

BRUCELLOSIS

Brucellosis is an infectious disease that causes fetal abortions in pregnant cows. The brucellosis eradication program is the first priority of the Health of Animals Branch of the Department of Agriculture. Although the incidence of this disease has been brought to a low level, it is not eradicated. Until the last traces are completely wiped out, damaging outbreaks can still occur.

Researchers are currently increasing their understanding of the disease process in brucellosis, particularly the immune response in infected cattle. Studies are in progress on the kinds and amounts of antibodies in cattle blood serum at various early stages of experimental brucellosis, as well as in the naturally acquired infection.

Findings from this research are being applied to the development of more-sensitive test procedures, which will detect, at an early stage of the disease, the small number of infected animals that can be missed by current herd-testing methods and remain to spread the disease further.

More than 99.5 per cent of Canada's 250,000 cattle herds are free from brucellosis. The new tests now under development may provide the solution for the other 0.5 per cent.

FOOD SCIENCE AND TECHNOLOGY

Agriculture Canada's research programs, in collaboration with universities and industry, affect food safety, nutrition, preservation, ingredients and processing. The objective of the food research program is to optimize the quality, nutritional value and use of Canadian agricultural products. Research ranges from fundamental studies in biochemistry to the development of better methods for processing food and the use of new nutrient sources for human foods.

The Food Research Institute (FRI) in Ottawa has developed a process to produce rapeseed protein concentrates and, in collaboration with the Canadian Department of National Health and Welfare, is currently studying their biological value. A process to produce rapeseed protein isolate is being researched at the University of Toronto. University of British Columbia researchers are working on methods to make industrial vegetable proteins soluble. An investigation of the potential toxicity of alkali processing of plant protein, carried out at the Université Laval à Québec, includes a study of the effect of proteolysis (the breaking down of proteins into simpler compounds) on the nutritional properties of plant proteins.

Research programs related to meat include (1) a process developed by FRI to evaluate amino-acid content (the basic constituent of proteins) in meat tissue; (2) a method devised by researchers at the Université Laval to measure protein quality in meat; and (3) the testing by Canada Packers of meat and non-meat proteins in mixtures.

Agriculture Canada's meat contract programs have focused on the microbiology of meat. For example, a study underway at the Université du Québec à Montréal is attempting to find ways to block the development of undesirable organisms in meat by injecting non-pathogenic organisms into the meat. A study to develop methods to evaluate the microbial quality of meats is being carried out at the Université Laval.

Dairy product research concentrates on the properties of whey proteins under different processing conditions.

Numerous programs pertaining to fruits and vegetables are devoted to devising improved methods for processing and canning. Others focus on developing new fruit and vegetable products and exploring new ways to use protein from Canadian vegetable products. A study underway at the Lethbridge, Alberta, Research Station is evaluating the protein quality of field beans. In a study of the suitability of fababeans as a wheat-flour substitute in various baked goods, it has been demonstrated that in some cases the substitution results in a significant increase in protein level.

NITROGEN FIXATION

Other areas of research being pursued by Canadian scientists, though not at the applied stage, have a potential for practical results in the future. Research on nitrogen fixation, for instance, may eventually enhance world food supply.

Nitrogen fixation is a bacterial process by which nitrogen from the air is converted into a form the plant can use as a nutrient. Research projects are underway in Canada, as well as in many other countries, to study the possible applications in other crops of the self-fertilizing process that takes place in the roots of such legumes as beans and peas.

The development of cereal crops that can draw on nitrogen in the air to meet an essential part of their fertilizer diets has been a long-time dream of agricultural research. Toward that goal, a group of scientists at Agriculture Canada's Lethbridge, Alberta, Research Station has genetically altered a type of spring wheat so that it supports soil bacteria that can fix nitrogen taken from the air into a plant nutrient.

The solution is still a long way in the future. Nevertheless, if lines of wheat can be developed that encourage the growth

Rhizobium BALZAC inoculant, a bacteria used in nitrogen fixation, is prepared at the Agriculture Canada research station in Sainte-Foy, Quebec, where it was discovered.



Agriculture Canada, Sainte-Foy