2003 Annual Report

"Adding Value to Oklahoma"

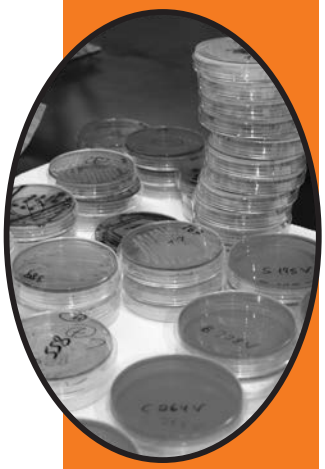
Oklahoma State University

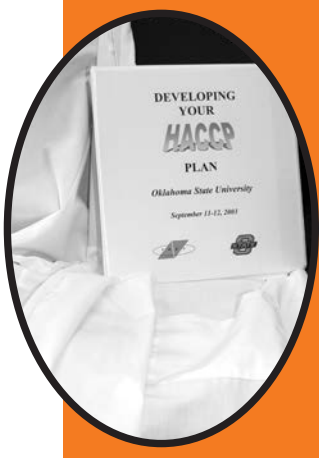
Contents

2003 Annual Report

Executive Summary 2
Vision and Mission 3
Financial Highlights 3
Industry Advisory Committee 4
Center Disciplines
- Agribusiness Economics 6
- Analytical Chemistry 10
- Business Planning, and Marketing 13
- Cereal Chemistry 27
- Food Engineering 31
- Horticulture Processing 38
- Food Microbiology 43
- Muscle Science 53
- Oil/Oilseed Chemistry 56
- Pilot Plant 61
- Quality Control and Assurance 67
- Sensory Evaluation 70
- Value-Added Wood Products 73

Outreach Projects 76





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Executive Summary

J. Roy Escoubas, Ph.D.

The Food and Agricultural Products Research and Technology Center is a state-of-the-art research and development, business development, and business and technology outreach laboratory. This 96,000-square-feet facility has research laboratories, pilot plant facilities, offices, and conference rooms that support a faculty and professional staff that fosters growth of value-added food and agricultural products processing in Oklahoma. The faculty and professional staff represent the disciplines of agricultural economics, business and marketing development, horticultural food science, food process engineering, food microbiology, oil seed chemistry, food grain science, forest products science, food safety and quality technology, food harvesting and processing technology, and food sensory science. Center faculty and staff work to discover value-added products and processes to enhance the value of Oklahoma agricultural commodities.

The Center has participated in more than 1,000 client projects for Oklahoma and the region bringing more than 100 start-up companies into Oklahoma and scores of new products for the market. Center faculty and staff assist food industry and entrepreneurial clients identify, develop, and commercialize products, as well as help them train and educate their staff and develop business plans to expand their businesses. The Center extends a special recognition and appreciation to faculty and professional staff members in other parts of the Oklahoma State University campus who contribute significantly to the mission of the Center. Their help in projects is essential to the performance of the Center.

Center faculty and staff have scientific research projects that contribute to fundamental scientific knowledge in agricultural commodities and food products. In five years, the Center has developed a research program based on about $2 million of annual extramural funding. Because of the high impact nature of Center research, the extramural funding base will continue to increase.

I am very pleased with the contributions of the Center. It has demonstrated success in increasing the value of Oklahoma agricultural commodities and food products and success in contributions to scientific knowledge in food science, food safety, and food processing. I believe you should consider a working relationship with the Center for your needs in business, technology, and science.

Director and Professor

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Roy Escoubas received his Ph.D. in Food Science at Oklahoma State University. He earned his Associate Professorship with tenure at West Virginia University, having activity in graduate and undergraduate teaching, research, and extension. He was an officer in the United States Army Reserve having served on active and reserve duty.

Roy resigned his commission and his tenured faculty position and began a career in the food industry. He worked 20 years for a food-packaging firm and held increasingly responsible positions, the last five years of which was Vice President of Worldwide Technology. Roy resigned his corporate officer position with that business and initiated a start-up consulting business. He owned and managed this consulting business for almost two years when he accepted an offer to return to Oklahoma State University and join the Food and Agricultural Products Center as Director.

Vision and Mission

Food and Agricultural Products Center

Vision

The Oklahoma Food and Agricultural Products Research and Technology Center has programs, projects, and activities that support innovation and growth of the food and agricultural business sectors of Oklahoma, increase food safety for consumers, assist in the development of students for careers in the Oklahoma food industry, and support and enhance the impact of the Center on the state, region, and nation.

Mission

Discover, develop, and deliver technical and business information that will stimulate and support the growth of value-added food and agricultural products and processing in Oklahoma.

Financial Highlights

Base Budget Allocation:	$2,320,000
Salary & Benefits	81%
Faculty & Staff Maintenance & Operations	9%
Center Maintenance & Operations	4%
Facilities, Equipment & Instrumentation	6%
Cowboy Meats Costs Recovery:	$ 220,000
Net Recovery:	$ 1,000
Grants & Contracts:	$1,800,000
Faculty Royalties:	$ 305,000
Donations & Endowments:	
Cash:	$ 40,000
Equipment or Instrumentation:	$ 170,000
Faculty & Staff Small Accounts:	$ 75,000
Conference Accounts:	$ 80,000

Notes:

1. *The base budget allocation is from State appropriated funds.*
2. *Cowboy Meats funds are obtained from harvested animal products and cover the costs of the purchase of livestock and the processing harvested carcasses into food products. The net recovery for 2003 was approximately $1,000.*
3. *Grants and contract funds are competitive extramural-sourced funds obtained by faculty and staff members and do not become a part of the Center budget.*
4. *Faculty royalties are financial benefits of protected technologies. These funds are directly available to the respective scientists and do not become a part of the Center operational budget.*
5. *Small accounts result from small research projects funded by industry and directed to individual scientists. The individual project budgets cannot exceed $5,000 to be classified as a small account. These small account funds do not become a part of the Center operational budget.*
6. *Conference accounts are created to cover the costs of conferences, workshops, and symposia. Registration fees for individual conferences are collected to cover the costs of those conferences and are used only for conferences, workshops, training sessions, and symposia.*

Industry Advisory Committee

Purpose

In 1996, the Oklahoma Legislature and the Governor mandated a food and agriculture industry-appointed advisory committee to oversee and advise the Center Director in the work of the Center. Their direct mandate was to "assist and advise the Oklahoma Food and Agricultural Products Research and Technology Center in prioritizing projects, setting fees, creating and designing joint ventures for the development and advancement of the production, processing, handling and marketing of agricultural commodities, so that the Center may meet the needs of the State's value-added processing entities." The appointees represent Oklahoma agricultural food and fiber producers, Oklahoma food processors, national food processors, economic development representatives, food and agriculture commodity distribution representatives, food and agriculture commodity transportation representatives, the textile industry in Oklahoma, and the food marketing sector in Oklahoma. The Center is particularly appreciative of the time, effort, and counsel of these business leaders as they assist the Center in meeting the business, marketing, and technology challenges of value-added food and agriculture commodities and growth of the Oklahoma economy.

"Adding Value to Oklahoma"

Industry Advisory Committee

Food and Agricultural Products Center

Front Row:

Mr. Don Ramsey, Secretary, Blue & Gold Sausage, P.O. Box 657, Jones, OK 73049
Mr. Virgil Jurgensmeyer, J-M Farms, 1920 Seventh Ave., NE, Miami, OK 74354
Mr. James Cochran, Pfizer Animal Health, 2502 Acacia Court, Norman, OK 73072
Dr. Charles Nichols, Past Chair, Davison & Sons Cattle Co., Rt. 2 Box 15-D, Arnett, OK 73832
Dr. J. Roy Escoubas, Center Director, 148 FAPC, OSU, Stillwater, OK 74078

Back Row:

Mr. Brett Burk, Elanco Animal Health, 1425 S. Santa Fe, Suite D 326, Edmond, OK 73003
Mr. Gary Crane, Ralph's Packing Co., P.O. Box 249, Perkins, OK 74059
The Late Mike Mitchell, The Scwhan's Food Co., P.O. Box 432, Stilwell, OK 74960
Mr. Dean Smith, Chair, SS Farms, Rt. 2 Box 178, Hydro, OK 73048
Mr. Roger Ediger, Vice Chair, Mitchell & DeClerck, PLLC, 202 W. Broadway, Enid, OK 73701

Not Pictured:

Dr. Robert Bingham, Bil-Jac Foods, Inc., 9718 N. Peach CT, Cedar Hills, UT 84062
Mr. Rodger Kerr, Southwest Technology Center, 18 Constitution Ave., Altus, OK 73521
Mr. Gregg Ladd, Hiland Dairies, P.O. Box 219, Chandler, OK 74834
Mr. David McLaughlin, Advance Food Co., 13800 Wireless Way, Oklahoma City, OK 73134
Mr. Michael Wright, Hormel Foods, Rt. 1 Box 154A, Minco, OK 73059
Dr. Sam Curl, OSU Division of Ag Sciences and Natural Resources, 139 Ag Hall, Stillwater, OK 74078

Agribusiness Economics

Purpose

The Center has a stake in the economic viability of Oklahoma's value-added food and non-food processors. The Center strives to ensure a profitable future for Oklahoma food and fiber processors by necessitating a constant and intensive review of changes in both industry characteristics and markets. The Center assists processors and entrepreneurs by providing information in the forms of research reports, extension publications, and workshops in the areas of:

1) Legalities and liabilities of business development in Oklahoma,
2) Industry status and trends,
3) Market demographics and growth patterns,
4) Preliminary feasibility assessments,
5) Product-specific research, and
6) Business management assistance.

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Research Projects

Rodney Holcomb, Ph.D.

Highlighted Project

Title: Feasibility Study for Centralized Processing Facilities of By-Products from Oklahoma's Small- to Medium-Sized Animal Slaughter Operations

Funding Sources: Oklahoma Department of Agriculture, Food, and Forestry

Objective: 1) Assess the amount of processing by-products generated by Oklahoma meat processors and the chosen means for disposing those by-products. 2) Determine the potential for alternative collections and disposal methods to lower costs for Oklahoma meat processors.

Executive Summary: Data on by-product creation, disposal, and disposal costs were received from Oklahoma meat processors in early 2003. This information was used to develop multiple models in which the addition of onsite by-products cooler space, regional by-products collection points, and the potential for additional rendering facilities were all considered. The study and its findings, which resulted in a thesis for an Agricultural Economics M.S. student, were summarized in a report to the Food Safety and Market Development divisions of the Oklahoma Department of Agriculture, Food, and Forestry in September 2003.

Work To Be Completed: Publications from the study were being prepared in the fall of 2003. However, the BSE issue in late 2003 resulted in sweeping changes in by-products handling and disposal. Thus, the models utilized in the study will be revised to take into account the increased amount of inedible waste due to new USDA rules and the associated costs for their disposal.

Collaborators: Phil Kenkel - Agricultural Economics, Tim Bowser

Other Projects

Title: Examining the Feasibility of a Producer Cooperative-Owned Bakery in Lawton, OK.
Collaborators: Phil Kenkel - Agricultural Economics

Title: Establishment of an Agricultural Marketing Resource Center
Collaborators: Phil Kenkel - Agricultural Economics

Title: Production, Development, and Marketing of Value-Added Horticultural Products
Collaborators: William McGlynn, Darren Scott, Timothy Bowser, Niels Maness - Horticulture, Stanley Gilliland, Kathleen Kelsey - Agricultural Education

Technical Assistance Projects

Rodney Holcomb, Ph.D.

Highlighted Project

Client: Oklahoma Wheat Commission

Assistance Requested: The Oklahoma Wheat Commission was interested in the feasibility of developing a non-profit, quality-based wheat marketing center to service Oklahoma and eventually the entire hard red winter wheat production region.

Work Performed: Rodney Holcomb and an Agricultural Economics graduate student assessed the wheat marketing needs of Oklahoma grain handlers and their domestic/foreign buyers, studied the operating formats and services provided by wheat marketing organizations in other parts of the country, and evaluated all available and needed resources for the establishment of a wheat marketing center in Oklahoma. The result of these efforts was the establishment of Plains Grains, Inc. PGI is housed in the Wes Watkins Center for International Trade Development on the OSU campus and will work closely with the FAPC for wheat quality testing, product R&D workshops, and trade programs designed to help market hard red winter wheat on the basis of end-use quality both domestically and abroad.

Economic Returns: It is too early to assess the economic returns associated with PGI. Assuming PGI can attain its goals for quality-based wheat marketing, the economic impacts to the grain industry in terms of trade volume and profitability should be substantial.

Other Projects

Client: Production Specialties, Inc.
Collaborators: Brian Adam and Phil Kenkel - Agricultural Economics

Client: McClure Farms
Collaborators: Merritt Taylor - OAES Research Station, Lane, OK

Client: Vaughan Foods
Collaborators: Jim Brooks

Client: Oklahoma White Wheat Growers Association

Client: American Native Beef Cooperative
Collaborators: Phil Kenkel - Agricultural Economics

Rodney Holcomb, Ph.D.

Biography

Agricultural Economist

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Rodney Holcomb earned both his B.S and doctorate degrees in Agricultural Economics from Texas A&M University.

Rodney is an Associate Professor in the Department of Agricultural Economics, holding a 70 percent extension, 30 percent research appointment in the FAPC. Rodney has been with OSU and the FAPC since March 1997.

His research interests lie in the areas of value-added manufacturing economics and market evaluations. His goals are to identify economically feasible processing alternatives and business structures for adding value to regional agricultural commodities, along with determining the impacts of these activities on local and state economies. He specializes in the economic modeling of processing businesses, consumer demand analysis, and business organization.

The primary services Rodney provides are industry analyses, market assessments, and venture feasibility. Rodney serves as OSU's representative on the Oklahoma Agricultural Enhancement and Diversification Board and has served on the Lt. Governor's Small Business Commission. He is also a board member for the Food Distribution Research Society, an organization of economists from academia, government, and industry that focuses on food manufacturing, marketing, and distributions research. His programs have received awards from the Oklahoma Cooperative Extension Service, Oklahoma State University, the Oklahoma Wheat Commission, and former Governor Frank Keating. He has also received the USDA Plow Honor Award for Exceptional Service – the highest honor given by the U.S. Secretary of Agriculture.

