

FOOD

BIOTECHNOLOGY RESOURCE

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CURRENT NEWS ON FOOD BIOTECHNOLOGY

Milk and rBST:

THE FINAL WORD?

by Milly Ryan-Harshman, Ph.D., R.D.

Was the announcement that rBST would not be approved for sale in Canada the final word on the subject? The answer is "not likely".

The controversial genetically modified hormone rBST is used to increase milk production in cows. Public interest groups opposed to its use focused their efforts mostly on human safety and placed their hopes for rejection on the findings of the Human Safety Panel that is looking into the use of the product in Canada. But it was the findings of the Animal Safety Panel that provided Health Canada with their basis for rejection.

Interestingly, the media weren't particularly interested in the Human Safety Panel's conclusions and Monsanto, the company that makes rBST, was surprised by the veterinarians' conclusions. Health Canada used this situation to create some breathing space for itself amid the controversy.

No Link to Cancer Found

Although the conclusions drawn by the Human Safety Panel received little press coverage, some are especially noteworthy because they bring perspective to the rBST controversy and settle outstanding questions.

The most important conclusion is that

drawn about Insulin-like Growth Factor (IGF-1). IGF-1 is found in cow's milk and is also produced in the human body. The amount of IGF-1 in milk is somewhat increased by the use of rBST, but overall levels do not rise very much. The panel concluded that, although some IGF-1 may be absorbed from the intestine into the bloodstream, the levels are not significant compared to what is already in the blood from the body's own production.

Why the concern about IGF-1? People have a wide range of circulating IGF-1 levels, and scientists are actively investigating the theory that individuals with higher levels may be at greater risk for certain types of cancer. However, exogenous (dietary) IGF-1 is insignificant compared to endogenous (made by the body) IGF-1. In other words, diet, including milk drinking, has nothing to do with IGF-1 levels and cancer risk.

The panel was also asked to comment on the possibility that the intestinal health of newborns would be affected by IGF-1 in milk from rBST supplemented cows. The panel concluded that

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any IGF-1 consumed by newborns was inconsequential. Their reasoning was based on the fact that virtually all newborns are either breast fed or formula fed; human breast milk contains much higher amounts of IGF-1 than does milk from either treated or untreated cows, and the process for making infant formula destroys IGF-1.

While it is true that some infants are introduced to cow's milk too early in their first year, the amount of IGF-1 consumed would not exceed that consumed by breastfeeding infants. In fact, public health professionals have promoted proper infant feeding practices for many years. Early introduction of cow's milk may be problematic because of the risk of immune system reactions, the risk of iron deficiency anemia, and – when solid food intake is too low – the risk of constipation. Education about infant feeding practices has been and always will be an important public health activity.

Increased Exposure to Antibiotics Marginal

A third question the committee was asked to respond to was that of the potential for increased antibiotic resistance in bacteria that are harmful to humans, if antibiotics were used more often to treat mastitis (mammary infection) in rBST-treated cows. After consulting with other prominent experts, the committee stated that the increased exposure to antibiotics due to the treatment of mastitis would be marginal in comparison to other agricultural and human use.

So, why weren't these conclusions of the Human Safety Panel given proper attention by the media? The answer to this probably lies in the fact that the media needs controversy to sell newspapers or to capture the attention of television viewers. Monsanto's surprise at the Animal Safety Panel's recommendations and Health Canada's uncommonly swift decision following the release of the reports provided an opportunity for reporters to "milk" the controversy. The conclusions of the Human Safety Panel failed to meet this objective.

Animal Safety Panel Findings Not Clear

For the record, the conclusions and recommendations of the Animal Safety Panel present an interesting option for Canada. The committee felt that they were able to detect some trends indicating compromised animal safety with the use of rBST, but that not enough consistent or comprehensive data were available to draw firm conclusions. In particular, the committee could not assign the risks to rBST itself or to the increased milk production, even though the health outcomes would be the same. Furthermore, if there are increased cases of mastitis or lameness in cows treated with rBST, the panel felt that Canadian dairy health management practices were not sufficient to handle the problems.

