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CURRENT FOOD DISTRIBUTION RESEARCH

THE CANADIAN GOVERNMENT'S CONTRACT RESEARCH PROGRAM AS AN INSTRUMENT TO ENHANCE THE UTILIZATION OF RESEARCH ON FOOD PRODUCTS

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The title of this session, Improving the Application of Technology in the Food Industry, relates to what is undoubtedly one of the most important aspects of connecting Research and Development Activities with commercial realization of R & D results. This linkage or bridge is important for two reasons:

1. If R & D activities and the results of these endeavors do not find application from which our societies can benefit, we can wonder if the expenditures for the R & D are really worthwhile or well-spent.

2. If we wish to improve the quality, augment the variety or ensure the safety and value of the foods that are presented to the consuming public, we must rely upon the scientists and technologists engaged in food research to provide the information regarding product compositions, process methods, and equipment application which will allow these objectives to be attained.

This reliance upon the endeavors of the scientific community becomes even more important as the concerns of the consumer become more vocal, more searching, and more demanding. Certainly in our societies today these concerns of the public regarding the motivations and the activities of the food industry are evident to all. Every day the communications media present these concerns and debate the issues involved. Direct consequences of these acts are realized

frequently by the banning of this or that, by the impositions of controls and standards not imposed before, and by the rather vicious attacks that have been directed towards the foods we eat.

All countries are searching for ways by which we can ensure the acquisition of new facts and new technology and by which we can provide new means to test the applicability of these findings to the production, collection, distribution, processing and marketing of new food products and ingredients.

Canada is a country of large dimensions and small population, relative to that of the U.S., the European and Asian countries which we include in the rather arbitrary list of developed countries. Canada is a country capable of conducting R & D activities that could provide new facts and new technologies of value to the food industry. It is also true however, that the facts and technologies we utilize in this country are more imported than homegrown; they are more developed elsewhere and applied here, than we would think is necessary or desired. The Canadian society recognizes that this situation exists and is searching for means by which the ratio of imported to homegrown may be changed, may be lowered in fact and hence elevate the position of this country as one which does develop and apply new technology to its commercial enterprises.

Many schemes are provided by both the Federal and Provincial governments in Canada to assist industry in this national goal. Today I wish to spend a few minutes talking about one such scheme; one in which the Food Research Institute of Agriculture Canada is seriously involved. This scheme is called the Contract Research Program of the Federal Government.

The governmental R & D laboratories in this country spend very sizable amounts of money in producing new scientific and technological information. Agriculture Canada, for example, through its Research Branch distributes about \$130,000,000 per year. Other Departments also spend large sums which are related to the supply of food to this country's domestic and export requirements. The Canadian food industry as well as the universities of this country also maintain significant R & D facilities and spend large amounts of money in the development of new foods. The Contract Research Program originated in response to the view that we must ensure that the industrial sector can and will participate in the development of the new technology in conjunction with the public centers involved in similar or related areas.

The objective is to involve all in the planning, conduct and application of the R & D required to attain the ends which all desire.

The program therefore, provides the means by which all sectors do participate in defining the priorities of R & D programs, choosing the most appropriate facilities at which to conduct the R & D required, ensuring the adequate conduct of the work involved, and in reporting the results in a way which the industrial sector can most readily utilize them in its own commercial activities.

Contract Research Programs exist in many disciplines. They range from Waste Product Utilization to Engineering. They are aimed at aiding many industries, including the food industry. Of most importance to us in the food field are those programs on Meats, Dairy Products, Plant Proteins, Waste Utilization, Agricultural Engineering and Animal Genetics. Those which our Institute are most involved with include Meats, Plant Proteins, Dairy Products, and Waste Utilization.

These programs are administered through the Science Procurement Division of the Department of Supply and Services. The funds originate from the Treasury Board and are allocated to the various programs in response to statements of need and projected utility.

The definition of need and projected utility are of course the important aspects in these programs. Several groups, made up of representatives of all sectors involved in a given field, for example Meats or Dairy Products, are now providing direct inputs to the definition of needs, the priorities of these needs, and the description of how information answering these needs can find utility in the commercial field.

The Department of Supply and Services then solicits through various public communication media, from companies and universities in Canada, proposals for the conduct of activities which will provide new information in these defined priority areas. These proposals, which define the objectives of the work, describe how the work will be conducted, how long it will take and how much it will cost are then reviewed by a Program Review committee relative to the pertinence of the proposal to the priorities defined, the capabilities of the center

to perform the work and the realistic estimation of the costs involved. Those approved are funded to the extent permissible by the funds available. Each proposal is assigned to a Scientific Authority in some governmental laboratory or technical center and this technical person, as well as financial/legal representative then negotiate the exact content and details of the contract that is finally drawn up. This process takes from 2 to 5 months depending upon conditions which prevail throughout the whole sequence of events.