Rodney advised three graduate students and served on four other graduate student advisory committees in 2003. He also had three undergraduate student workers housed in the FAPC.

Analytical Chemistry

Purpose

The Analytical Chemistry area focuses on instrumental analysis. This involves high performance liquid chromatography, gas chromatography, capillary electrophoresis, and spectroscopy. The department works closely with Oklahoma clients on research projects pertaining to developing methods, procedures, and analytical services. Current research includes the development and optimization of quantitative method for conjugated linolenic acids.

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Technical Assistance Projects

Guadalupe Davila-El Rassi

Highlighted Project

Client: Latin American Ingredients

Collaborators: William McGlynn

Assistance Requested: Latin American Ingredients requested assistance in the analysis of vanilla extract samples from several suppliers.

Work Performed: Guadalupe Davila-El Rassi performed quantitative analysis of vanillin as well as some contaminants, including ethyl vanillin in vanilla extracts. The analyses were performed by high performance liquid chromatography.

Economic Return: Not been determined.

Other Projects

Client: Olson Ranch
Collaborators: Jake Nelson

Client: No Man's Land Beef Jerky
Collaborators: Jake Nelson

Client: Lopez Foods
Collaborators: David Moe

Guadalupe Davila-El Rassi

Biography

Analytical Chemist

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Guadalupe Davila-El Rassi received her B.S. degree in Chemistry from the University of Monterrey, Mexico and her doctoral degree from Claude Bernard University, Lyon, France.

Guadalupe was appointed as Postdoctoral Research Associate in the Department of Dermatology at Yale University, New Haven, CT from 1982 to 1988. In 1989, Guadalupe joined the Biochemistry and Molecular Biology Department at Oklahoma State University as a Postdoctoral Fellow and in 2003 transferred to the FAPC as an Analytical Chemist.

The primary services that Guadalupe offers to the FAPC include: 1) Provide analytical analysis and technical assistance for Oklahoma's business, 2) Coordinate the analytical and instruments labs, 3) Collaborate with and provide technical assistance to FAPC faculty and staff, and 4) Establish new analytical methods in order to expand the Center's services to businesses.

Business Planning and Marketing

Purpose

The primary goal of the Center is to help producers, processors, and entrepreneurs add value to Oklahoma's food and agricultural processing industries. Agricultural processors are not merely manufacturers, but business professionals with a unique set of needs and objectives. Our business planning and marketing associates can assist any Oklahoma community by providing information, tailoring workshops to meet specific needs, and assisting in a variety of business and marketing areas such as:

1) Business plan development,
2) Market identification and evaluation,
3) Product pricing and promotion,
4) Finance option evaluation,
5) Co-processor identification, and
6) State and federal regulation compliance.

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Research Projects

Corey Stone

Highlighted Project

Title: Consumer Awareness of Made In Oklahoma

Collaborators: Chuck Willoughby, Rodney Holcomb

Funding Sources: MIO Coalition, ODAFF, and FAPC

Objective: Acquire and analyze data regarding consumer awareness of the Made In Oklahoma brand across the state.

Executive Summary: In the Spring of 2002, the MIO Coalition launched its first extensive marketing campaign, declaring April as Made In Oklahoma month. The campaign used television and radio in concert with in-store promotions and newspaper ads to inform Oklahomans of the value of buying Oklahoma products. The FAPC researched the effect of this advertising on the Oklahoma consumers six months after the campaign ended to determine the degree of sustained awareness the campaign achieved. It was found that Oklahomans believed strongly that the sale of MIO products was good for the state's economy. People living in the Tulsa MSA and rural Oklahoma were less informed on where to find MIO products than the Oklahoma City MSA residents. Radio appeared to be more effective relative to other media used in the campaign.

Work Completed: Data was collected and analyzed, and a report of the findings were delivered to the MIO Coalition.

Other Projects

Title: Overlaying Properties of Three-Layer Particleboard Manufactured From Eastern Red Cedar
Collaborators: Salim Hiziroglu, Rodney Holcomb

Title: Ag Enhancement and Marketing Utilization Grant
Collaborators: USDA, ODAFF, Santa Fe Tamale Co.

Research Projects

Chuck Willoughby

Highlighted Project

Title: Case Study of Selected Economic Impacts of Services Provided by the Food and Agricultural Products Research and Technology Center

Collaborators: Ann Zimmerschied - Agricultural Economics Research Assistant, Mike Woods - Agricultural Economics, Rodney Holcomb, Daniel Tilley - Agricultural Economics

Funding Source: Food Research Initiative Program

Objective: The general objective of the study was to assess the impact of the Center on the state of Oklahoma. Two specific objectives were used to accomplish the general objective. The specific objectives included: 1) Determine the economic impact of all of the firms assisted by the Center and 2) Determine the economic impact of services offered by the Center.

Executive Summary: The first objective was accomplished using data collected in a telephone survey. The second specific objective was addressed by using a case study methodology. All firms were categorized into start-up firms, information-only firms and further-research firms based on the type of assistance received. Nine case studies were completed; three from each category. The firms assisted by the Center account for approximately 21 percent of the direct food processing jobs and 31 percent of the indirect food processing jobs in the state of Oklahoma. The five-year comparison of firms indicates an increase in full-time employment, sales, and payroll. The responses to the case study analysis indicate that the services provided by the Center are having a positive impact on the firms.

Work to be Completed: Publications, posters, and paper presentations have resulted from this research. Future endeavors of this nature are expected.

Other Projects

Title: Katahdin Sheep Project
Collaborators: Jake Nelson, Darren Scott, Guadalupe Davila El-Rassi, Gerald Fitch - Animal Science, Mike Brown - USDA, ARS

Technical Assistance Projects

Jim Brooks

Highlighted Project

Client: Pepper Jo's

Assistance Requested: Owners of Pepper Jo's requested assistance in recipe refinements for their salsa products, recommendations on how to increase the sales and distribution of their products, and purchase of equipment that would increase production and lower cost of goods.

Work Performed: Samples and recipes for the salsa were submitted to the Center for evaluation and testing. Based on tests that were conducted, a few minor changes were recommended to ensure consistent color, texture, and extend shelf life of the salsa. An engineer from the Center also made a site visit to Pepper Jo's to consult on additional equipment recommendations to increase production rates and efficiency. After the change in recipes of the salsa was completed and some additional equipment was installed, a marketing plan was developed to promote the products through the retail grocery stores in southern Oklahoma.

Economic Returns: The economic impact for the client is ongoing, as they now have included jellies, jams, preserves, and bulk spices to their product line. They are also co-packing products for eight other Oklahoma companies and have added two full-time employees. The Ardmore Development Authority has offered to donate some land for a new production facility and are in negotiations to assist in the financing of the project.

Other Projects

Title:	Collaborators:
Christian Cheese Company	William McGlynn
Firelake Discount Foods	Chuck Willoughby
	Corey Stone
Granna's Chili	David Moe
	William McGlynn
	Darren Scott
	Jason Young
	Tim Bowser
Mo Betta Meats	David Moe
	Darren Scott
B & D Farms	Tim Bowser
Oklahoma Refrigerated Services	Tim Bowser
Heartland Specialty Foods	Chuck Willoughby
	Corey Stone
Poppin Glows, Inc.	Patricia Rayas
Redlands Community College	Tim Bowser
	William McGlynn

Technical Assistance Projects

Jim Brooks

Other Projects, cont.

Client:	Collaborators:
Vaughan Foods	Tim Bowser William McGlynn Darren Scott Rodney Holcomb
Backwoods Foods, Inc.	William McGlynn Darren Scott Tim Bowser Chuck Willoughby Corey Stone Jason Young
Carl's Chili Company	William McGlynn Darren Scott Chuck Willoughby Corey Stone
Emu Products Marketing, Inc.	Nurhan Dunford Jason Young
Express Meat Company	Jake Nelson David Moe
O'Steen Meat Company	Chuck Willoughby Corey Stone Jason Young David Moe
Enriched Life Foods	Tim Bowser William McGlynn Jason Young David Moe Darren Scott
Maridee's Gourmet Cakes & Sauces	Darren Scott William McGlynn
BigTime Sports Drinks & Fitness Waters	William McGlynn Tim Bowser Darren Scott David Moe
Schwartz Meat Company	Jason Young David Moe Siobhan Reilly
Cedar Hill Seasonings	Chuck Willoughby
Clements Foods	
City of Del City	Tim Bowser
City Produce Company	Chuck Willoughby Corey Stone

Technical Assistance Projects

Jim Brooks

Other Projects, cont.

Client:	Collaborators:
Bricktown Market Place	
Caddo County Industrial Authority	
Advance Foods	
City of Edmond	
Central Expanded Metal	Chuck Willoughby
	Corey Stone
Our Enterprises	Tim Bowser
Ken's Bakery	
Harvard Heights Salad Dressings	Darren Scott
	William McGlynn

Technical Assistance Projects

Corey Stone

Highlighted Project

Client: Ol' Santa Fe Tamale Co.

Assistance Requested: HACCP Assistance, USDA Facility selection, Market planning, Retail outlet identification

Work performed: The FAPC team assisted with product development and refinement. Team members also assisted with development of HACCP plan. In Summer 2003, Santa Fe was rewarded more than $20,000 out of Marketing Utilization monies from ODA/USDA. The company used this money to purchase billboard space and run ads in Tulsa. This advertising solidified their presence in the Tulsa market. Sales volume increased as they attempted to move product into SYSCO's Norman warehouse. Meetings with Taco Bueno and Albertson's occurred in 2003. Albertson's approved them for all Oklahoma and Texas locations, but because of volume considerations, the decision was made to only service the Tulsa and Oklahoma City area stores. Additional assistance included designing promotional material for foodservice clients.

Economic returns: Santa Fe has tripled its weekly production time and continues to open new markets. Sam's Club and Wal-Mart have inquired about product for their locations and will use the Tulsa market to determine feasibility nationwide.

Other Projects

Client:	Collaborators:
Smackwater Jack's Stuffed Potatoes	Tim Bowser
MIO Coalition	Jim Brooks
	Chuck Willoughby
CinnaSpread	Nurhan Dunford
	Darren Scott
County Line Candles	Tim Bowser
Wichita Buffalo Company	David Moe
Lonnie Davis Sausage	Darren Scott
Salt Creek Cattle Co.	William McGlynn
	Darren Scott
	Jason Young
	Tim Bowser
	David Moe
Salsa Sublime	Darren Scott
	David Moe
Dryd Hyd	Jason Young
	Jake Nelson
Madeline's of Wewoka	Seminole County Extension

Technical Assistance Projects

Corey Stone

Other Projects, cont.

Client:	Collaborators:
Pep In the Mustard	Darren Scott
	Tim Bowser
Stu's-Q BBQ	Darren Scott
Dragon Java	Chuck Willoughby
	David Moe
	Tim Bowser
Ebiita Food Tech	Patricia Rayas
Red River Raspberry Salsa	William McGlynn
Heartland Gourmet	Chuck Willoughby
Steve Russum	Chuck Willoughby
Sarah Chang	David Moe
Landrun Seasonings	Tim Bowser
Margie Hensley Pie Crusts	Suzanne Holcombe
Wood Industry Association of OK	Salim Hiziroglu
Rural OK Initiative Team	Department of Commerce
	Glenn Muske
	Oklahoma Cooperative Extension Service
Little Blue Bottled Spring Water	Tim Bowser
Our Enterprises, LLC	

Technical Assistance Projects

Chuck Willoughby

Highlighted Project

Client: Judy's Back Packer's Jerky

Assistance Requested: Formulation and Scale-Up, Co-Packer Identification and Business Planning & Marketing

Collaborators: David Moe, Darren Scott

Work Performed: Client attended Basic Training in October 2002. An initial project meeting was scheduled between the client and FAPC in early April 2003. The project was completed by July 2003. The following objectives were met:
Assisting with formulation scale-up and conversion

1) Converted homemade recipe to commercial formula
2) Researched tumble vacuum method adding water to dry mix formula
3) Provided nutritional facts
4) Submitted label to USDA for review

Finding a co-packer with USDA inspection

1) Telephoned several potential co-packers as to interest and availability
2) Client interviewed co-packer in Tulsa and Alex on own
3) Traveled to McAlester and Guymon with Client – Client chose co-packer in McAlester

Providing opportunity for market development

1) Asssisted client with production of test market batch for C-Store Show
2) Provided discounted booth space at C-Store Show
3) Provided other marketing opportunities (declined due to booked schedule)

Economic Returns: Specific sales data was not made available; however, client reported product movement of approximately 100 pounds per week.

Other Projects

Client:	Collaborators:
7th Heaven Bakery	Tim Bowser Patricia Rayas
Allied Custom Gypsum	William McGlynn Darren Scott David Moe
Augusto's Green Sauce	Darren Scott William McGlynn
Bear Creek Cookie Company	Tim Bowser Darren Scott
Bryan Pecan Company	Darren Scott
Busch Farms	

Technical Assistance Projects

Chuck Willoughby

Other Projects, cont.

Client:	Collaborators:
Casa De Mexico Foods, Inc.	William McGlynn David Moe Darren Scott
Cherokee Locker Plant	Tim Bowser Jake Nelson Corey Stone
Cherokee Station Convenient Cooking Country Gal's	
Crain Dairy	Tim Bowser Rodney Holcomb Stanley Gilliland Darren Scott
Devine Water Company	Tim Bowser
Dog-A-Licious Bakery	Darren Scott
Dorma-Sprigs, Inc.	David Moe Charles Taliaferro
Dorothy Faye Bread, Inc.	Patricia Rayas Rodney Holcomb
Garrett's Buffalo Jerky	
Geraldine's Pies	William McGlynn Darren Scott
Gift Companies, Inc.	Darren Scott
Good Living Tea	William McGlynn
High Country Granola	Tim Bowser Darren Scott
High Hopes Beef Jerky Honey Hill Farms	
Hutch's Market	Jim Brooks
Idle Knot Dairy	Tim Bowser
J & K Hay Guard	Nurhan Dunford Ray Huhnke John Caddel
Jerry's Gourmet Barbecue Sauce John Mason Company, PC Kennedy Farms Kim's Ribs Lazy S Bar-B-Q	
LeBlanc's Specialty Foods	Darren Scott William McGlynn
Linda's Kountry Kitchen	Tim Bowser
Lottinville's Wood Grill	
Lynn's Cakes	Tim Bowser

Technical Assistance Projects

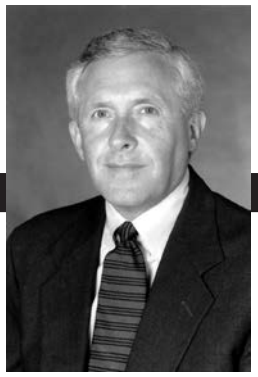
Chuck Willoughby

Other Projects, cont.

