USDA Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE

Southern Regional Research Center

Enhancing Value and Growing the Future

1100 Allen Toussaint Blvd.
New Orleans, LA 70124

USDA HISTORY

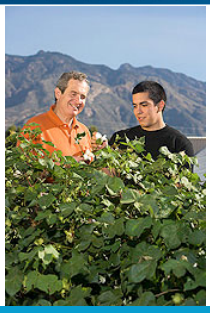
President Abraham Lincoln founded the U.S. Department of Agriculture in 1862, and called it the "People's Department". In Lincoln's day, 48 percent of the people were farmers who needed good seeds and information to grow their crops. Today, USDA continues Lincoln's legacy by serving all Americans and USDA remains committed to helping America's farmers and ranchers. We provide leadership on food, agriculture, natural resources, and related issues based on sound public policy, the best available science, and efficient management.

ARS MISSION

The Agricultural Research Service (ARS) is the U.S. Department of Agriculture's chief scientific in-house research agency, established in 1953. Our job is finding solutions to agricultural problems that affect Americans every day from field to table. ARS delivers scientific solutions to national and global agricultural challenges.

ARS is committed to delivering cutting-edge, scientific tools and innovative solutions for American farmers, producers, industry, and communities to support the nourishment and well-being of all people; sustain our nation's agroecosystems and natural resources; and ensure the economic competitiveness and excellence of our agriculture.

ARS also maintains global leadership in agricultural discoveries through scientific excellence.

SRRC HISTORY

The Southern Regional Research Center (SRRC) is one of the four regional research facilities of the USDA's ARS established by the Agricultural Adjustment Act of 1938. Completed in 1941 on a 39.9 acre site adjacent to City Park, SRRC employs approximately 125 scientists and technical support staff with an annual budget of approximately $24 million. As with the vision of its founding, SRRC has demonstrated that favorable impactful scientific investigation can significantly affect the welfare of American farmers, industries, and its citizens. Research of high national priority has helped to improve the environment and provide new and stable markets, high-quality fiber and nutritious, safe food, and industrial products at reasonable costs.

SRRC payroll is $16.25 million, leading experts to calculate its regional economic impact as $79 million annually. Coupled with additional purchases of equipment and supplies, the Center's overall impact to th e local economy is $88 million. SRRC research products have also made a significant national economic impact and the estimated return on investment value is 34%. Many of the conveniences we take for granted - such as frozen concentrated orange juice, wrinkle-resistant and flame retardant cotton clothing – we owe to the work done at SRRC.

Please visit our website at:
https://www.ars.usda.gov/southeast-area/new-orleans-la/southern-regional-research-center/

SRRC MISSION

The Southern Regional Research Center conducts national and international research on post-harvest processing, product enhancement, safety, and use of agricultural commodities, utilizing a multi-disciplinary team of scientists in six research units. Center programs align with Food Safety, Global Food Security, Climate Change, Biofuels, and Health/Nutrition priorities, as well as general Agricultural Sustainability needs to decrease our dependence on fossil fuel. General research objectives include achieving maximum use of agricultural products for domestic markets and export, developing new uses and processes for farm products and the means for promoting optimum human health and well-being through improved nutrition, and promoting product safety and quality.

The Center conducts a major effort to measure and improve upon the quality of products made from natural fibers, the main thrust being cotton, to provide a marketing advantage to the domestic cotton farmers and textile manufacturers in the global market.

Research also extends to developing new processes to improve efficiency and effectiveness of food-processing systems and reduction of processing costs; enhancing the quality and nutritional value of food products; developing efficient processing and quality in sugar for food and bioenergy production; prevention of food allergies, off-flavors in fish, and contamination of agricultural products by fungal toxins which may be affected by climate change and which affect food safety and global food security; evaluation and study of by-products of agricultural commodities and animals; and, application of recent advancements in biotechnology to promote use of agricultural commodities.

SOUTHERN REGIONAL RESEARCH CENTER RESEARCH IMPACTS:

Results from SRRC contribute to improving the way we live. Products produced make life healthier, safer, more convenient and better tasting. Thousands of industry jobs have been created. A sampling of significant research accomplishments that benefit our lives each day are highlighted below:

- Cotton durable-press clothing makes ironing obsolete
- Flame retardant textiles: clothing, batting, furniture, automobile seats, and mattresses
- Frozen orange juice concentrate
- Cotton fabrics that are: formaldehyde-free, dyeable, temperature-adaptable, stretchable, antibacterial, oil repellant, mildew and rot resistant
- Our science in your grocery cart includes: defatted peanuts, infant formula, dehydrated sweet potato flakes, sunflower seed butter, firmer pickles, rice bread, flan-like pudding, carbonated milk beverage, rice fries and low oil-uptake batter, rice bran oil, improved quality of cut fruits
- Cotton processing improvements from better textile machinery, efficient processing to innovative testing equipment helped save the U.S. cotton industry
- Emulsifiers, stabilizers, plasticizers, coatings, and texturizers in food and cosmetics
- Products from Southern pines: paints, varnishes, lacquers, turpentine, paper sizing, printing inks
- Development of new sugarcane varieties, management practices, and optimized processing methods
- Control of the carcinogen, aflatoxin from crops using biotechnology
- Reduction in peanut and other nut allergens

SOUTHERN REGIONAL RESEARCH CENTER RESEARCH IMPACTS:

- Environmentally friendly compounds to control Formosan termites and early detection baits
- Biochars and activated carbons from nut shells and poultry manure for waste water clean-up
- Encapsulation of biological control agents for safer pesticide application and weed control
- High calorie fat emulsion for intravenous feeding used by hospitals for postoperative care
- Prevention detection of off-flavor in catfish and meat
- Phytase improves animal feed by increasing phosphate bioavailability and reduces pollution from animal waste
- Process to culture taxol, a drug successful in treating cancer
- Methods to measure food flavor and aroma help food industry maintain high standards
- Elimination of endotoxin in cotton dust, the cause of byssinosis among textile workers
- Smart cotton wound dressing for chronic wound therapy
- Nonwoven cotton fabrics for disposable diapers, feminine hygiene, adult incontinence and wound treatment
- Discovery of anti-obesity, anti-cancer compounds called glyceollins found in soybeans
- Development of a non-woven cotton gauze wound dressing that quickly stanches bleeding and promotes healing, resulting in a commercial product used for battlefield and emergency response applications to trauma
- Breeding genetically improved cotton with longer and stronger fibers

CURRENT RESEARCH PROGRAMS AT SRRC

COMMODITY UTILIZATION RESEARCH UNIT

The Commodity Utilization Research Unit focuses on the development of new and improved agricultural products and processes through research. Our work focuses on two important research areas. They are:

1. Developing new uses of cotton seed products and byproducts.
2. Improving raw sugar production for food, fuel, and chemicals.

Cotton is grown in 17 states (e.g., Texas Georgia, North Carolina, and Mississippi). The fibers are separated from the seeds in a cotton gin. Cotton seed is valued as a U.S. crop at 1.3 billion dollars, and it is mainly used for its oil (for cooking) or animal feed. Our project focuses on the development of new uses for the oil, meal, and byproducts from cotton seed processing. We develop modified cotton seed oils with compositional properties that would be more nutritional. We study how breeding and environment have impacted the cotton seed size and storability. We are exploring the use of cotton seed protein for protein drinks and spreads, coating for paper, and as packaging film; and using cotton seed oil refining by-products as antioxidants and stabilizers for oils.

Sugar cane is grown in three states with tropical climate (e.g., Florida and Louisiana) and sugar beets are grown in ten northern states (e.g., Minnesota, North Dakota and Idaho). The crop values for sugar cane and sugar beet are 1.5 and 1.7 billion dollars. Our research investigates the use of additives during the processing and the use of various commercial and experimental biocides to control bacteria and molds. We find uses for molasses, sugar cane bagasse, sugar beet pulp, and processing filter cake. We investigate uses for these material as soil amendments, as filler in plastics, as raw material for biochar, and as starting points for production of fuels and chemicals.

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CURRENT RESEARCH PROGRAMS AT SRRC

COTTON FIBER BIOSCIENCE & UTILIZATION RESEARCH UNIT

Cotton Fiber Bioscience & Utilization Research Unit develops innovations to improve cotton fiber quality via genetic, genomic and breeding approaches; and new processes and technologies that broaden the utility of cotton fibers and enhance the value of U.S. cotton products. Research programs align with green energy priorities, as well as general agricultural sustainability needs to decrease our dependence on petroleum by production and maximum utilization of natural fiber products.

Current research areas focus on: 1) better and deep understanding of the biology of fiber development such as gene expression in the fiber, discovering the genetic and genomic mechanisms controlling fiber traits, and developing breeding and selection tools and innovative methods to enable "value-capture" from improved cotton fiber traits or products; 2) developing new germplasm resources and chemistries to improve fire retardant abilities on cotton products; and 3) developing technology to facilitate greater use of cotton fibers and commercial products in industrial and home use such as wipes, medical and personal care products. Such products will also find utility in the food safety and health fields. The overall result will help facilitate a sustainable U.S. cotton industry while providing life-enhancing cotton products.

