

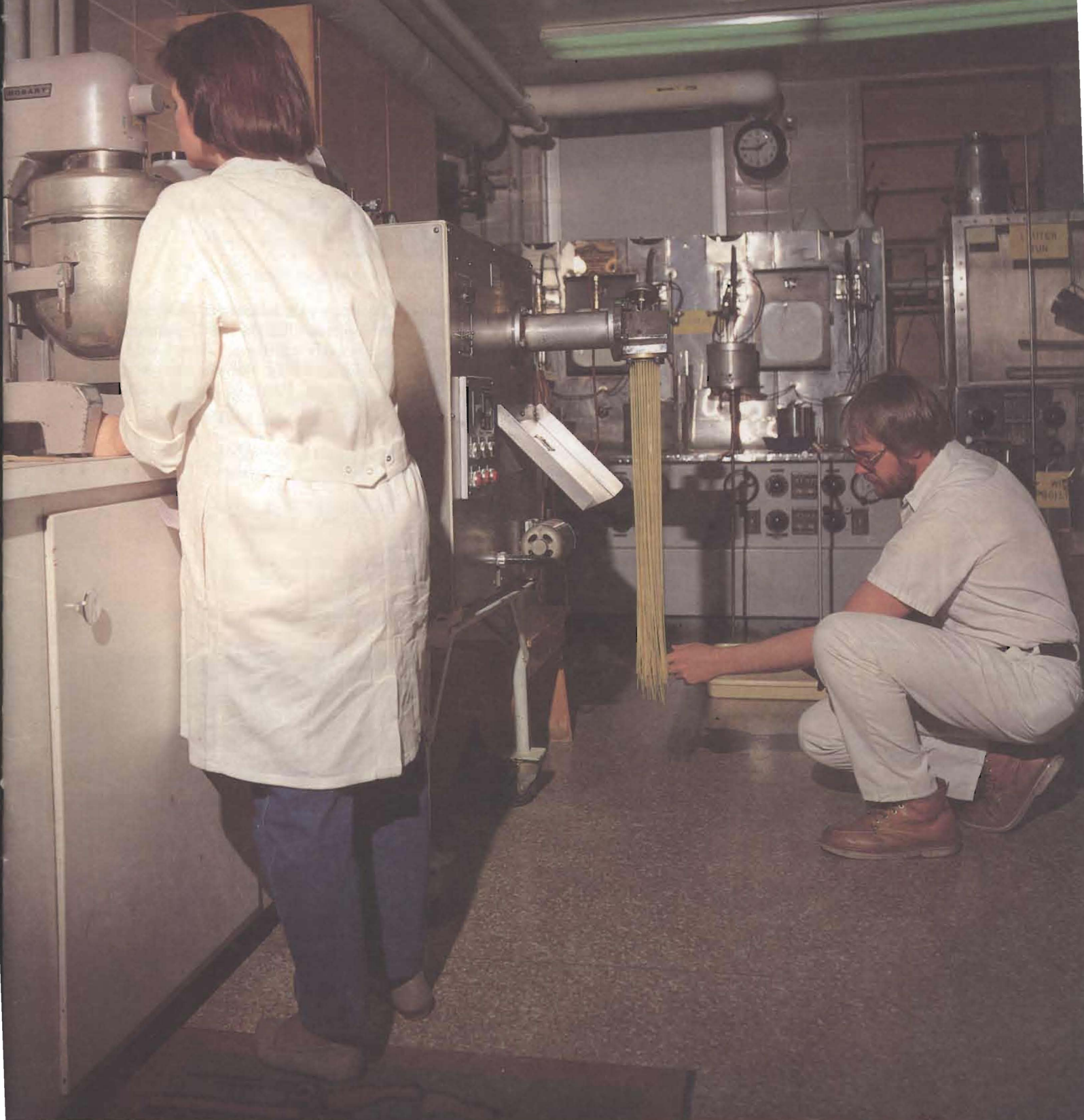


NORTH DAKOTA Farm Research

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Director's Column

Donald E. Anderson
Director of Station Research



Local processing of raw agricultural products into finished goods has long been the goal of agricultural producers of the region. In North Dakota some of the early developments were supported by state resources, resulting in the creation of a state-owned mill and elevator which produced mill products and animal feeds. Livestock marketing and processing facilities were also created with state support.

My first contact with efforts to develop value-added industry in North Dakota occurred in 1964, when Fritz Ottem of Osnabrock and a group of barley growers came to North Dakota State University to meet with Arlon Hazen, Dean of Agriculture, and a number of agricultural economists and cereal scientists to discuss the possibility of developing in-state barley malting facilities. Mr. Ottem indicated that there was a need for a value-added barley processing industry in North Dakota, and that the NDSU Agricultural Experiment Station ought to help make it happen. At that point, Dean Hazen indicated that I was fresh out of a marketing Ph.D. program and that I should take leadership to study this situation. I accepted the charge with considerable trepidation, but began, with the help, encouragement and support of Mr. Ottem, Basin Electric Power Cooperative, the state economic development agency, and other development agencies, to seek funding to support an economic feasibility study.

This assignment led to several trips to Washington, D.C. to meet with federal officials of the Economic Development Administration and congressional delegations from North Dakota and Minnesota. Approximately a year later, the Department of Commerce Economic Development Administration funded an economic feasibility study. The study was completed in 1969 and published in 1970. The general conclusion was that there was an economic incentive to build malting facilities in North Dakota's barley production areas. Some four years later, the first plant was built by the Ladish Malting Company at Spiritwood. Later, Anheuser Busch built a plant in Moorhead, Minnesota. This is a success story for value-added industry in North Dakota based on a strong development effort by the university, working in cooperation with state economic development groups and community development organizations. Similar success stories have been written regarding other processing activities such as oilseed crushing facilities at West Fargo, Enderlin, and Minot, and the pasta processing facilities at Cando. Many small food processors have been aided by university scientists in solving technical problems relating to processing and handling technologies.