Client:	Collaborators:
Mandrell Solutions	Nurhan Dunford
Manure Gourmet	Rodney Holcomb
Middle Mountain Dairy	
Mr. Spriggs BBQ	
National Pet Products	Tim Bowser
No Man's Land Beef Jerky	Jason Young
	Tim Bowser
NuCare	
Osage Orange	Salim Hiziroglu
	Rodney Holcomb
P & D Farms	
PanQuesos Bread Company	Patricia Rayas
Peppernade	
Prairie Maide	Corey Stone
Red Corn Native Foods	Tim Bowser
	Patricia Rayas
Ruth Huffman Designs	Corey Stone
	Cheryl Farr
	Glenn Muske
Siegi's Sausage Company	David Moe
Sleeping Bear Creek Bottling Company	Corey Stone
Specialty Bakery	Patricia Rayas
Stephanie's Cookie Company	Darren Scott
Sweet Spirit Foods	William McGlynn
Taco Factory	
Taco Ranch	William McGlynn
The Wandering Viking	Corey Stone
Tilley's Old Fashion Candy	
Torre's Treats	William McGlynn
	Siobhan Reilly
Tortilleria Velasquez	Jason Young
	Tim Bowser
Udder Farms	Tim Bowser
	Nurhan Dunford
	David Moe
Valley View Pecan Company	Tim Bowser
Vinita Flag & Apron	Corey Stone
Wild Horse Mountain Bar-B-Q	William McGlynn
Wild West Restaurant	
Wright Enterprises	
Yoder's Bake Shop	
Zook's Foods	David Moe
	Darren Scott

Jim Brooks

Biography



Business and Marketing Specialist

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Upon attending the University of Central Oklahoma in Edmond, Okla., Jim Brooks began his career in industrial sales and marketing, which subsequently lead him to serve as Branch Manager for Swift and Co. in Oklahoma City and Denver, CO. Jim was promoted to Swift Branded Products Manager for the western region, headquartered in Dallas, TX.

After many years of service and leadership with Swift and Co., he assumed responsibility as General Sales Manager for the Food Service Division of Scrivner Foods Inc. Following 11 years of management at Scrivner Foods, Jim became co-owner and partner of Bake Rite Foods in Oklahoma City.

Joining the FAPC in January 1997, Jim serves the Center as a Business and Marketing Specialist, engaging his extensive business experience and skills to lead the business and marketing team to help Oklahoma businesses develop and expand. Jim has exclusively worked in industrial consulting since that time. In addition, Jim has recently been selected by the National Grocers Association to serve as a member of the University Coalition strategic planning team.

Corey Stone

Biography

Business Planning and Marketing Associate

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Corey Stone is a Business Planning and Marketing Associate at the Oklahoma Food and Agricultural Products Research and Technology Center at Oklahoma State University. Corey joined the Center in January of 2000 and has assisted clients in various applications of agricultural products for retail and foodservice sales.

Previous to joining the Center, Corey earned a Bachelor of Science degree in Statistics from Oklahoma State University and spent more than nine years in industry as a foodservice manager, either directly supervising operations or as a special consultant in units in five states. Corey uses his foodservice experience to assist clients in marketing to foodservice or institutional outlets.

Chuck Willoughby

Biography

Business Planning and Marketing Associate

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Chuck Willoughby is a Business Planning and Marketing Associate at the Oklahoma Food and Agricultural Products Center at OSU. His educational background includes a Bachelor of Science degree and Master of Science degree both in Agricultural Economics from Oklahoma State University.

After graduating from OSU in 1988, Chuck worked in the field of Agricultural Economics through research contracts with the USDA and the Western Highway Institute. Other professional endeavors in his career include sales and marketing and serving as a District Executive with the Boy Scouts of America. In 1995, Chuck returned to OSU to work in the area of rural community development and in 1999 joined the team at the FAPC.

Chuck's main responsibility at the FAPC is to assist new food business entrepreneurs with business planning, market evaluation, and resource identification. He serves as instructor at Basic Training for Food Business Entrepreneurs, a monthly workshop hosted by the FAPC. Chuck also works with large Oklahoma Food Manufacturers, assisting them to find the appropriate technical assistance to meet their needs. Chuck provides program presentations educating Oklahomans about the Center and how it can be a resource for communities and benefit the Oklahoma economy.

Cereal Chemistry

Purpose

Cereal Chemistry specialists focus on the food and agricultural uses of hard red and white winter wheat and understanding the physicochemical basis that contributes to the end-user quality of wheat.

Examples of the basic research projects include interactions of wheat proteins and carbohydrates, rheological properties of dough and model systems, and proteomics of wheat endosperm organelles that synthesize and modify storage proteins during grain development.

"Adding Value to Oklahoma"

Research Projects

Patricia Rayas-Duarte, Ph.D.

Highlighted Project

Title: Physico-Chemical Characterization of Gluten Proteins

Collaborators: Sabitha Patel

Funding Source: Oklahoma Wheat Research Foundation, Oklahoma Wheat Commission

Objective: Understand the properties of gluten proteins from wheat of contrasting functionality and analyze their correlation with rheological and baking properties.

Executive Summary: Gluten proteins, glutenin and gliadin, are the most important storage proteins of wheat endosperm due to their vital role in the baking quality of flour. Glutenin and gliadin fractions from hard red spring wheat cv. Butte 86 were characterized based on differences in hydrophobicity, apparent molecular size, and surface charge to mass ratios. At least 12 polypeptide units that differ in mass to charge ratios formed the high molecular weight glutenin subunits ranging in molecular weight from 50,000 to 120,000. The more hydrophobic low molecular weight glutenin subunits consisted of eight polypeptide units with molecular weight range from 20,000 to 54,000 and revealed at least 13 polypeptide units with closely related charge to mass ratios. The gliadin fraction revealed eight different major peaks of distinct surface hydrophobicities and ranging in molecular weight from 24,000 to 54,000. These eight subfractions are made up of 13 polypeptides based on differences in charge to mass ratios, with the more abundant omega-gliadins migrating as a separate cluster at the end of the electropherogram.

Work to be completed: Studies of similar scope are being conducted on hard red winter wheat cultivars of contrasting baking performance. Possible correlations of the studied physico-chemical properties to rheological parameters of dough from each cultivar are also being investigated.

Other Projects

Title: A Proteomics Approach to the Identification of Endoplasmic Reticulum and Golgi Apparatus Membrane Proteins of Wheat Endosperm During Development
Collaborators: Mohamad El-Osta, Steve Hartson, Patricia Ayubi - Biochemistry and Molecular Biology

Title: Studies of a Hard Red Winter Wheat Cultivar of Variable Endosperm Hardness: Differences in Puroindoline Proteins
Collaborators: Cristina Escober, Brett Carver - Plant and Soil Sciences

Title: Development and Testing of a "Woodward Chaffy Seed Processing" Prototype to Select Wheat Kernels With Potential Application of Discover Value
Collaborators: Tim Springer and Phillip Sims - USDA-ARS Southern Great Plains Field Station, Arron Beisel - Arron's Engineering, Sheldon Miller - Ag-Renewal, Inc., Oklahoma Wheat Commission

Title: Genetic Improvement and Varietal Release of Hard Red Winter Wheat
Collaborators: OSU Wheat Improvement Team

Technical Assistance Projects

Patricia Rayas-Duarte, Ph.D.

Highlighted Project

Client: Poppin' Glows, Inc.

Collaborators: Joseph Cragun, Cristina Escober, Tim Bowser

Funding Source: FAPC

Assistance Requested: To reduce shrinking/settlement of candy product during transportation.

Work Performed: Tested performance of different ingredients directed to formula modification.

Economic Return: Unknown

Other Projects

Title: Evaluation of baking performance of competitions for the FFA and 4-H Clubs at the Texas County Fair
Collaborators: Cristina Escober, Brett Carver - Plant and Soil Sciences

Patricia Rayas-Duarte, Ph.D.

Biography

Cereal Chemist

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Patricia Rayas received her M.S. degree and Ph.D. in Food Science and Technology from the University of Nebraska-Lincoln. She holds a B.S. in Chemistry from the University of Sonora, Mexico.

Formerly, Patricia worked with the Department of Cereal Science and Technology at North Dakota State University. In July 1997, she joined the Department of Biochemistry and Molecular Biology and the Food and Agricultural Products Center at OSU. At the FAPC, Patricia holds appointments in research and extension.

Her research focuses on hard red winter wheat proteins, specifically on gluten proteins associated with the functionality of the flour used in yeasted bread products. Currently, Patricia's team is studying the gluten proteins and their effect on the rheological properties of gels and a proteomic approach to the identification of all the proteins from wheat endosperm during grain development.

The extension work performed by Patricia is related to the utilization of hard red and white winter wheat. Every crop year, her team analyzes the end-user quality of Oklahoma wheat crop and prepares a crop survey report used by the milling industry. She also works closely with the Oklahoma Wheat Commission providing technical information to support the marketing efforts of Oklahoma wheat.

Patricia has participated in national and international seminars related to the wheat crop quality. Her extension activities have included technical assistance provided to cereal-related industries in the state.

Patricia's team includes one research specialist, three graduate assistants, two undergraduate students, and two seasonal student assistants during the wheat crop survey.

Food Engineering

Purpose

The mission of the Food Engineering area is to help Oklahoma's food and agricultural processors solve problems and achieve competitive advantage, leading to sustained economic growth, new jobs, and improved food safety and quality through better engineering. The Center strives to become the highest quality leading supplier of research, development, and technology transfer services to the food and agricultural products industries; to stimulate and sustain growth in the food and agricultural processing industry of Oklahoma; to increase food safety for consumers; to provide more and better-prepared graduates for careers in the industry; and to provide clients a competitive edge.

"Adding Value to Oklahoma"

Research Projects

Danielle Bellmer, Ph.D.

Highlighted Project

Title: Improvement of Oxygen Transfer During Xanthan Gum Fermentation

Collaborators: Siobhan Reilly

Funding Sources: OSU Center for Energy Research, Food Research Initiative Program

Objectives: 1) Develop and test a microbubble generation system for use in enhancing mass transfer during xanthan gum fermentation. 2) Investigate the potential use of an ultrasonic treatment system for enhancement of mass transfer during xanthan gum fermentation.

Executive Summary: Commercial production of xanthan gum occurs in a conventional aerobic batch fermentation process and as fermentation proceeds, the viscosity of the broth limits oxygen transfer to the microbes. The focus of this work is to investigate new techniques for enhancing mass transfer in the system; specifically the use of microbubbles and the use of ultrasound. In microbubble studies, microorganisms were found to be considerably resistant to shear in the microbubble generator, allowing the entire broth to be processed. Resulting microbubbles had an average size of 145 µm and good hold-up and foam stability at agitation speeds of 5000-8000 rpm and surfactant levels of 120-500 ppm. Fermentation studies were conducted with full air sparging and partially substituted microbubble sparging, in which microbubbles were injected for 30 minutes every 6 hours after exponential growth. A comparison of microbubble and air sparging methods showed that partially substituted microbubble sparging increased oxygen uptake by about 50 percent and increased xanthan gum yield by about 30 percent. For ultrasound studies, the fermenter was equipped with an external loop containing an autoclavable flow-through ultrasonic cell operating at 20 kHz. Ultrasonic energy was administered at the end of the exponential growth phase, and ultrasonic treatments were studied both as single-dose applications and as intermittent ultrasonic doses. As a result of ultrasonic treatment, oxygen uptake rate increased between 33 percent and 97 percent, depending on the treatment time and the viscosity of the broth. Intermittent sonication increased xanthan gum yield by an average of 22 percent and single-dose sonication increased yield by about 12 percent. In all cases, there was no significant change in the molecular weight of the xanthan gum molecule as a result of ultrasonic treatment.

Work to be Completed: Future work on both of these applications will focus on process optimization. Specifically, the timing and duration of treatment in both microbubble sparging and ultrasonic treatment must be optimized. In addition, the use of both of these techniques in large scale production must be made more efficient. In the microbubble system, future work may involve placement of the microbubble generator inside the fermenter to maximize microbubble usage.

Research Projects

Danielle Bellmer, Ph.D.

Other Projects

Title: Conversion of Biomass to Ethanol
Collaborators: Tim Bowser, Ray Huhnke - Biosystems and Agricultural Engineering, Randy Lewis and A.J. Johannes - Chemical Engineering, Charles Taliaferro - Plant & Soil Sciences, Francis Epplin - Agricultural Economics, Ralph Tanner - University of Oklahoma

Title: Rheological Characterization of Semi-Solid Foods
Collaborators: Jerry Brusewitz - Biosystems and Agricultural Engineering

Title: Osmotic Dehydration of Watermelon
Collaborators: William McGlynn

Title: Enzymatic Conversion of Cellulosic Waste Casings
Collaborators: Randy Lewis - Chemical Engineering

Title: Use of an Immobilized System for Production of Riboflavin
Collaborators: Randy Lewis - Chemical Engineering

Research Projects

Timothy Bowser, Ph.D.

Highlighted Project

Title: Biomass-Based Energy Research

Funding Sources: USDA CSREES and USDA 401 IFAFS Special Grants Program

Objective: Convert biomass to ethanol and other valuable products.