Therefore, the overall message appears to be that additional studies are needed to define the nature of dairy cattle diseases (such as determining the specific conditions and bacteria that cause mastitis) and to assess the ability of herd health management programs to alleviate problems. These types of studies expand the breadth of dairying and would benefit the entire dairy industry; therefore, such studies should not be the responsibility of a single company.

The final word, however, is that the story is not finished. Canadian dairy farmers may yet, like their American counterparts, have an opportunity to use and learn to properly manage tools like rBST. After all, the milk is safe to drink. And to sell! ■

GROCERS' FORUM

Grocers' Forum is a regular feature of this newsletter. It provides food retailers and consumers with an opportunity to ask questions about the use of biotechnology in the food industry. If you, your customers or your clients have questions about food biotechnology that you would like to have answered through Grocers' Forum, please fax them to the Saskatchewan Agricultural Biotechnology Information Centre at 1-306-975-1966 or call 1-306-668-2660.

Q. Steven Wong is a Vancouver chef and restaurateur who has operated two restaurants. Mr. Wong is now a restaurant consultant and a food writer with three books and numerous magazine articles to his credit. Steven Wong is concerned about the time-frame for testing food biotechnologies. He asks, "Are the time-frames of studies on biotechnologies of sufficient duration to determine the long-term implications of new products?"

A. According to the Office of Biotechnology at the Canadian Food Inspection Agency (CFIA), the most practical approach to assessing the long-term safety of a genetically modified food is to find out if a novel food is "substantially equivalent" to its traditional counterpart.

For example, the oil from a genetically engineered canola plant would be studied to find out if it is substantially equivalent to traditional canola oil that is already known to be safe. The traditional and modified oil would be compared in terms of compositional, nutritional, toxicological and molecular data.

"If the food is found to be substantially equivalent

lent," says the CFIA, "it can be treated in the same manner as the traditional food with respect to safety. No additional safety concerns would be expected. If, on the other hand, substantial equivalence is more difficult to establish, then the identified differences, or new characteristics, would be the focus of further safety considerations."

Another possibility is that no similar traditional food exists. In that case, the new food must be evaluated on the basis of its own composition and properties. The more a novel food differs from its traditional counterpart, the more detailed the safety assessment that must be undertaken.

It should also be noted that the products of biotechnology actually pass through a number of tests — including the tests for food safety — before they are approved for use in Canada. The safety assessment of genetically modified plants, for instance, involves a number of steps:

- The companies or institutions developing the new product must provide information including descriptions of the host plant species for the novel trait, the donor organisms, and the biotechnology methods used. The safety evaluation will include a consideration of potential toxicity, biochemical changes and allergenicity.

- New products are also evaluated for their environmental impacts. The novel plant is initially confined to development in a facility that prevents dissemination of any genetic material from the facility into the environment. Once it is considered safe, the next step is confined release into the environment with conditions of confinement imposed to minimize gene escape, either in the form of pollen, seed or vegetative plant parts. The safety assessment takes the location and ecological status of the release site into *consideration*.

- Before the plant is freely released into the environment, human and animal safety (non-target effects) and the potential impacts on either the natural or agricultural environment are considered.

- Further regulatory requirements may need to be met prior to commercialization even after a plant with a novel trait has been authorized for unconfined release. In addition to the assessment for food safety by Health Canada, the Feed Section of Agriculture and Agri-Food Canada will require information to show that any animal feed from a plant with a novel trait is substantially equivalent to feed from its unmodified

plants. As well, the new crop will have to go through a variety registration process.

CFIA says that the multi-stage approach to registering products of biotechnology represents a careful, thorough and precautionary approach to food safety. The best scientific information available is used to develop regulations and guidelines, and these are continually revised as new information becomes available.

"No one can predict anything with 100% assurance," says CFIA, "but the regulatory system that exists provides that every possible precaution is taken in assessing the safety of foods before they are made available to the consumer. The fact that Canada has one of the safest food supplies in the world is evidence of how well this system is working."