I am not here to describe in any more detail than this how the Contracts come to be; my objective is to attempt to show how this program, even though yet very young in the food field, will provide information of value to the food industry.

It is important to remember that the priorities are set in collaboration with the industry involved. Therefore, we feel that the needs defined truly represent needs that the industry says exist. I will use some direct examples of defined needs that have or are being answered by R & D Contract Projects.

1. In Meat Science and Technology for example--

a) The concern regarding the means by which to lower and control the microbiological contamination of fresh and processed meats from slaughter to retail outlet is of high priority and results are now being published which indicate the nature and extent of microbiological contamination through the whole supply chain, which prescribe more positive sanitary practices that are realistic to maintain in abattoirs, cutting and packing facilities, and which state the optimum storage conditions for maintenance of safe and acceptable levels of microorganism on the surface of the meats we receive.

b) In answer to the desire to develop and market products which are mixtures of meat and plant protein extenders, the need for methods by which to determine the content of each source of protein in the mixture is of high priority. Here several different methods are being explored and developed by which this can be done, and be done readily by commercial companies in their normal quality control programs.

c) The growing concern regarding the extent of the hazard presented by the incorporation of nitrite in cured meats is of major importance. Projects which have described the reactions which nitrites undergo in the curing process, the chemical species which are formed by these reactions, and the biological evaluation of the safety of these compounds in the diets of experimental animals have been and are now being funded by this Contract Research Program. The results will be thoroughly reviewed with Food and Drug Agencies when available.

d) The quality of meats is of course greatly dependent upon the proper aging of that meat after slaughter of the animal. The carcass passes through rigor mortis and the tensions developed in rigor must be relaxed to provide the most desirable texture in the meat cuts obtained. The description of the rigor process and the effects of variation of the treatments and the storage of the carcasses upon the relaxation of the muscle and the organoleptic quality of the meat are being extensively studied.

2. In our Plant Protein Program, for example--

a) The realistic description of the market possibilities for new plant

protein ingredients for the food industry is of high priority and is being studied.

Such information will aid in recognizing applications in which these ingredients can be used, in defining the functional and nutritive properties they must possess, and in estimating the economics involved in the applications which appear possible.

b) To develop new plant protein ingredients from Canadian crops is viewed as important to the Canadian food industry. To do so required a combination of both laboratory and pilot plant R & D in assessing the technical and economic feasibility of processes by which these fractions can be obtained. Work on rapeseed, faba bean, other legumes and cereals is being supported. In addition the effects which processing conditions have upon the functional and nutritive value of the proteins obtained are of great importance to the commercial development and projects in this area are active.

c) To find direct commercial application of protein ingredients, it is also important to determine what functional properties these proteins must possess in order to be useful in given applications and several projects directed to describing the properties of protein fractions from various sources exist, as well as work aimed at determining the predictability of the utility of these proteins in specific uses based upon measurements of certain properties they show in model systems.

3. In our Dairy Products Program, for example--

a) It has been defined of high priority to present the results of model system studies to the dairy and

agriculture industry which reveal the economic value of cheese whey in animal feeding applications. This we feel is of great import to those small and medium sized cheese plants which do not, and cannot afford to have the large and costly central drying facilities for the whey produced in their cheese production activities. The development of the full system of transport to the farm and utilization on the farm for swine and cattle is under study now and will be presented in a way by which others may benefit.

b) In answer to concern regarding the surpluses of skim milk powder which exist, projects are now being invited and initiated relative to finding new utilizations of skim milk powder in both food and feed uses, as well as in other industrial applications.

These examples I hope will show that these programs are being used to develop information which will be of direct and ready value to the industrial sector. I cannot as yet itemize specific examples of how the information has been applied. The process of technology transfer itself does take time. At this stage of the game however, I can say that we feel these programs have excellent potential for assisting the private sector to apply new technological data to the development of foods of improved quality, lower costs of productions, of augmented variety, and possessing the safety and nutritive value that the consuming public desires.

The industry can benefit from these programs by direct participation in their definition, by actually conducting R & D activities which are fully funded by government sources, and by sharing the results throughout the industry for the benefit of all.