Executive Summary: Team members include researchers at Oklahoma State University, University of Oklahoma, and Mississippi State University. Team activities center on a unique process for biomass conversion to ethanol and other chemical products. In this process, biomass is gasified into a producer gas, which is then converted to the final product using a microbial catalyst. Scope of the effort is holistic and includes five primary research projects: feedstock development, biomass gasification, fermentation, microbial catalyst development, and economics. The five projects work simultaneously, and synergistically, to address the most important issues in the conversion of biomass to ethanol and other important products. The effort is driven by the need for a low-cost, sustainable, renewable energy source that is economically and environmentally beneficial. Development and exploitation of this energy source could have a major impact on rural economies, as poorly utilized land and agricultural residues would attain new economic value. Gasification work involves several different activities aimed at understanding and optimizing the pyrolysis of biomass materials. Fluidized bed gasification has been studied because of its process flexibility and design simplicity. Producer gas cleaning and storage is an integral part of the system. Materials handling and optimization studies, such as process effects on producer gas composition, are geared toward scale-up and commercialization. Specific results from 2003 include: 1) study of switchgrass moisture content effect on process efficiency and producer gas composition, 2) design, building, and testing of a full-scale plastic model of the fluidized bed gasifier for use in bed fluidization tests, 3) design, construction, and implementation of more accurate producer gas sampling and testing methods, 4) study of producer gas cleaning methods, 5) gasification of alternative biomass materials such as corn fermentation sludge and bermuda grass, and 6) conceptual design of a new gasifier system for more efficient and cleaner generation of producer gas.

Work to be completed: The paramount result of the study is design information for a commercial facility to convert agricultural biomass to fuel ethanol and other valuable products. Specific goals for the gasifier team include: 1) build and test a new, improved gasifier system; 2) improve condition and composition of producer gas with reference to downstream processing requirements; 3) continue to optimize gasification systems; 4) gasify additional biomass materials.

Other Projects

Title: Production, Development, and Marketing of Value-Added Horticultural Products
Collaborators: Rodney Holcomb

Title: Conversion of Food and Agricultural Processing By-Products to Energy
Collaborators: Paul Weckler and Krushna Patil - Biosystems and Agricultural Engineering, Christina DeWitt - Animal Science

Technical Assistance Projects

Timothy Bowser, Ph.D.

Highlighted Project

Client: O'Steen Meat Co.

Assistance Requested: Temperature profile of rehabilitated cooling oven.

Work Performed: A slim-profile, four-channel, data logger was used to record on-line process temperatures in a newly rebuilt oven. The data logger was placed directly onto the oven conveyor belt to record temperatures as it passed through the oven with the product. Temperature probes were placed into the product and exposed in the heating environment. A formal report was issued to the process owner of the oven. The report and data collected were used to help check improvements in the oven and to assist with product quality and energy issues.

Economic Returns: Unspecified process/quality improvements.

Other Projects

Client: Dave Archung

Client: Oil Extraction facility
Collaborators: J. Roy Escoubas, William McGlynn, Nurhan Dunford

Client: Redland Juice Co.
Collaborators: William McGlynn

Client: Chef's Requested

Danielle Bellmer, Ph.D.

Biography

Food Engineer

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Danielle Bellmer is a native of Michigan and began her college career at Michigan State University, where she received her B.S. degree in Food Engineering in 1992. She then traveled to Purdue University and earned a Ph.D. in Food Process Engineering in 1996.

Danielle was a member of the faculty at Delaware Valley College in Doylestown, PA for one year before joining Oklahoma State University in June 1997. She has a teaching and research appointment in the Food and Agricultural Products Research and Technology Center and the Department of Biosystems and Agricultural Engineering and was recently promoted to Associate Professor.

Her research has been focused on various issues related to food process engineering, including biomass conversion, rheology and texture analysis, waste product utilization, and mass transfer in aerobic fermentation. In addition, she has been involved in the development of new value-added products from Oklahoma commodities and is one of the co-inventors of Peanut Butter Slices.

Timothy Bowser, Ph.D.

Biography

Food Engineer

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Tim Bowser is a registered, professional engineer with 20 years of experience in food process engineering. He is an Associate Professor of Food Process Engineering at Oklahoma State University.

His responsibilities include: technical assistance to entrepreneurs and food processors, research and development of food processing equipment and techniques, and the establishment of extension programs in food engineering. His industrial experience includes positions at the Gerber Products Co. and Lockwood Greene Engineers.

Tim holds a Ph.D. from The University of Tennessee and M.S. and B.S. degrees from The Pennsylvania State University. Tim's primary research focus is on food process optimization, including biomass gasification and process waste recovery.

Tim supervises one half-time post-doctoral researcher, three graduate students, and one part-time undergraduate student.

Horticultural Processing

Purpose

The Center is committed to helping Oklahoma's producers and processors of horticultural products provide nutritious, delicious, and convenient food products to consumers everywhere. Whether assistance is needed with formulation, process evaluation, trial production runs, or other services, the Center has the know-how and equipment to help move the project forward. In addition to technical assistance, on-going research helps to answer fundamental questions about the healthful properties of fruit and vegetable products, as well as how to extend shelf life while maintaining both quality and safety.

"Adding Value to Oklahoma"

Research Projects

William McGlynn, Ph.D.

Highlighted Project

Title: Using β-cyclodextrin to Improve the Correlation between Lycopene Concentration and ORAC Values.

Funding Sources: OSU Experiment Station, USDA CREES

Objective: To improve the ability to assess the antioxidant activity of lycopene, a fat-soluble antioxidant, in water-based food systems.

Executive Summary: Lycopene, a fat soluble antioxidant found in watermelon and tomatoes, plays a crucial role in biological systems. Studies have shown that it can function as an anti-cancer agent, to lower cardiovascular risks, and as an immune system regulator. The oxygen radical absorbance capacity (ORAC) assay has been used extensively to measure the antioxidant activity of water-soluble antioxidants, but has not been previously used for lycopene. This study validated the ORAC assay for different concentrations of lycopene in the presence of ß-cyclodextrin, a water-solubility enhancer.

Work to be Completed: Avenues for continued research include evaluating the effectiveness of additional cyclodextrin compounds as lycopene solubilizing agents and attempting to correlate ORAC values with lycopene concentrations in actual foodstuffs.

Other Projects

Title: Correlation of Oxygen Radical Absorbance Capacity (ORAC) Values with Anthocyanin and Phenolic Content of Red-, White-, and Yellow-Fleshed Peaches
Collaborators: B. Dean McCraw

Title: Effect of Hot Water Sanitizing Treatment of In-shell Pecans on Pecan Kernel Color During Storage
Collaborators: B. Dean McCraw

Title: Development of Value-Added Functional Food Products from Watermelon
Collaborators: Niels Maness, Darren Scott, Dharmendra Bangalore

Title: Development of an Economical Small-Scale Processing System for Thermal Processing of High-Acid Food Products
Collaborators: Tim Bowser

Title: Development of Lycopene-Rich Concentrates and Extracts from Watermelon
Collaborators: Niels Maness, Nurhan Dunford, Dharmendra Bangalore, Darren Scott, Penelope Perkins-Veazie

Technical Assistance Projects

William McGlynn, Ph.D.

Highlighted Project

Client: Redland Juice Co.

Assistance Requested: The development of a process pasteurizing and bottling grape juice and the use of our facilities for production of test marketing batches of shelf-stable grape juice products made from Oklahoma-grown grapes.

Work Performed: Processing and pasteurizing procedures were developed for the company's grape juice products. With the system in place, the Center assisted the company's personnel in the filtration, pasteurization, and bottling of about 1,700 containers. Each container held 750ml of grape juice.

Economic Returns: Redland Juice Co., comprised of a partnership among four Oklahoma vineyards, has already secured more than 27 retail outlets for their products in the state. Through their partnership with the FAPC, they have had the opportunity to learn about the equipment and processes necessary to produce their juice. This has given the company the knowledge and the confidence to pursue establishing their own production facilities. These facilities will provide employment as well as an additional potential market for grapes from Oklahoma vineyards.

Other Projects

Client:	Collaborators:
Amy Smith	
Apple Hollow	
Backwoods Food Manufacturing Inc.	
Beverly Billings Salsa	
Big Time Sports	Darren Scott Tim Bowser Jim Brooks David Moe
Blessetti's	Chuck Willoughby Darren Scott David Moe
Bloomin Botanicals	
Brannon's Blazzin Pickles	
Christian Cheese	
C.J. Nutricon	
CLMBC – Sweet Spirit Foods	
Code 3 Salsa	
Fulton Fried Pies	
Griffin Foods	

Technical Assistance Projects

William McGlynn, Ph.D.

Other Projects, cont.

Client:	Collaborators:
Ham it Up	
Janice Sappington	
Jess Juice	
Judy Ann's	
Kennedy Foods	Danielle Bellmer
Latin American Ingredients	Guadalupe Davila-El Rassi
	Tim Bowser
	Darren Scott
No Man's Land Beef Jerky	Jason Young
Pepper Creek Farms	
Pepper Jo's	
Salsa Noches	
San's Salsa	
Spellman Barbecue Sauce	
Stratford's Little Jelly Factory	
Sue's Gourmet Fried Pies	Darren Scott
Sweet Agony	
Torrie's Treats	
Tracy Schlupe	
Uncle Allen's Pepper Shop	
Willy's Spice Box	
Winter Creek Farms	

William McGlynn, Ph.D.

Biography

Horticultural Process Specialist

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William McGlynn received a B.A. degree from the University of California at Davis in 1979, an M.S. degree in Food Science from the University of Arkansas in 1989, and a Ph.D. in Food Science from the University of Arkansas in 1997.

William came to work for the Food and Agricultural Products Research and Technology Center on the Stillwater campus of Oklahoma State University in May 1997 and is a faculty member in the Department of Horticulture and Landscape Architecture. William is responsible for the extension and research activities of the Center relating to value-added processing of horticultural products. In this capacity, he provides technical assistance to entrepreneurs and businesses of all sizes.

William's research focuses on the application of new or existing processing technologies to enhance or retain content and functionality of inherent health-promoting compounds in processed horticultural products. These studies include physical and chemical methods of extraction and concentration of antioxidant compounds in watermelon and sage. He is also investigating the application of new processing technologies and techniques to improve the quality and safety of processed horticultural products, such as fresh-cut produce.

William is supported by one research specialist, two graduate assistants, and three undergraduate student employees.

Food Microbiology

Purpose

The main focus of research in the Food Microbiology area is microbial food safety from farm to table. There also is heavy commitment to research related to the beneficial use of lactic acid bacteria as starter cultures for foods and as probiotics for both humans and animals. Other research involves microorganisms responsible for food spoilage.The food safety research includes studies on improved detection and identification and control of *Listeria monocytogenes*, *Salmonella ssp*., *Escherichia coli* 0157:H7, and *Campylobacter jejuni*. The research in probiotics focuses on its use to control intestinal pathogens, which can be foodborne pathogens in livestock, as well as providing other health/nutritional benefits for both humans and animals. Funds to support the research have come from a variety of sources including the Oklahoma Agricultural Experiment Station, USDA/CSREES, and industry and commodity groups.

"Adding Value to Oklahoma"

Research Projects

Stanley Gilliland, Ph.D.

Highlighted Project

Title: Selection of Starter Culture to Reduce "Beany" Flavor of Soy Yogurt

Funding Sources: Oklahoma Agricultural Experiment Station and Royalty Funds

Executive Summary: Samples of soymilk were cultured with different lactic acid bacteria in efforts to reduce levels of volatiles associated with the "beany" flavor of the product. Of the four major volatiles detected (acetaldehyde, hexanal, methanol, and ethanol), all eight tested cultures eliminated the hexanal and caused significant reduction of methanol. All cultures except *Lactobacillus acidophilus* C19 and *Lactobacillus casei* E5 significantly lowered the level of acetaldehyde. Comparison of all of the cultures revealed that *Lactobacillus acidophilus* L1 offers the best potential for producing fermented soymilk with an improved volatile profile. It completely eliminated the acetaldehyde and hexanal peaks plus caused a significant reduction in the methanol. Although not significant, it also caused reduction in the concentration of ethanol.

Work to be Completed: Soy yogurt should be prepared and subjected to sensory evaluation to confirm that fermentation with the selected culture(s) significantly reduces the "beany" flavor. For this part of the study, the yogurt likely will be made using soy protein isolate plus the necessary stabilizers and sugar to more closely align with commercial processes.

Other Projects

Title: Lactobacilli as Probiotics, Biopreservatives, and Producers of Nutraceuticals

Title: Food Safety: Farm to Table
Collaborators: Peter Muriana, Siobhan Reilly, Glenn Zhang - Animal Science, Terry Lehenbauer - Veterinary Pathobiology

Title: Biocatalysis of Linoleic Acid to Conjugated Linoleic Acid
Collaborators: Nurhan Dunford

Title: Efficacy of Chicken Antimicrobial Peptides in Killing Bacteria
Collaborators: Glenn Zhang - Animal Science

Title: Cloning, Expression, and Analysis of Bovine Defensins
Collaborators: Glenn Zhang - Animal Science

Title: Production of Recombinant Porcine Antimicrobial Peptides as Antibiotic Alternatives
Collaborators: Glenn Zhang - Animal Science

Title: Antimicrobial Peptides as a New Class of Antibiotics
Collaborators: Glenn Zhang - Animal Science

Research Projects

Peter Muriana, Ph.D.

Highlighted Project

Title: Use of Liquid Smoke to Inhibit *Listeria monocytogenes* on Ready-to-Eat Meats

Funding: Food industry sources (Mastertaste Inc., Agricultural Experiment Station)

Objectives: 1) Determine if liquid smoke extracts can be used to reduce *Listeria monocytogenes* on ready-to-eat (RTE) meats. 2) Determine if liquid smoke extracts can be used in conjunction with heat (i.e., pasteurization) to reduce *Listeria monocytogenes* on RTE meat products.