For more information on the regulatory system for biotechnology contact the the Office of Biotechnology, Canadian Food Inspection Agency, 59 Camelot Drive, Nepean, Ontario K1A 0Y9 or visit their Web site at <http://cfia-acia.agr.ca/> ■

Citizen's conference gives cautious nod to biotech Designer Genes at the Dinner Table

Britain may be in an uproar over genetic engineering, but Canadians appear ready to proceed — with caution. That's the verdict of an experimental citizen's panel that spent three months assessing the pros and cons of food biotech. The panel announced its findings at a citizens' conference held March 5-7 in Calgary.

The panel brought together divergent views on food biotechnology using a public participation mechanism pioneered in Europe. The independent panel of 15 members was selected from over 350 volunteers from the four western provinces. Their backgrounds ranged widely, including, a manager of a large food retail centre, a secondary science teacher, a cattle farmer, a grade twelve student, a heavy equipment mechanic and an environmental consultant.

The panel set an agenda of probing questions and consulted with experts, stakeholders and the general public to find the answers. The panel then wrote a report which was presented to the Calgary conference

and forwarded to the seven federal ministries responsible for government policy on biotechnology.

Is biotechnology beneficial for all of society? Is it safe? Can it be used in a way that respects the individuality of humankind? The panel concluded "the answer is yes, if we make it so."

But the panel also insisted a number of steps are needed to ensure that food biotech will continue to be safe and beneficial in the future.



They recommended that:

- future biotech developments should involve the public in the decision-making process in a more meaningful way;
- a Code of Ethics governing food biotech be established with input from all stakeholders and that the code be used as an integral part of the regulatory process;
- labeling issues be resolved by the Canadian Biotechnology Advisory Committee;
- international biosafety standards be established;
- multidisciplinary peer reviewed research be incorporated into the environmental risk assessment process;
- the Federal government monitor and assess the impact of concentrated control of the food industry;
- current patenting laws with respect to food biotech be reviewed;
- alternatives be found for antibiotic resistant marker genes; and that
- public interest should be stimulated via a comprehensive public communications plan developed by industry, producers, and government.

The panel concluded that biotechnology is here to stay, but that confidence can be bolstered if public participation is incorporated into government decision making on the safety of biotech products. ■

Aquaculture: The Future of Fish

We've all hear stories of declining cod and salmon stocks in the ocean fisheries. Aquaculture, or fish farming, shows promise to supplement ocean fisheries to meet consumer demand for fish. Aquaculture is a fast growing segment of food production. Already, it contributes more than 16 million tonnes of fish and shellfish annually to the world food supply.

Biotechnology and Aquaculture

As demand for fish from aquaculture intensifies, science is beginning to explore new ways to improve fish production, health and nutrition – including the use of biotechnology.

Biotechnology offers the possibility to modify fish genetics in order to help fish grow faster, use feed more efficiently, resist disease and tolerate colder temperatures.

Examples of the potential use of biotechnology in fish farming include:

- A gene that helps Arctic Char survive in cold water has been transferred to another species that normally requires warmer water in which to survive. This will expand the range of fish farming to colder climates.

- An extra copy of a gene that codes for the production of growth hormones has been introduced into talapia fish, a popular aquaculture species. The modified fish can grow up to twice as fast and several times larger.

Biotechnology can also be used in developing new sources of fish feed. Most farmed fish or shellfish are fed on fish meal, a byproduct of fish processing. This can be expensive, supplies are limited and it can cause environmental problems.

Researchers are now looking at ways to modify plants to make them more suitable for fish feed. Biotechnology can be useful in eliminating anti-nutritional properties of plant-based fish feed or in the production of enzymes that will make plant-based feed more digestible.

Biotechnology in aquaculture is still in the experimental stages. Its use in aquaculture represents an important innovation that will help ensure an ongoing supply of quality fish products.

For more information contact Paul Adelizi, Fish Feed Scientist, at the Saskatchewan Wheat Pool 306-668-6634. ■

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