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## PROBIOTICS – UNDERSTANDING THEM WILL LEAD TO GREATER USE

In recent years, consumers have begun to look at foods not only for their basic nutrition, but also for their health benefits. The Canadian food industry has responded to these demands and introduced a new generation of value-added foods known as 'functional foods.' Probiotics, prebiotics and bioactives are common labels on many food products.

Now research at Agriculture and Agri-Food Canada (AAFC) could help the industry standardize the way probiotics are used and bring new information to help the government assess probiotic food products. Scientists at AAFC's Food Research Development Centre in Saint-Hyacinthe, Quebec, Canada are partnering with industry, universities and clinical researchers to study the nutrition of functional foods and some challenges facing the food industry.

Probiotic cultures are beneficial bacteria that occur naturally in the digestive system of animals and humans and keep the bad bacteria and yeast from growing. Normally you have an abundance of friendly bacteria, but stress, antibiotics and poor food choices can offset the balance of good and bad bacteria. When consumed in sufficient quantities, probiotic cultures exert beneficial effects on health. And this is not only limited to humans.

With regards to livestock, these cultures have the potential to minimize or eliminate pathogens not only during the animal's life on the farm but also later in the foods we eat. Simply put, probiotics improve the

balance of "good microbes" in the intestine, and this has far reaching effects of the health of our digestive system but also on our immune system.

Probiotic cultures can also be found in many fermented foods and are being added to many food products. Worldwide, dairy products represent the highest share of the functional foods market - probiotic cultures are the single most important bioactive ingredient. At present, it is estimated that there are 80 different types of probiotic-containing products in the world.

Dr. Ted Farnworth, a scientist who specializes in human nutrition and metabolism with AAFC, leads a research team to examine how food and basic food components, such as probiotics, affect the balance of good and bad bacteria in the intestine and the intestine's role in nutrition and health.

"My research focuses on the events and conditions in the gastrointestinal tract – which is regarded as the vital interface between what we eat and our health and wellbeing," says Dr. Farnworth. "Gaining a better understanding of how our food is digested, metabolized, and helps in the immune and disease processes will help people achieve optimal nutrition levels."

Dr. Farnworth's team examines how these factors work together with the consumption of food and the potential for probiotics to help control or reduce the risk of disease through targeted diet-based control measures.

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An essential part of the research is developing the science that is needed to support health claims for food and food components.

However, introducing probiotic cultures into food products is not as simple as mixing two ingredients. Dr. Claude Champagne, a scientist also at AAFC, leads another research team and works closely with the food industry to help overcome some of these challenges. He hopes to extend the use of probiotics into other non-dairy food products or expand into other novel probiotic applications.


"Whether one wishes to supplement a beverage with antioxidants or probiotic cultures, one has to answer the same questions," states Dr. Champagne. "We need to determine what type or form of ingredient/probiotic should be selected; how much must be added to have a beneficial effect; are there toxicity issues; are they destroyed during processing; can we determine the concentration of the active compounds; are they stable during storage; and does the addition of probiotics alter the sensory properties of the food product. The ability to ensure that consumers are receiving the claimed amount of probiotic cells is an important step in providing credibility to the probiotic sector."

Dr. Champagne is starting to find ways to ensure probiotic products are not altered by the food to which they are added. His research team is studying three probiotic encapsulation methods and examining how they interact with food products; for example when added to frozen yogurt or breakfast cereals. Micro-encapsulation holds promise as a way to stabilize the probiotic cells during food processing and storage. This technology may also help cells survive in the gastro-intestinal system, and support the release and growth of probiotic cells.

This is where the two AAFC teams link their expertise. One is trying to develop innovative encapsulation technologies to ensure probiotic viability in foods, while the second looks at how these innovations impact the functionality of probiotics in the intestinal system.

The team believes this research will have a positive technological impact on Canadian probiotics producers and food manufactures. "Our research will go a long way to standardize the health effect of probiotics in food," say Dr. Champagne. This will benefit consumers and help government officials more effectively assess the health claims of food products containing them."

To learn more about research conducted by AAFC scientists, please visit [www.agr.gc.ca/scienceandinnovation.com](http://www.agr.gc.ca/scienceandinnovation.com).



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