Executive Summary: Retail frankfurters purchased at retail were used as a basal meat matrix for testing the effectiveness of a liquid smoke dip process against *Listeria monocytogenes* during extended shelf-life testing. All hotdogs were boiled for 3-5 minutes prior to use and then cooled. Hotdogs treated with Zesti-B^{Tm} (Mastertaste Inc.) liquid smoke extract were dipped for 2 minutes. A mixed culture of 4 strains of *L. monocytogenes* was used to inoculate all treatments. Quantitation consisted of plating either initial or surviving Listeria at the start of the experiment, after 1 hour of treatment, and weekly for 6 weeks. One treatment consisted of *Listeria*-inoculated hotdogs (without smoke) that were heated at 165^{o}F for 1 minute; a similar treatment was performed with hotdogs dipped in smoke extract. A third treatment examined the effect of *Listeria* when heat alone was used (no smoke extract). When heat alone was used, the heat regimen provided nearly a 3-log cycle reduction to the inoculated population of *L. monocytogenes*. However, the surviving cells quickly recovered within 1 week to initial levels and, thereafter, increased to a maximum of 10^9 CFU/ml of rinse. Using hotdogs dipped in smoke extract alone, *Listeria* populations showed a 2-log cycle reduction within 1 week that was maintained for an additional 5 weeks. This type of reduction would classify the smoke extract as satisfying USDA-FSIS Alternative I as per the recent "final rule for control of *L. monocytogenes* on RTE meats" in both preventing outgrowth of *Listeria* as well as demonstrating reduction of *Listeria*. The most dramatic results were obtained with a combination of heat (165^{o}F for 1 minute) and liquid smoke extract which showed a decline of more than 2-log cycles beyond that observed for heat alone and slowly continued to lower such that no viable cells were obtained by the third week. The use of such inhibitory liquid smoke extracts may have promise in providing *Listeria* control on those products that have "smoke" flavoring and may be especially useful for smoked deli products that are currently receiving a short pre- or post-package pasteurization heat treatment.

Work to be completed: We are currently beginning additional studies, similar to the above, but using shorter dip times that are more practical to the industry. We will also use liquid smoke on large, smoked deli meats (i.e., smoked turkey) in conjunction with pre- and postpackage pasteurization. Mastertaste Inc., the manufacturer of the liquid smoke extracts is collaborating with us on this project. The data above has facilitated the receipt of a grant (American Meat Institute, 2004) and currently carries a M.S. student. An abstract has been submitted and accepted for presentation at the Annual Meeting of the Institute of Food Technologists (June 2004). The work described above should result in at least two research publications (one with hotdogs, another with surface pasteurized RTE meats).

Research Projects

Peter Muriana, Ph.D.

Other Projects

Title: Fluorescence-Based PCR Detection of *Listeria monocytogenes* Using Amplifluor Uniprimer^{Tm}
Collaborators: Suparna Mitra - M.S. student

Title: Development of a Biofilm Assay to Identify Biofilm-Forming Strains of *Listeria monocytogenes*
Collaborators: Rachel Wright - M.S. student

Title: Multi-Locus Sequence Typing to Identify Phylogenetic Differences between Pathogenic Isolates (i.e., *Listeria monocytogenes*)
Collaborators: K. Kalparna - Ph.D. student

Title: Bacteriocins as Antimicrobials in Foods
Collaborators: Sunita Macwana - Ph.D. student

Title: Pre- and Postpackage Pasteurization of RTE Deli Meats
Collaborators: William Robertson - Research Technician

Research Projects

Siobhan Reilly, Ph.D.

Highlighted Project

Title: Improved Method for the Recovery of *Campylobacter jejuni* from Food

Funding Sources: USDA-CREES Food Safety Special Research Grant

Collaborators: Stanley Gilliland

Objectives: To test the Center's newly developed methods for improved recoverability and detection of *Campylobacter jejuni* in artificially inoculated food systems.

Executive Summary: Ground beef appeared to be the best food system for the supporting *C. jejuni* growth and recoverability when compared to the other two food systems tested. Using the FDA method, *C. jejuni* cells were not detectable after seven days of storage at 2°C. However, using the Center's improved method, a significant number of cells could still be detected after 10 days of storage at the same temperature. When *C. jejuni* was inoculated into milk and stored under refrigeration conditions (2°C) for several days, only the improved method allowed for adequate detection, regardless of inoculation level. When evaluating sliced whole turkey meat, *C. jejuni* recovered similarly on day three but the new method could recover cells on days seven and 10. The improved method is a simplified version of the FDA method. The new method excludes temperature changes, addition of horse blood, and rapid agitation hence saving time and money. In addition, a different growth vessel is used compared to the FDA suggested methods. The use of tissue culture flasks to enhance the growth and maintenance of *C. jejuni* has successfully been incorporated. By using a tissue flask, the enrichments have a controlled and consistent environment; whereas, the condition inside the FDA bags will vary depending on how the bag is oriented during incubation.

Work to be completed: These experiments are being prepared for publication.

Other Projects

Title: Developing Methodology for *Helicobacter pylori*
Collaborators: Stanley Gilliland

Technical Assistance Projects

Peter Muriana, Ph.D.

Highlighted Project

Client: Unitherm Foodsystems, Inc.

Assistance Requested: 1) Validate that a commercial radiant heat oven (Infrared Grill^{Tm}) has equivalent lethality to a pilot plant scale oven (FAPC/OSU) used for lethality trials on client product. 2) Determine the appropriate cooling method to reduce the core temperature rise to below 40^{o}F in Infrared Grill-heated products.

Executive Summary: Prepackage pasteurization trials in our pathogen pilot plant demonstrated a 3.5- and 4.76-log cycle reduction of *Listeria monocytogenes* on deli turkey when processed for 60- or 75-seconds, respectively, in the Infrared Grill^{Tm} at full power. A potential client of Unitherm Foodsystems (Bristow, OK) was interested in demonstrating that similar lethality levels could be achieved on a commercial-scale machine. Inoculated trials performed at Unitherm Foodsystems (in triplicate replications) demonstrated that these same levels can be obtained on a commercial unit. However, in the process of performing the trials, we helped to identify areas of improvement that were remedied by manufacturing modifications and allowed us to achieve similar data with the commercial units as obtained in the FAPC pathogen pilot plant. The Unitherm client was also interested in maintaining core temperature below 40^{o}F. However, heating with the Infrared Grill causes a wave of heat energy to migrate into the product during subsequent chilling. This wave of heat could be best reduced if it is addressed immediately after processing when the heat energy is still at the product surface. We examined core temperatures after Infrared Grill surface pasteurization followed by various chilling regimens (simple refrigeration, ice slurry, blast chill) and the best chilling method that prevented product from reaching 40^{o}F was a -20^{o}F blast chill on individual pieces for 10 minutes followed by boxing and continued chilling at 28^{o}F. The -20^{o}F blast chill used in the tests represents the higher temperature range, since Unitherm's blast chiller can go down to -40^{o}F. Based on this assistance, the client purchased several systems for each of two deli turkey plants to provide prepackage pasteurization of deli turkey.

Economic Returns: Since the assistance provided by the FAPC on this project, sales have sigificantly increased for Unitherm Foodsystems, Inc. The company projects that sales will continue to increase.

Technical Assistance Projects

Siobhan Reilly, Ph.D.

Highlighted Project

Client: Hall Cattle Company

Assistance Requested: To test the storage stability of the company's baked-bean products when stored under various refrigerated conditions.

Worked Performed: Hall Cattle Co. is a start-up company that has signed numerous contracts to put their unique baked-bean products on the shelf. Being a new company and a new product line, there is very little information regarding the shelf stability. The products were tested at a low-average refrigerated temperature (38°F) and a higher refrigerated storage temperature (45°F). This allowed the stability of the products to be evaluated if conditions vary in production, transit, or storage. The target microbial flora that would provide the most changes were yeast/mold and lactic acid bacteria. In addition, the total microbial flora as an additional indicator of spoilage was evaluated, and the water activity and pH were also monitored. The storage study was conducted over a 35-day period with sampling every seven days. The results were used to determine how long the product could stay on the shelf.

Economic Returns: Unknown

Other Projects

Client: Cusack Meats
Collaborators: Jason Young

Client: McFerron's Quality Beef
Collaborators: Jason Young

Client: Mikkelson Beef
Collaborators: Dave Moe, Jason Young, Jake Nelson

Client: Oklahoma Beef and Provisions
Collaborators: Dave Moe, Jason Young

Client: Schwartz Meats
Collaborators: Dave Moe, Jason Young

Client: Wholesome Sweetners

Stanley Gilliland, Ph.D

Biography

Food Microbiologist

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Stanley Gilliland was awarded a Ph.D. in Food Science from North Carolina State University in 1966. He received B.S. and M.S. degrees in Dairy Manufacturing from Oklahoma State University in 1962 and 1963, respectively. He was on the faculty in the Department of Food Science at North Carolina State University until 1976. In the fall of 1976, he joined the faculty in the Department of Animal Science at Oklahoma State University as a Dairy Food Microbiologist. He currently holds the rank of Regents Professor and Sitlington Endowed Chair in Food Microbiology in that department and the Oklahoma Food and Agricultural Products Research and Technology Center. He also serves as the coordinator for the food science graduate program at Oklahoma State University. He is a fellow in both the American Dairy Science Association and the American Academy of Microbiology. Because of his accomplishments in both research and teaching, he has received eight awards at the national level and seven at Oklahoma State University. These awards include the Eminent Faculty Award from among all OSU faculty, which is the highest recognition given to a faculty member at the university, and the 2003 American Dairy Science Association Award of Honor.

Stanley has worked with other Center microbiologists to develop and present a Food Microbiology Laboratory Workshop for industry. He has also served as Interim Director of the Center.

Stanley's primary research areas include: 1) Lactic acid bacteria used in dairy fermentations and/or as probiotics including their production and stability; 2) function of species of *Lactobacillus* and *Bifidobacteria* as probiotics to control serum cholesterol, control intestinal pathogens, and improve nutrient utilization by the host; 3) use of selected lactobacilli to control foodborne pathogens and spoilage organisms in refrigerated foods; and 4) improved detection methods for *Campylobacter*.

Peter Muriana, Ph.D.

Biography

Food Microbiologist

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Peter Muriana received his B.S. degree in Biology from Fairfield University in 1976 and his M.S. and Ph.D. in Food Science/Biotechnology from North Carolina State University in 1986 and 1990, respectively. Prior to his post-graduate education at N.C. State, Peter was a Research Associate at the Nabisco Brands Corporate R&D facility in Wilton, CT. After receiving his Ph.D., Peter joined the faculty in the Department of Food Science at Purdue University in 1990 and subsequently joined the Department of Animal Science at Oklahoma State University in 1997, where he currently holds the rank of Associate Professor. Peter also holds a position in the Oklahoma Food and Agricultural Products Research and Technology Center, where his office and laboratory are housed.

Peter's research has focused on a) inhibitory proteins (bacteriocins) as potential biopreservatives and molecular analysis of their genes, b) egg pasteurization to eliminate Salmonella, c) pasteurization of processed meat surfaces to eliminate *Listeria*, and d) molecular detection and characterization of foodborne pathogens. His research work with submersed-water postpackage pasteurization has been adopted and implemented by several large processors, including Sara Lee and Cargill to provide additional food safety assurances on their ready-to-eat meat products. Peter has worked with approximately eight nationwide companies regarding surface pasteurization of processed deli turkeys, hams, and roasts.

Peter is a member of several professional associations such as IFT and IAFP, has served as Treasurer of the Indiana and Oklahoma sections of IFT, currently serves as Member-at-Large of the Executive Committee for the IFT Biotechnology Division, and is Chair of the Graduate Paper Competition for the IFT Food Microbiology Division. Peter also is on the editorial board of Applied and Environmental Microbiology and has served as an ad hoc reviewer for 4 scientific journals related to food safety.

Peter currently supports one research technician and advisor for five graduate students and two undergraduate student employees.

Siobhan Reilly, Ph.D.

Biography

Food Microbiologist

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Siobhan Reilly completed her Bachelor of Science degree in Food Science at the University of Florida. Upon completion of her degree, she was immediately offered a full-time position at Oklahoma State University and given the opportunity to attend graduate school. She began in the area of meat science (value-added processing) and progressed into food microbiology. From 1992 to 1997, Siobhan worked full-time as the Laboratory Manager and Research Specialist in the Food Microbiology Laboratory in the Animal Science Department. During this time Siobhan completed her Master of Science degree in Food Science with an emphasis on Food Microbiology.

In 1997, Siobhan began working at the Center. She utilized appropriated start-up funds to build her program and equip her laboratory. Since then, through competitive grants and industry contracts, the program has grown significantly. While working full-time for the FAPC, Siobhan completed her Doctor of Philosophy in Food Science with emphasis in Food Microbiology.

Siobhan's program employs an average of five students per semester. Past students (undergraduate and graduate) have been trained in all areas of food safety and have moved into prominent roles in major companies in Oklahoma and the nation.

Siobhan is a member of several professional organizations, including the Institute of Food Technologists, Association of Official Analytical Chemists, Oklahoma Food Processors Association, International Association of Food Protection, and International HACCP Alliance.

Muscle Science

Purpose

The Center works toward the development of an outstanding research program emphasizing chemical or biochemical aspects of further processing of livestock, poultry, and aquatic muscle, as well as other food-producing species for value-added products. Commodities other than muscle foods may be included as well. The Center also helps solve short- and long-term problems relating to further processing and value-added products, including food safety. Additional efforts center on the development of products from muscle foods to assist the growth of Oklahoma value-added businesses.

"Adding Value to Oklahoma"

Research Projects

Renee' Albers-Nelson

Highlighted Project

Title: Evaluation of Quality and Oxidative Stability of Ohmically Heated Meat Products

Objective: The goal of this study is to assess ohmically cooked hamburger patties for color, textural properties, and oxidative rancidity, which is a contributor to warmed-over flavors.

Executive Summary: Ohmic heating is a relatively new cooking method that utilizes the instantaneous heat generated within a product when an electric current passes through a food. The food is cooked thoroughly and evenly in generally less than 10 to 15 seconds and is consequently used, or being considered, in some fast food chains. With the originality of this cooking method, no information is available in literature regarding the effects ohmic heating may have on the quality and stability of meat products, especially the production of warmed-over flavors, or WOFs. For comparison, hamburger patties were also cooked in an impingement oven and tested along the same parameters. Additionally, vitamin E, a natural antioxidant, was added to ground beef via an ethanol carrier and cooked, both ohmically and more traditionally, to evaluate its usefulness in inhibiting the formation of WOFs.

Work to be Completed: This work will be completed in Spring 2004, and publications will be developed. Subsequent work will focus on the stability aspect of the heating process.

Renee' Albers-Nelson

Biography

Muscle Science Research Assistant

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Renee' Albers-Nelson received her B.S. degree in Microbiology, with a minor in Food Science, and M.S. degree in Agronomy from Oklahoma State University in 1995 and 1998, respectively.