Work is ongoing to develop fundamental knowledge regarding biology of fiber quality attributes such as strength, length, maturity and fire retardance or resistance; integration of nanoparticles into cotton fiber, novel cotton processing conditions, and the relationship between cotton quality parameters and nonwovens performance and sustainability and guidance toward new cotton varieties.

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CURRENT RESEARCH PROGRAMS AT SRRC

COTTON QUALITY AND INNOVATION RESEARCH UNIT

The Cotton Quality and Innovation Research Unit develops new processes, applications and product enabling technologies which facilitate the expanded use and enhanced value of U.S. cotton and works to increase the value and competitiveness of U.S. cotton by developing new technologies and methods for assessing the quality of cotton fiber at various processing stages from field to fabric.

Work focuses on assessment of the impact of new germplasms, harvesting, storage, and ginning operations have on fiber quality, processing efficiency, and final product quality. In addition, it provides for developing technology to facilitate greater use of cotton textiles and commercial products in industrial and home use such as wipes, furniture and mattress batting, medical and personal care products. The overall result will help facilitate a sustainable U.S. cotton industry while providing life-enhancing cotton products.

Current research focuses on developing new chemistries to improve fire retardant finishes on cotton, development of biomedical textiles, including bandages to be used for the treatment of chronic and acute wounds, antibacterial textiles to prevent disease transmission and cotton-based decontamination fabrics for chemical and biological warfare agents and food safety. Supercritical CO_2 and enzyme treatments that reduce waste and energy consumption are explored for innovative alternatives to traditional cotton processing. Research areas include: development of new rapid and accurate methods to assess the properties of cotton fiber, yarn, and fabric; determination of how fiber properties affect processing and how these properties affect the quality of yarn and fabric; development of economical, accurate and real-time methods to detect, quantify, and remove undesirable non-lint materials from fiber, e.g., sugars, waxes, metals, seed coat fragments, plant trash and field contaminants.

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CURRENT RESEARCH PROGRAMS AT SRRC

FOOD & FEED SAFETY RESEARCH UNIT

The Food & Feed Safety Research Unit conducts research to safeguard U.S. agricultural crops, such as corn, cottonseed, and peanuts, from toxic compounds known as aflatoxins produced by the fungus *Aspergillus flavus*. Aflatoxins are among the most carcinogenic natural toxins known according to the International Agency for Research on Cancer (IARC).

Our research focuses on eliminating pre-and post-harvest aflatoxin contamination of food and feed crops using a multidisciplinary approach including:

(1) Improve our understanding of the genetic regulation of aflatoxin biosynthesis, as well as (2) the effects of the changing climate on fungal infection and aflatoxin production; (3) Predictive modelling, using machine learning [ML] and artificial intelligence; [AI], to forecast impending breakout of aflatoxin contamination; (4) Evaluate *A. flavus* resistance in crop plants as affected by resistant genes, antifungal proteins, and microbiomes; (5) and enhance plant resistance to infection through classical and molecular breeding; (6) Employ biological control using ecologically safe and stable non-toxin producing *A. flavus* to reduce aflatoxin in the field; (7) Detect and remove contaminated kernels/seed from the food supply using advanced rapid imaging techniques; (8) Safety of nutritious proteins from plant sources free of fungal toxins during pod development, and storage; (9) And by combining all our tools and knowledge, we aim to develop integrated management practices to ensure the safety of our food and feed supply and enhance global food security.

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CURRENT RESEARCH PROGRAMS AT SRRC

FOOD PROCESSING & SENSORY QUALITY RESEARCH UNIT

The Food Processing and Sensory Quality Research Unit develops technologies that optimize the nutritional and health benefits, functional properties, and sensory qualities of agricultural commodities, thus enhancing their utilization.

A team of multidisciplinary scientists is tackling these challenges by: (1) investigating the biochemical mechanisms underlying effective texturization of plant proteins; (2) developing innovative methods for texturizing plant-based proteins; (3) defining sensory and other quality attributes in foods like rice and farmed fish pre- and post-processing; (4) developing processes to convert fish, rice, and their byproducts into high-value products; (5) creating technologies to predict food allergens and assess tree nut and peanut nutritional, sensory, and processing qualities; (6) enhancing our understanding of food allergens to reduce peanut and tree nut allergy risks; and (7) devising methods to produce fortified foods from rice, soybeans, sugarcane, and underutilized legumes for disease prevention.

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