Better Oats, Better for You

Your mother knew what she was talking about – you should eat your oatmeal. And now research is showing that oats have more health benefits than even mom could have guessed.

If there was a food that could reduce cholesterol levels, lower blood pressure, decrease risk of diabetes, and increase your body's immune response, you would eat it wouldn't you? Would you be surprised to discover that oats have been identified as a food source that can deliver all of these health benefits? It is precisely because of the demand for healthier foods that Alberta has focused some of its research resources on oats.

Oats have always had a reputation as a healthy and versatile food, but now researchers funded by the Alberta Crop Industry Development Fund Ltd. (ACIDF) are looking at innovative ways to improve nutritional and quality characteristics that could generate completely new uses for the traditional crop. Oats are a source of many important nutritional components that can really have a positive impact on human health. "Often, oats are considered lower quality food compared to other crops – that's unfortunate. We are working to change that," says Doug Walkey, Executive Director of ACIDF. Despite the health benefits of the crop, the best oats typically go to horse feed. Horse owners want white, plump, well-shaped oats and pay for it. The second grade oats go to human consumption, primarily into breakfast cereals. The lowest grade oats end up in the feed market.

"The oat industry is an interesting one. Typically, oats are planted as a second choice crop. They are planted last in comparison to other crops, but to get the most of it, they should be considered the same as other crops and get the same attention," says Walkey.

Driving downstream benefits from the crop is important in achieving maximum returns from oats, so ACIDF-funded research on oats is focused on value-added benefits and new food uses. The first project focuses on the value-added benefits of extracting beta glucans from oats, and using them as food amendments/additives. "It's about the custom formulation of foods and increasing fibre in low fibre foods," adds Walkey.

Inside Oats
Components of oats with specific health benefits include:

- **Beta Glucans – reduces cholesterol, regulates glucose levels, stimulates immune response, reduces heart disease, reduces risk of Type 2 Diabetes.**
- **Tocopherols – inactivates free radicals and other harmful compounds, thus reducing risk of heart disease and cancer, and possibly slowing cellular aging.**
- **Phenolics – similar benefits to Tocopherols.**
- **Phytosterols – reduces cholesterol, reduces risk of cardiovascular disease, reduces risk of colon, breast, and prostate cancers.**

Beta Glucans

Dr. Thava Vasanthan is a University of Alberta researcher investigating beta glucans. His research covers three areas: development of cost efficient technologies for beta glucan extraction from oats and barley, the use of beta glucans as a food additive, and the food and non-food applications for the by-product, after the beta glucan is removed. If successful, this research would demonstrate that oats and barley could be used as a commercially viable source of beta glucans, while possibly improving the feed quality of the by-product.

Why look at beta glucans? Beta glucans are a soluble fibre that has been shown to have several health benefits, including lowering cholesterol, regulating glucose, and stimulating the immune system. Good sources of beta glucans include oats, barley, yeast, bacteria, and some fungi. Many studies have shown the positive health benefits of increasing

Dr. Solomon Kibite Remembered

Dr. Solomon Kibite, an oat breeder with Agriculture and Agri-Food Canada (AAFC) in Lacombe, passed away suddenly on August 20, 2003 at the age of 54. Before his untimely death, Dr. Kibite focused his research energy on barley, oats, and wheat, developing 13 different varieties as well as many other lines that are used in breeding programs internationally. Since 1995, he concentrated exclusively on oats. AC Morgan, a variety he developed, is the highest yielding and most widely grown oat variety on the western prairies.

Kibite was studying the special characteristics of oats and finding new food uses for the crop as well as applications in the cosmetics and nutraceuticals industries. His current work will be completed to ensure the new lines get out.

Heavily involved in the international plant breeding community, Kibite published many papers on cereal breeding and genetics. He offered plant breeding courses in China, conducted extensive collaborative research with scientists across Canada and the United States, and was a respected member of the Executive Committee of the International Oat Conference and Chair of the American Oat Workers' Conference.

"Everyone was surprised by the amount of collaboration he was able to achieve," says Dr. George Clayton, a colleague and friend at AAFC. "He was very quiet and unassuming, and never bragged, but he was a great leader; very generous, very kind, and very respectful of everybody in the office. He will be greatly missed."

the level of beta glucans in the diet, to the point where the Food and Drug Administration in the U.S. has allowed food makers using whole oat products to claim that products containing at least 0.75 grams of soluble fibre per serving reduce the risk of heart disease by reducing levels of cholesterol.

In order for oat beta glucans to be used more widely, viable methods of extracting them from whole oats must be developed. Vasanthan, in collaboration with Dr. Feral Temelli, is applying new patented technology to the fractionation of oats in order to separate the beta glucans. Creating a reliable, high quality product is very important in developing food additives.

Once the beta glucans have been extracted, Vasanthan and Temelli are investigating using this oat product as a food additive to increase the fibre levels of low fibre foods. The key is determining if the health benefits of beta glucans in oats can be transferred to other foods that would not normally contain sufficient levels of soluble fibre.

An interesting side benefit of Vasanthan and Temelli's work is that the remaining oat product, after the removal of the beta glucans, may be a more efficient feed product. So an additional aspect of the project is a feeding trial to investigate the possible benefits of feeding oats post-beta glucan-removal. "Some feel that with the reduced fibre content, the material may actually be higher in feed energy," notes Walkey. This demonstrates an excellent opportunity to drive value right through the chain. From developing production technology for a new food additive to finding a beneficial use for the by-products, it should all translate into more value.

More than Just Oatmeal

Until his untimely death this summer, Dr. Solomon Kibite was an oat breeder with Agriculture and Agri-Food Canada in Lacombe, focused on making better food oats. He described his work this way: "Traditionally, oats have been used for breakfast cereals and muffins. We are trying to find new uses for oats in pasta and noodles as well as improve nutrition through increased antioxidant levels." Thus, a focus for his breeding program was increasing the levels of antioxidants in improved oat varieties.

There has been a lot of work on increasing antioxidants in oats in China, making Chinese varieties more nutritious. He explained that the goal is to develop improved oat varieties with higher antioxidant levels that would be successful in Alberta. Since there is no industry accepted level yet, part of the work is to establish how high increased levels of antioxidants need to be.

Antioxidants are compounds that clean free radicals and other unstable chemical compounds from cells. Damage by free radicals has been implicated in aging, heart disease, and cancer; thus the ability of antioxidants to protect the body from damage by free radicals might help reduce the risks associated with these conditions. Oats contain two types of antioxidants, tocopherols (better known as Vitamin E) and phenolic compounds. The phenolic antioxidants are different compounds but function in a similar fashion to tocopherols.

Drs. Kevin Swallow of Alberta Agriculture, Food and Rural Development's Food Processing Development Centre, and Bin Xiao Fu of Canadian International Grains Institute are working with material from Kibite's breeding program to investigate the use of oats in making pasta and noodles. Swallow is enthusiastic about the opportunity to take a product, in this case oats, and develop it into something never before utilized in Canada. He applauds Kibite's vision. "He could see the versatility of a traditional grain and use it for novel applications," he says. "The health benefits to be gained from oats is the major attribute of Dr. Kibite's work."

By modifying certain quality characteristics, the improved oats could become a new ingredient in the growing pasta/noodle market. This would create a unique new market for the use of oats and oat products that would offer a more nutritious product to the consumer, making oats more than just a breakfast food.

So the next time only oatmeal leaps to mind when considering oats, think of a world of possibilities. From specialized noodles and pasta to extracted beta glucans, oats have the potential to positively affect our health. r&d