After receiving her M.S. degree, Renee' started working at the Food and Agricultural Products Center in the area of Cereal Chemistry. She was then hired as the Research Specialist in the Muscle Foods Laboratory. She has worked on a range of research projects, involving laboratory studies with gel electrophoresis to harvest floor studies examining the microbial and quality effects of steam pasteurization on pork and beef carcasses.

Oil/Oilseed Chemistry

Purpose

Oil and oilseed specialists work closely with researchers and industrial entreprenuers in Oklahoma, among other states, to develop value-added oilseed-related processing and products. The main objective of the oil/oilseed research program is to enhance the nutritional and economic value of plant-based materials and oils/oilseeds through innovative processing. The program focuses on four major areas, which include green processing; value-added product development; waste minimization; and recovery of biologically active, high-value components from agricultural material processing industry waste streams and by-products.

"Adding Value to Oklahoma"

Research Projects

Nurhan Dunford, Ph.D.

Highlighted Project

Title: Value-Added Product Development from Wheat Milling Industry By-Products

Funding: Wheat Commission Research Foundation

Objective: The main objective of this project is to develop value-added products from wheat milling industry by-products. Specific objectives include: 1) determination of polycosanol (PC) and octacosanol (OC) concentrations in various wheat fractions and varieties grown in the state of Oklahoma, 2) development of an efficient and economically feasible extraction process for OC and PC recovery from wheat milling industry by-products, 3) refining of OC and PC containing wheat extracts for utilization in functional foods and nutraceutical formulations.

Executive Summary: Wheat germ oil contains a number of bioactive compounds such as tocopherols, polyunsaturated fatty acids, phytosterols, and OC. Wheat germ oil has been reported to improve human physical fitness and this effect is attributed to its high PC, specifically its high OC content. PC is a mixture of high molecular weight primary aliphatic alcohols (waxy alcohols), and its main component is OC. There are numerous research studies indicating that 5-20 mg/day PC consumption is effective in lowering total cholesterol (by 17-21 percent) and low-density lipoprotein (LDL) (21-29 percent) levels, and increasing high-density lipoprotein (HDL) (8-15 percent) by inhibiting cholesterol synthesis and increasing LDL processing. A Gas Chromatography/Mass Spectroscopy (GC/MS) method was developed to analyze PC and OC content of wheat fractions. Samples of 31 wheat varieties grown and/or developed for Oklahoma (Intrada, Above, Cutter, Jagalene, Tam 302, Coronado, Custer, Kalvesta, Enhancer, OK101, Thunderbolt, Cisco, Chisholm, Trego, Avalanche, Jagger, Dumas, Triumph64, AP502 CL, Lakin, OK 94P549-11, Tam 110, Venango, Cossack, Tam 111, G1878, OK102, WT3P1, 2174, 2137, 2145) were milled at the ADM facilities in Enid using a pilot scale mill. The wheat fractions are being analyzed using the GC/MS method that was developed for this purpose. Wheat fractions from commercial milling operations and hexane-extracted wheat germ samples were also analyzed for their PC and OC content. The highest PC concentration was obtained in crude wheat germ oil.

Work to be Completed: A new grant proposal has been submitted to the Wheat Research Foundation requesting funds to develop an extraction method to recover PC from wheat fractions. Research findings will be presented at two different International Conferences in 2004. A postdoctoral fellow is working on this project.

Research Projects

Nurhan Dunford, Ph.D.

Other Projects

Title: Effects of Conventional Breeding and Genetic Engineering on Lipophilic Bioactive Components of Peanuts
Collaborators: Kenton Dashiell - Plant and Soil Sciences, Kelly Chenault - USDA/ARS Plant Science and Water Conservation Research Laboratory, Stillwater, OK

Title: Value-Added Product Development from Oklahoma Grown Peanut and Pecan Shells

Title: Oregano Oil Processing
Collaborator: CIRENA - Center of Investigation of Natural Resources, Chihuahua, Mexico.

Title: Processing and Characterization of Eastern Red Cedar Oil
Collaborators: Salim Hiziroglu, Rodney Holcomb

Title: Biocatalysis of Linoleic Acid to Conjugated Linoleic Acid
Collaborators: Stanley Gilliland

Title: Improvement and Field Evaluation of an Attract-and-Kill Bait Station for the Indianmeal Moth
Collaborators: Thomas Phillips and Jack Dillwith - Entomology and Plant Pathology

Title: A New Process for Producing Phytosterol and Lycopene Nano- and Micro-Particles
Collaborators: Brian Quinn - Activ-Dry LL, Boulder, CO; Robert Sievers - University of Colorado

Technical Assistance Projects

Nurhan Dunford, Ph.D.

Highlighted Project

Client: Udder's Farm

Assistance requested: Technical help on lemon balm production and processing.

Work Performed: This project involves growing lemon balm in Oklahoma and extraction of essential oils from the plant. Udder Farms requested help with technical aspects, including essential oil extraction methods, oil quality, equipment selection, and starting seeds in the green house. Lynn Brandenberger, Department of Horticulture and Landscape Architecture, assisted in the start of lemon balm seeds in the greenhouse. Essential oils were extracted from the plants grown on the client's farm, and the chemical composition of the lemon balm extracts were analyzed. FAPC is exploring the possibility of larger scale lemon balm essential oil extraction.

Economic Returns: Successful completion of this project may result in a new business and creation of jobs.

Other Projects

Client: Aaron Castor

Client: Mandrell Solutions Inc.
Collaborators: Chuck Willoughby

Client: Cinnaspread
Collaborators: Corey Stone, Darren Scott

Client: EXIM Services

Client: Ken McAfee and Jack Gamble
Collaborators: Chuck Willoughby

Client: U.S. Nutraceuticals

Client: Natural Milling

Client: High Plains Natives

Client: Biolinkglobal Co. Ltd.

Nurhan Dunford, Ph.D.

Biography

Oil/Oilseed Chemist

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Nurhan Dunford received a B.S. degree in Chemical Engineering and M.S. degree in Chemistry from Middle East Technical University and University of Ankara in Turkey, respectively. She was awarded M. Eng. and Ph.D. in Food Process Engineering from University of Alberta, Canada. She worked at Technical University of Warsaw, Poland in the Chemical Engineering Department as a visiting scientist on a fellowship awarded by United Nations, UNESCO section for one year. In 1999, Nurhan was awarded a prestigious "Government Invitation Fellowship" given by the Department of Health and Human Services of Japan. On this fellowship, she visited and gave lectures at the Kyushu and Kumamoto Universities. Nurhan's experience as an engineer and scientist encompasses more than 20 years, including positions in Turkey, Canada, and the United States. Before she joined Oklahoma State University, Nurhan worked at the U.S. Department of Agriculture, Agricultural Research Service, National Center for Agricultural Utilization Research (NCAUR), Peoria, IL as a Research Chemist. In the winter of 2001, Nurhan joined the faculty in the Department of Plant and Soil Sciences and Food and Agricultural Products Research and Technology Center at Oklahoma State University as an Oil/Oilseed Chemist.

Nurhan has established research collaborations with national and foreign scientists and experts in Japan, Canada, Turkey, and Mexico. She is a registered Professional Engineer in Canada and active in professional organizations such as Institute of Food Technologists and American Oil Chemists' Society (AOCS). Currently, she serves as a board member in the AOCS, Processing Division, and represents the division at the AOCS Technical Program Committee. She also serves as a member of the Oklahoma State University Food Science Graduate Program Coordination Committee.

Nurhan's primary research areas consist of: 1) Development of environmentally benign processing techniques for oil/oilseed extraction, refining, and fractionation; 2) Enhancement of lipid-based bioactive compounds in vegetable oils through processing; 3) Development of value-added products from agricultural by-products and waste streams; 4) Utilization of enzymes for oilseed processing and lipid modifications; 5) Evaluation of effect of breeding and genetic modifications on the nutritional components of oil-bearing agricultural materials.

Nurhan's research group includes one research specialist, four M.S. students, one postdoctoral fellow and three undergraduate student employees.

Pilot Plant

Purpose

The Pilot Plant facilities were designed with the needs of the Oklahoma food and agricultural products processing industry in mind; therefore, it fits all levels of the industry. The Center has pilot processing facilities for meat, cereals, dairy, and fruit and vegetables, as well as specific unit operations for thermal processing, drying, freezing, packaging, milling, and fermentation. Some of the services offered by the Pilot Plant facilities include training and demonstration, process system development and evaluation, new product development, equipment evaluation, evaluation of functional product ingredients, technology transfer, thermal process evaluation, and consumer market testing.

"Adding Value to Oklahoma"

Research Projects

Jacob Nelson

Highlighted Project

Title: Characterization of Katahdin Sheep Growth, Finishing, and Sensory Attributes

Collaborators: Chuck Willoughby, Darren Scott, Guadalupe Davila-El Rassi, Gerald Fitch - Animal Science, Mike Brown - USDA-ARS, Grazinglands Research Station, El Reno, OK

Funding: Producer sponsors, USDA-ARS, FAPC

Objective: Compare the production of Katahdin sheep for meat against traditional sheep meat breeds. Katahdin sheep are traditionally raised for hair/wool production.

Work to be Completed: Still in the growing/feeding phase.

Other Projects

Title: Alternative Methods for Dehairing Freshly Slaughtered Pork Carcasses
Collaborators: Chance Brooks and Kendra Payne-Hooper - Animal Science

Title: Effects of Carbon Monoxide Atmospheric Packaging on Fresh Beef Color Stability
Collaborators: Brad Morgan and Kendra Henry - Animal Science

Title: Determination of the Napole Gene Effect on Fresh Pork Quality
Collaborators: Brad Morgan and Chad Carr - Animal Science

Title: High-Pressure Oxygen Treatment Effects on Visual Characteristics of Dark Cutting Beef
Collaborators: Brad Morgan and Keith Charmasson - Animal Science

Title: Effects of Enhancement Technologies and Modified Atmospheric Packaging on Fresh Beef Shelf Stability
Collaborators: Brad Morgan and Jason Jordan - Animal Science; National Beef, Liberal, KS; Nu-Meat Technology, South Plainfield, NJ

Title: Cooperative Beef Research Trials - Effects of Feeding Regimens on Whole Body and Carcass Compositions
Collaborators: Gerald Horn and Matt McCurdy - Animal Science, John Wagner - Continental Beef Research, Lamar, CO.

Technical Assistance Projects

David Moe

Highlighted Project

Client: Bar-S Foods

Assistance Requested: Process product samples to evaluate new product concepts, revised ingredients, and cost reduction.

Work Performed: Approximately 20 processed meat samples were produced in 2003.

Economic Returns: Sustain and/or increase output of Oklahoma processing plants.

Other Projects

Client:	Collaborators:
Granna's	Tim Bowser
Blessetti's	Corey Stone
	William McGlynn
	Darren Scott
Pep in the Mustard	Corey Stone
	Darren Scott
	Tim Bowser
	William McGlynn
Big Time Sports Drink	Jim Brooks
	Darren Scott
	William McGlynn
Orient Flame	Corey Stone
	Darren Scott
Willow Pond Vineyards	William McGlynn
	Darren Scott
CJ Nutricon	Tim Bowser
Judy's Backpacker Jerky	Chuck Willoughby
Udder Farms	Tim Bowser
Carneco Foods	
Loeb Enterprises	Jim Brooks
Ol' Santa Fe Tamale Co.	
Cusack Meat Market	Jason Young
	Tim Bowser
Rath Inc.	Jason Young
Chefs Requested Foods	Siobhan Reilly
	Jacob Nelson
Bar 19 Foods	
Hodges Meat Co.	Jason Young

Technical Assistance Projects

Jacob Nelson

Highlighted Project

Client: Vector, USA

Assistance Requested: Pilot processing for new casing applications, with specific emphasis on infrared heating to initiate color change on cooked meat.

Work Performed: Jake Nelson and David Moe produced boneless hams into various smoke-impregnated nylon casings (approximately 4-inches thick) to make 4- to 6-pound chubs. After manufactured, the chubs were processed in the impingement oven (smoke house) as well as in the submerged water steam-jacketed water bath (large wet processing room). Extended heating in submerged water indicated that product will change to a desirable color (i.e., smoke) as expected. However, the short duration, high-temperature treatment accommodated by the infrared grill in Peter Muriana's laboratory was not sufficient to create the same color change.

Economic Returns: Unknown

Other Projects

Client: Bar-S Foods
Collaborators: David Moe, Rasool Rabbani - Bar-S Foods

Client: American Breed Association
Collaborators: Rodney Holcomb

Client: Cherokee Locker
Collaborators: Jason Young, Tim Bowser

Client: Viskase Corporation
Collaborators: David Moe, Jake Nelson, Roy Escoubas, Paul DuCharme - Viskase Corporation

Client: No Man's Land Beef Jerky

Client: Natural Beef
Collaborators: Yates Adcock - Natural Beef

Client: North Central Beef, L.L.C.
Collaborators: Rodney Holcomb

David Moe

Biography

Pilot Plant Manager

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David Moe received his B.S. degree from the University of Minnesota and M.S. degree from Kansas State University. David has more than 30 years experience in the food industry, with a focus on processed meat products and systems.

David served as Director of Research and Development for Wilson Foods. His responsibilities included new product development, equipment and system evaluation, technical support to marketing, cost containment, and quality systems for the full range of Wilson products.

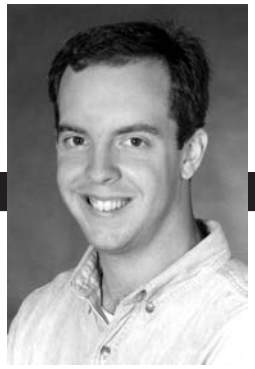
David has developed numerous products and processing systems, including tailored products and systems for industrial and foodservice markets; some of which have become benchmarks for the industry.

David joined the FAPC in 1997 as Pilot Plant Manager. He coordinated the start up of the Center's pilot processing facility. David currently works with Oklahoma entrepreneurs and industry to facilitate adding value to Oklahoma agricultural commodities through further processing. Typical projects may involve recipe scale up to commercial application, cost analysis, ingredient evaluation and sourcing, equipment evaluation, setting process parameters, and processing product for market evaluation. He also serves as a resource for food safety, labeling, regulatory, and other issues.

David has led hands-on processing sessions at the Oklahoma Beef Quality Summit, Pork 101, and for other groups and participates in workshops including HACCP training.

