New advances in enzyme technology promise new ways to process crops to get more value from them, and to improve digestion in animals so they make more efficient use of feed. Advances in biotech also promise to revolutionize food safety.

“In my view, the biggest use (of these technologies) is the safety and traceability of our food chain,” Dawson says.

Current techniques test for how much of a given contaminant is in a food sample. The problem is that detection equipment has gotten better and better - to the point where the new equipment can detect substances at parts per quadrillion. That’s a one with 12 zeroes behind it. With this kind of sensitivity, it makes “zero tolerance” policies for food safety impossible.

“The test tells us it is there,” Dawson says. “But do we really need to be concerned if we have one part per quadrillion of PCBs?”

A better measure is whether or not the food contaminant has any harmful effects. Biotech researchers have harnessed our knowledge of genetics to produce new, fast, and extremely accurate tools. They work by monitoring how gene function is altered, because if gene function is altered, the effect is seen throughout the body.

New tests called microarrays are able to detect changes in the function of tens of thousands of genes simultaneously, providing results in hours instead of days. These systems (Alltech’s version is called GeneChip) are used to look at the effects of toxins as well as nutrients.

“We have a tool now for teasing out these intoxicants or contaminants in the food system – a very powerful tool,” Dawson says. “It’s based on biological risk, not perceived risk.”

The same technology can be used to detect the presence of disease organisms such as SARS and avian flu. Microarrays can be designed to test for multiple diseases simultaneously – with results available in two hours.

This has profound implications for food safety and health, not the least of which is eliminating much animal testing. Dawson sees a future in which “sentinel programs” will be set up at critical points of the food chain to detect contamination long before it reaches our plates.

These same advances in biotechnology are also being used on the other side of the equation: nutrigenomics, or how to design our diets to maintain and enhance our health.

For example, Dawson and his colleagues used a 60,000-gene array to test the effects of selenium in chickens. The results were markedly different for this micronutrient, depending on what form it was in (selenium salts vs selenium in yeast). In cattle, genes in the mitochondria, the cells' "power plants," were cranked up by a supplement, allowing the animals to produce more milk.

"This is a dream come true for nutritionists," Dawson says. "We've never been able to look at energy metabolism this way."

The technology can also be used to design diets to help prevent diseases such as Alzheimer's. Initial research with certain supplements suppressed the action of the genes that code for the plaques that are characteristic of the disease.

"This is very interesting, because it suggests there are nutritional things you can do to start preventing (disease)."

ABIC 2010 was held in Saskatoon, hosted by Ag-West Bio. Since it began in Saskatoon in 1996, the conference has traveled the world, from Australia and Ireland to Germany and Thailand.

ABIC 2011, themed "Moving Towards a Bio-Economy," will take place from September 6 to 9 in Johannesburg, South Africa. For information on next year's conference, visit www.abic.ca/abic2011, or e-mail abic2010@foundation.co.za

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