What of the future? Can we expand agricultural processing in North Dakota? I believe that, with solid planning, ex-

Continued on page 7

In This Issue

Agricultural Processing — A Major Contribution to the North Dakota Economy <i>Bert D'Appolonia and Del L. Helgeson</i>	3
Becoming part of the solution...A success story for rural North Dakota <i>F. Larry Leistritz and Brenda L. Ekstrom</i>	8
Characteristics of the Carrington Aquifer <i>Alan Wanek and R.F. Meyer</i>	10
Small Wonder, Northern Delight, and Nodak Early Tomatoes <i>A.A. Boe</i>	14
Three Barley/Corn Diets For Feedlot Steers <i>V.L. Anderson and S.L. Boyles</i>	16
ND265: A New Parental Line of Early Corn <i>H.Z. Cross</i>	19
Time and Method of Fertilizer Application For Potatoes <i>W.C. Dahnke, D.C. Nelson, L. Swenson, A. Johnson, and M. Thoreson</i>	22
Research Report Series	26

On the Cover: Utilization and processing of agricultural products has been a major effort in the Department of Cereal Science and Food Technology. Here food technologists Yvonne Helm and Dale Hansen extrude pasta from durum wheat semolina. Photo by Harold Caldwell.

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temperature — short time (HT/ST) extrusion for possible use in manufacture of more nutritious snack foods. Today's consumers are becoming more aware of and demanding more nutritious snack food products. One attraction for pursuing the snack foods area is that it is a billion dollar industry.

In order to find a niche(s) for a new market(s), research on the physicochemical, nutritional and antinutritional, and functional properties of dry edible beans and their fractions must be undertaken. The information derived from this research would be very useful to scientists and food processors in planning strategies for potential new uses (markets) for dry edible beans.

Dr. Paul Schwarz of the cereal science and food technology department is initiating work in oats and barley utilization. The public has become increasingly aware of research which suggests that oat or barley products may reduce serum cholesterol levels when included in the diet at adequate levels. The food industry has responded with a wide range of new products. As research in this area progresses, the evidence seems to suggest the (1→3), (1→4) beta-D-glucan constituent(s) as the factor which influences cholesterol levels. It has been suggested that beta-D-glucans might be isolated from barley and employed as a food additive. However, to be economically feasible for the food producer, this isolate should display some unique and advantageous characteristic which is not present in the crude cereal flour.

A portion of the beta-D-glucans present in both oats and barley is water soluble. In solution the beta-D-glucans exist in a rigid ribbon-like conformation, and are thus capable of forming highly viscous solutions. These properties suggest possible use in food gum applications.

The objective of this research is to evaluate the rheological/flow properties of beta-D-glucans. Beta-D-glucans are to be isolated from barley or obtained commercially. The isolate will be chemically characterized. Rheological properties will be determined under a range of conditions including temperature, concentration, and the presence of other solutes. Attempts will be made to alter the functionality of the beta-D-glucan through chemical modification. Based on the results of this work the functionality of beta-D-glucans in model food systems may be evaluated.

Work has been initiated with flax in the departments of food and nutrition and cereal science and food technology. Dr. Glenace Baldner-Shank of the food and nutrition department will determine the efficacy of crushed flaxseed (as a source of omega-3-fatty acids) to alter blood lipids when incorporated into a bakery product.

In the cereal science and food technology department, Dr. Navam Hettiarachchy will examine the stability of ground flax under various processing and storage conditions. Conditions will be optimized to obtain a product that would be stable for product utilization and consequently provide a good source of omega-3-fatty acids. Work is also in progress to determine omega-3-fatty acid levels in various cultivars of flax.

Research on the utilization of pectin from the sunflower head will be initiated by Dr. Sam Chang of the food and nutrition department. The extraction, characterization and gelling properties of this material will be studied.

Investing in the future by supporting principal thrusts in value-added agricultural research and development can produce results that will not only create growth, but will serve to diversify the economic base and protect against pronounced economic cyclical swings in the state's economy. Value-added research can help keep profits at home and the bottom line not only becomes net profits for businesses, but new markets, new jobs, new investment opportunities, and increased wealth accumulation for North Dakota.

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- Experiment Station Committee on Organization and Policy. (1988). **Enhanced Research Agenda for Value-Added Food and Non-Food Uses of Agricultural Products**.

ACKNOWLEDGEMENT

Sincere thanks and appreciation are expressed for the summary research write-ups provided by the principal investigators listed in Table 1 of this article.

Continued from page 2

panded efforts can lead to new and exciting processing industries in our state. Many potential non-food uses for agricultural raw materials offer additional large and expanding market potential. Products such as biodegradable plastics, high performance lubricants, plastics, and coatings made from starches and oils produced in North Dakota farms are just a few examples of what research will develop in the years ahead. If we are to participate in the new industrialization of agriculture in this state, we must provide adequate support to the research enterprise to develop the technology

and assist private entrepreneurs in commercializing the new technologies as they emerge.

There is a significant effort in Congress to pass legislation that will provide federal support to assist value-added industries in rural areas. North Dakota research and development agencies need to be positioned with state support to participate in this program. Economic development of the agricultural resource base can and will happen if state resources are properly positioned to take advantage of new opportunities.

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