Jacob Nelson

Biography



Meat Processing Manager

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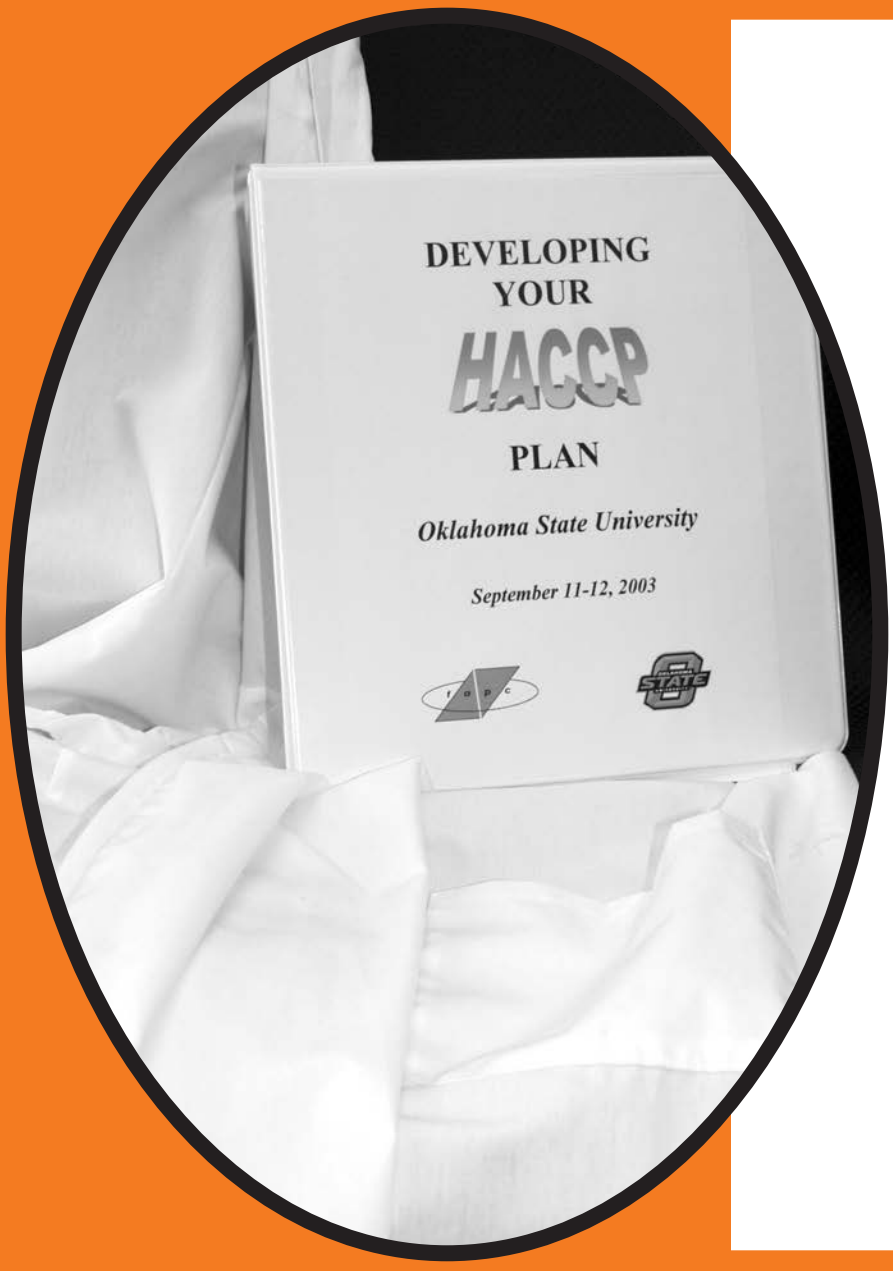
Jacob Nelson received B.S. and M.S. degrees in Animal Science and Food Science, respectively, from Oklahoma State University. Jacob assumed his position with the Center in June 1997.

His responsibilities primarily include the coordination of meat processing activities in the Center's pilot plant, cooperating with other faculty/staff to meet the technical needs of meat processors in the state, and assisting processors with USDA regulatory compliance.

Jacob also has obligations to OSU's Department of Animal Science, with regards to numerous research, extension, and academic teaching activities within the meat science discipline.

Quality Control and Assurance



Purpose

FAPC is committed to helping Oklahoma's producers and processors incorporate quality management into their operations. In recent years, there has been growing pressure for companies to meet requirements of legislation and the quality assurance practices of customers. Programs relating to HACCP, GMPs, and Sanitation and Quality Systems are forcing food companies to take a look at how they manage quality. The FAPC can use its diverse team of individuals to provide assistance, guidance, interpretation of regulations, and workshops to give Oklahoma's producers and processors the tools to incorporate sound quality management practices into their operations.

"Adding Value to Oklahoma"

Technical Assistance projects

Jason Young

Highlighted Project

Client: Mountain View Processing

Assistance Requested: HACCP Assistance

Work Performed: 1) Provided Mountain View Processing assistance in the regulatory and design issues of their HACCP Plans. 2) Mountain View Processing had multiple HACCP Plans for several individual products. The Center was able to demonstrate a method to combine several of the HACCP Plans. 3) Several regulatory requirements were not being met within the HACCP Plans and record keeping documents. These issues were discussed and corrected. 4) The Center provided several examples of documents so that Mountain View Processing was able to gain a better understanding of the regulatory requirements. Mountain View Processing was proactive in taking the assistance and information. The FSIS conducted a Food Safety Assessment in December. The Food Safety Assessment was positive and no enforcement actions were taken.

Other Projects

Client:	Collaborators:
Cusack Meats	Siobhan Reilly
Carl's Chili	
Cook's Processing	
Country Home Meats	
Country Squire Farms	
E.P.R.&D	
Gordon's Cow Tippin Jerky	
Granna's	Dave Moe
Greer Ranch House	
Head Country	
Jethro's Jerky	Dave Moe
McFerron's Quality Beef	Siobhan Reilly
Mikkelson Beef	Dave Moe, Siobhan Reilly, Jake Nelson
Mitchell Sausage Rolls	
No Man's Land Beef Jerky	
Oklahoma Beef and Provisions	Dave Moe, Siobhan Reilly
Ol' Santa Fe Tamale	Dave Moe
Panhandle State University	
Peck's Custom Butchering	
Poultry Express	
Raw Hide Beef Jerky	
Schwartz Meats	Dave Moe, Siobhan Reilly
Tennery Meats	
Turner Brothers	
United Meat Production	Dave Moe
Walke Brothers	

Jason Young

Biography

Quality Management Specialist

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Jason Young is a quality management specialist at the Food and Agricultural Products Research and Technology Center. Jason joined the Center in May 2001, bringing 11 years of food industry experience in quality management. During those years, Jason extensively developed food safety (HACCP), sanitation, and quality systems programs for the Shawnee Milling Company and ADM Milling Company.

Jason received his B.S. degree in Milling Science from Kansas State University. He is an accredited lead instructor through the International HACCP Alliance and a Certified Quality Auditor-HACCP through the American Society for Quality.

Jason's program areas consist of quality systems, HACCP and food safety, and sanitation. The demands by the USDA-FSIS on the small and very small meat and poultry establishments have kept Jason busy on regulatory HACCP assistance.

Jason is part of the Center's HACCP team and helps to coordinate and present HACCP workshops and food safety roundtables for the food industry.

Sensory Evaluation

Purpose

Sensory Analysis specialists at the FAPC assist Oklahoma's small processors and entrepreneurs with the scale up and reformulation of products. They serve as a liaison between the test kitchen and the pilot plant. When it is not economically feasible to use the same ingredients, packaging or processing when manufacturing a commercially produced product, the Sensory Analysis specialists use sensory evaluation techniques to ensure that the product retains its consistency and value.

"Adding Value to Oklahoma"

Technical Assistance Projects

Darren Scott

Highlighted Project

Client: Big Time Sports

Collaborators: Tim Bowser, Jim Brooks, William McGlynn, Dave Moe

Assistance Requested: Client requested assistance in developing isotonic beverage.

Work Performed: Technical assistance was given in the areas of product development, formulation scale-up, nutritional labeling, and pilot plant production.

Economic Returns: Not determined

Other Projects

Client:	Collaborators:
Pep in the Mustard	Tim Bowser Dave Moe Corey Stone
Sue's Gourmet Pies	William McGlynn
LeBlanc Specialty Foods	Chuck Willoughby
Helen Okhuos	Chuck Willoughby Tim Bowser
Prairie Gypsies	William McGlynn
Margie Hensley	Corey Stone
Bedre Chocolates	
Head Country Products	
Camille's Café	

Darren Scott

Biography

Sensory Specialist

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Darren Scott is a Food Science Sensory Specialist with the Food and Agricultural Products Center, located on the campus of Oklahoma State University. Darren obtained both his M.S. and B.S. degrees in Food Science from the University of Arkansas (Fayetteville).

Darren's primary responsibilities at the FAPC are in the areas of product development and formulation scale-up, process evaluation, nutritional labeling, and sensory analysis in support of product development.

Value-Added Wood Products

Purpose

The FAPC is concerned with the physical and mechanical properties of wood products and value-added wood composites. Research areas include particleboard manufactured from eastern redcedar, overlaying quality of particleboard panels, and composite panel manufacture from underutilized species in Oklahoma.

"Adding Value to Oklahoma"

Research Projects

Salim Hiziroglu, Ph.D.

Highlighted Project

Title: Overlaying Properties of Particleboard Made from Eastern Redcedar

Collaborators: Corey Stone, Rodney Holcomb

Funding: FAPC-FRIP

Objective: To evaluate overlaying properties and surface characteristics of laminated particleboard manufactured from whole-tree eastern redcedar.

Executive Summary: The study showed that particleboard panels made from whole-tree eastern redcedar can easily be overlaid with melamine-impregnated paper. Based on the roughness measurement in this work, three-layer panels are ideal for overlaying or any other further application on substrate. It appears that both single- and three-layer panels did not show any deterioration and delamination as a result of high humidity exposure. Overlaying of such panels would provide a value-added economical incentive to convert a land management problem into marketable panels, which can be used as raw material in furniture and cabinet industry.

Salim Hiziroglu, Ph.D.

Biography

Wood Products Specialist

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Salim Hiziroglu received his B.S. degree in Forest Products Engineering from Blacksea Technical University, Turkey in 1979; M.S. degree in Wood Science from University of California, Berkeley in 1985; and Ph.D. in Forest Products from Michigan State University in 1989.

Salim worked as a Research Associate at Michigan State University prior to joining the Department of Forestry and the FAPC at Oklahoma State University. He also worked as a consultant for Midwest Universities Consortium for International Activities in Malaysia for more than one year as a Visiting Scientist at Istanbul University, Turkey, and University of Lulea, Sweden.

Salim's research focuses on value-added wood composite panel technology, physics, and mechanics of wood and wood products. In addition to his research and extension appointments, he also teaches wood products courses in the Department of Forestry.

Salim has received a Technology Transfer and Extension Award from the Oklahoma Division of the Ouachita Society of American Foresters. He also has presented papers in national and international conferences in the area of forest products.

Outreach Projects

Purpose

The Center offers a variety of educational and service programs tailored to the needs of the food and agricultural products processing industry. Center faculty and staff provide outreach programs, such as workshops, seminars, professional public presentations, tours, and educational displays to increase the awareness of the services of the Center.

"Adding Value to Oklahoma"

Outreach Projects

Food and Agricultural Products Center

Rodney Holcomb
Agribusiness Economics

Workshops: Basic Training, "Real World" Marketing, Financial Management

Speaking Engagements: AGEC 3323 - Agricultural Production Marketing and Sales, AGEC 3703 - Issues in Agricultural Policy, SUNUP interviews, Oklahoma Rural Community Opportunities Summit conferences, Field Day- USDA/OAES Research Station in Lane, OK, Ethanol In Oklahoma Meeting - Autry CareerTech Center, Initiative For Rural Oklahoma Conference, 2003 Food Distribution Research Society Conference

Publications: Packer Ownership Ban being Considered - *FAPC Flash*, Renewable Energy and Energy Improvement Grants Available For Agricultural Producers and Rural Businesses - *FAPC Flash*, Oklahoma-Texas Meat Processors Association newsletter reviewer, Consumer Perceptions of the "Made In Oklahoma" Marketing Initiative: 2002, F-578 Current and Changed Operating Characteristics of Oklahoma Meat Processors - Fact Sheet, FAPC-123 Resources for Oklahoma's Women in Business - Fact Sheet, Success Factors for Value-Added New Generation Cooperatives, Slaughter Cow and Bull Processing Feasibility Template, Steps to Commercializing Value-Added Business Idea, Sample Business Plan for Small Food Businesses, FAPC-124 Helpful Tips for Improving the Visual Appeal of Marketing Materials - Fact Sheet, Success Factors for Value-Added New Generation Cooperatives, Economic Impacts of the Oklahoma Food and Agricultural Products Research and Technology Center, Economic Impact of Firms Assisted by the Oklahoma Food and Agricultural Products Research and Technology Center, Case Study Assessment of the Firms Assisted by the Oklahoma Food and Agricultural Products Research and Technology Center, P-997 Attitudes of Cooperative Managers and Board Members Toward Value-Added Enterprises and New Generation Cooperative Structures, Primary Agricultural Product Demand in Post Communist Russia, Before the Bricks and Mortar: Case Study of a New Generation Cooperative's Planning Process

Other: USDA Small Business Innovation Research program reviewer and panel member, ESCOP/ACOP Leadership Development Program Class XII Graduate, Agriculture Committee participant for Governor Henry's Economic Development Generating Excellence Program

Guadalupe Davila-El Rassi
Analytical Chemistry

Publications: Studies of Molecular Association of Glutenins and Maltodextrin in Solution by Capillary Electrophoresis, 8-Hydroxy-(+)-Delta-Cadinene is a Precursor to Hemigossypol in Gossypium Hirsutum

Outreach Projects

Food and Agricultural Products Center

Jim Brooks — Business Planning and Marketing

Workshops: Basic Training, Financial Management, "Real World" Marketing

Speaking Engagements: Tulsa Technology Center, Del City Economic Development Authority, Pauls Valley Rotory Club, Ardmore Development Authority, Anadarko Chamber of Commerce, Caddo County Industrial Authority, Bricktown Market Place, Oklahoma City Community College, Dale Rogers Training Center, MGM Capital Partners, Kerr Center Conference & Trade Show

Trade Shows: Associated Wholesale Grocers, National Grocers Association Annual Convention, Oklahoma State Chamber of Commerce, Made in Oklahoma Coalition Legislative Reception, Lincoln County Ag Expo, Midsouthwest Foodservice Show, Convenience Store Conference & Trade Show, Hale-Halsell Trade Show, Firelake Discount Foods Conference, Oklahoma State Fair, Women in Agriculture, Southwestern Oklahoma State University, Oklahoma Grocers Association

Publications: FAPC Helps Turn Hobby into Career - *FAPC Flash*, Oklahomans Develop Taste for the Food Industry - *FAPC Flash*, Center Helps Company Bring Gourmet Food to Oklahoma - *FAPC Flash*, Oklahoma Company Relies on Customer Service - *FAPC Flash*, FAPC-123 Resources for Oklahoma Women in Business - Fact Sheet

Corey Stone — Business Planning and Marketing

Workshops: Financial Management, Basic Training, "Real World" Marketing

Speaking Engagements: WIAO monthly meeting, Wewoka Chamber of Commerce

Trade Shows: Midsouthwest Food Expo, Ag Day at the Capitol, Hale-Halsell Food Show, AWG Food Show, OGA Food Show, CareerTech August Conference, Kerr Center Future Farms

Publications: Consumer Perceptions of MIO Initiative - *FAPC Flash*, FAPC-119 Food Labeling Made Simple - Fact Sheet, FAPC-123 Resources for Oklahoma's Women in Business - Fact Sheet, FAPC-124 Helpful Tips for Improving the Visual Appeal of Marketing Materials - Fact Sheet, Consumer Awareness of Made In Oklahoma

Outreach Projects

Food and Agricultural Products Center

Chuck Willoughby
Business Planning and Marketing

Workshops: Basic Training, Financial Management, "Real World" Marketing, Biosecurity of Food: Farm to Table

Speaking Engagements: FCS In-Service, OCES In-Service, Celebrate Ag Day, SUNUP Interview regarding Made In Oklahoma Coalition; SUNUP Interview regarding FAPC assistance to Oklahoma's value-added industry, OSU Career Day

Center Tours: Greater Oklahoma City Chamber of Commerce, ODAFF Meat Inspection Service, Northwest Texas International Trade Center, OSU College of Education's Gear-Up Program, Farm Credit Services, Cedar Hill Seasonings Company, Initiative for the Future of Rural Development Retreat, Kansas State University

Trade Shows: World Congress Expo, Ag Day at the Capitol, Midsouthwest Foodservice Show, Major County Fair, Oklahoma Convenience Store Association Show, Hale-Halsell Trade Show, Oklahoma CareerTech Expo, State Fair of Oklahoma, Tulsa State Fair, Oklahoma Grocers Association Show, Agriculture Associates Annual Meeting & Expo

Publications: Economic Impact of the Firms Assisted by the Oklahoma Food and Agricultural Products Research and Technology Center, Economic Impacts of Made In Oklahoma Coalition Members Companies on the Economy of Oklahoma, Consumer Perceptions of the Made In Oklahoma Marketing Initiative: 2002, The Economic Impact of Made In Oklahoma Coalition Member Companies on Oklahoma's Economy: 2002, Made In Oklahoma Helps Food Industry - *FAPC Flash*, FAPC-119 Food Labeling Made Simple - Fact Sheet, Bricktown Offers Market Opportunity for Entrepreneurs - *FAPC Flash*, Consumers Looking to Local and Store Brands - *FAPC Flash*, Health Food Trends are Becoming Increasingly Popular - *FAPC Flash*, Economic Impact of the Firms Assisted by the Oklahoma Food and Agricultural Products Research and Technology Center, FAPC 123 Resources for Oklahoma's Women in Business - Fact Sheet, FAPC-124 Helpful Tips for Improving the Visual Appeal of Marketing Materials - Fact Sheet, A Case Study Evaluation of Firms Assisted by the Oklahoma Food and Agricultural Products Research and Technology Center

Outreach Projects

Food and Agricultural Products Center

Patricia Rayas-Duarte
Cereal Chemistry

Workshops: Elevator Managers Business Conference

Speaking Engagements: 25th Anniversary of Food Science Department - University of Sonora, Mexico; Annual Customers Meeting - Balchem Encapsulates, New Hampton, N.Y.; Quality Aspects of Wheat in Relation to Baking Properties - Universidad Federal de Santa Catarina, Brazil; Hard Red Winter Wheat Quality: 2003 Crop Year and Soft Red Winter Wheat Quality: 2003 Crop Year - U.S./Mexico Wheat Transportation and Logistics Forum, Puebla, Mexico; Oklahoma Louis Stokes Alliance for Minority Participation Program, AACC Annual Meeting in Portland, Institute of Food Technologists Annual Meeting, Cereal Chemists Pacific Rim Conference

Publications: 2003 Oklahoma Hard Red Winter Wheat Crop Survey; FAPC - 125 The American Diet – How Fats and Grains Affect Your Health and Weight - Fact Sheet; Health Food Trends are Becoming Increasingly Popular - *FAPC Flash*; Studies Find MSG is not Harmful to Health - *FAPC Flash*; Development of a Biscuit with Added Fiber - *FAPC Product Profiles*; Estimation of HRW Wheat Heat Damage by DSC, Capillary Electrophoresis, Photoacoustic Spectroscopy and Rheometry; Studies of Molecular Association of Glutenins and Maltodextrins in Solution by Capillary Electrophoresis; Microwave Treatment of Flowing Grain for Disinfestations of Stored-Product Insects; Registration of "Intrada" Wheat; Registration of "Ok101" Wheat; The Effect of Mixing and Wheat Protein/Gluten on the Gelatinization of Wheat Starch; Changes of Polymeric Polypeptides Properties as a Function of Storage Temperature and Time

Danielle Bellmer
Food Engineering

Workshops: Reaching Engineering and Architecture Career Heights Program

Speaking Engagements: Institue of Food Technologists Annual Meeting, American Society of Agricultural Engineers

Publications: Effect of Pre-Cut Sanitizing Dip and Water Jet Cutting on Shelf Life of Fresh-cut Watermelon; In Vitro Tensile Strength of Four Monofilament Absorbable Suture Materials in Sterile and Infected Canine Urine; Glucose Fermentation in the Presence of Linoleic, Oleic, and Stearic Acids by a Mixed Culture

Outreach Projects

Food and Agricultural Products Center

Timothy Bowser
Food Engineering

Workshops: Biosystems and Ag Engineering Extension In-Service

Speaking Engagements: 2003 American Society of Agricultural Engineers Annual International Meeting, BAE 1012 Class Project

Publications: Steam Infusion Heating, Steam Injection Heating, Design Parameters for Operation of a Steam Injection Heater Without Water Hammer when Processing Viscous Food Products, Potential Application of a Direct Gas-Fired Water Heater for "Flash Pasteurization" of Microbially Contaminated Food Processing Streams

William McGlynn
Horticulture Processing

Workshops: Non-Meat HACCP Workshop

Speaking Engagements: Oklahoma and Arkansas Horticulture Industries Show, OSU Pecan Management Class, OSU Vineyard Management Class, Oklahoma Pecan Grower's Association Annual Meeting, Initiative for the Future of Rural Oklahoma

Publications: Acrylamides Present in Baked, Fried Foods - *FAPC Flash*

Stanley Gilliland
Food Microbiology

Workshops: "Biosecurity of Food: Farm to Table" Food Safety Symposium

Speaking Engagements: Institute of Food Technologists

Publications: Probiotics Provide Benefits for Livestock - *FAPC Flash*, Antagonistic Actions of Cells of *Lactobacillus delbrueckii* ssp. *lactis* toward Pathogenic Microorganisms in Fresh Meat Systems, Evaluation of *Lactobacillus delbrueckii* ssp. *lactis* as a Biological Control Agent for Pathogens on Fresh-Cut Vegetables Stored at 7˚C, Production of Conjugated Linoleic Acid by *Lactobacillus acidophilus* and *Lactobacillus casei* of Human Intestinal Origin, Binding of Bile Salts by Soluble Fibers and Its Effect on Deconjugation of Glycochotate by *Lactobacillus acidophilus* and *Lactobacillus casei*, Bacterial Direct-Fed Microbials in Ruminant Diets: Performance Response and Mode of Action, Influence of Whey Protein Hydrolysates on Growth of Probiotic Organisms in Yogart, Evaluation of Cells of *Lactobacillus delbrueckii* ssp. *lactis* RM2-5 and *Pediococcus acidilactici* D3 as Biopreservatives on Fresh-Cut Cantaloupe at 7˚C, Probiotics Chapter in Encyclopedia of Food Science and Nutrition, Effect of Growth Conditions on the Morphology and Cellular Fatty Acid Composition of *Campylobacter jejuni*

Outreach Projects

Food and Agricultural Products Center

Peter Muriana
Food Microbiology

Workshops: Food Safety Symposium, Basic HACCP, Advanced HACCP, Food Safety/HACCP Roundtable

Speaking Engagements: SUNUP Media Interviews, ANSI 1133 Fundamentals of Food Science, Institute of Food Technologists Annual Meeting, Koch Equipment, Tyson Foods, Hormel Foods, Farmer John's

Publications: Flash Pasteurization of Contaminated Streams Using a Direct Gas-Fired Water Heater, Radiant Heat Pre-Package Surface Pasteurization of RTE Deli Meats, Comparison of the Standard Brands and Armour Hydrogen Peroxide-Based Methods for Pasteurization of Egg White, Pre- and Post-Package Pasteurization of RTE Deli Turkey Products

Other: Interdisciplinary Food Science Graduate Program Committee; Biological Sciences Group I Nomination Committee Chair; Reviewed papers for Applied and Environmental Microbiology, Food Microbiology, Journal of Dairy Science, Int. J. of Food Mircobiology

Siobhan Reilly
Food Microbiology

Workshops: HACCP Roundtable/Food Safety Forum, Basic HACCP, Advanced HACCP, Non-Meat HACCP

Speaking Engagements: INIFAP-MIAC Workshop on Food Safety - Jiutepec, Morelos, Mexico; *E. coli* Reassessment Workshop for Meat Processors - Kansas State University; Southeastern USA Association of Official Analytical Chemists Annual Meeting; Food Safety for Mexico - Durango and Gomez Palacio

Publications: Improved Techniques for Culturing *Campylobacter jejuni*.; Influence of Storage Temperature, Pre-cut Sanitizing Dip, Packaging Material, and Water Jet Cutting on Storage Life and Quality Retention in Fresh-cut Watermelon; Influence of Gaseous Atmosphere on Morphology and Cellular Fatty Acid Composition of *Campylobacter jejuni*; New Food-Protection Company Focuses on Safety and Quality - *FAPC Flash*

Outreach Projects

Food and Agricultural Products Center

Nurhan Dunford — Oil/Oilseed Chemistry

Speaking Engagements: National and International Scientific Conferences, Department of Plant and Soil Sciences In-Service Training

Publications: ADM Launches Fat-Fighting Cooking Oil - *FAPC Flash*, New Nutritionally Advanced Cooking Oils - *FAPC Flash*, International Discussions Brewing about GM Crops - *FAPC Flash*, FDA Announces New Rules on Food and Dietary Supplement Labeling - *FAPC Flash*, FAPC-126 Deep Fat Frying Basics for Food Services: Fryer, Oil, and Frying Temperature selection - Fact Sheet

Other: Reviewed grant applications for in- and out-of-state institutions, Reviewed several technical papers for journals, Acted as a Board Member and Technical Program Committee Representative for the American Oil Chemists' Society Processing Division, Acted as a member of the American Oil Chemists' Society and Japanese Oil Chemists' Society Joint Meeting Organizing Committee, Member of American Oil Chemists' Society Honored Student Selection Committee; Member of the American Oil Chemists' Society Processing Division Graduate Student Poster Competition Selection Committee; OSU Food Science Industry Club Junior Faculty Advisor and IFT College Bowl Team Coordinator, OSU Food Science Industry Club Senior Faculty Advisor and IFT College Bowl and Product Development Team Coordinator

David Moe — Pilot Plant

Workshops: Beef Quality Summit, Food Safety Roundtable, Non-Meat HACCP, Basic HACCP, Advanced HACCP, OTMPA Convention

Jacob Nelson — Pilot Plant

Workshops: Oklahoma Beef Quality Summit, Basic HACCP, Advanced HACCP, Food Safety Roundtable, National Livestock Grading and Marketing Association Workshop, Oklahoma/Texas Meat Processors Association Convention, National Pork Board's "Pork 101," Department of Animal Science Youth Field Days

Speaking Engagements: AMSA Reciprocal Meat Conference, Oklahoma Beef Council

Publications: Government Emphasizes Proper Animal Handling Facilities - *FAPC Flash*

Outreach Projects

Food and Agricultural Products Center

Jason Young
Quality Control and Assurance

Workshops: HACCP Roundtable/Food Safety Forum, Basic HACCP, Advanced HACCP, Non-Meat HACCP

Publications: FDA Proposes Regulation for Registering Food Facilities - *FAPC Flash*, Reminder: FDA Proposes Regulation For Registering Food Facilities - *FAPC Flash*, Allergen Control in Food Processing Plants - *FAPC Flash*

Darren Scott
Sensory Evaluation

Publications: National Legislation May Affect Ready-to-Eat Food Labels - *FAPC Flash*

Salim Hiziroglu
Value-Added Wood Products

Workshops: Forest Products Training Program

Speaking Engagements: National Conference on Grazing Lands, Eastern Redcedar Rodeo Fundamental of Timber Drying, Keynote Lecture at the Third Asia-Pacific Drying Conference in Bangkok

Publications: The Changes in Important Quality Properties of Continuous Pressed Laminates with Some Changes in Thickness and Press Parameters, Performance Management Systems Constructed Based on Business Processes Re-Engineering and Developing Some Suggestions, F-5045 Use of Wood Composite Panels as Substrate for Cabinet Manufacture - Fact Sheet, F-5046 Efficient Use of Bandsaws in Lumber Manufacture - Fact Sheet, Basic of Pressure Treatment of Wood

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