
THE CENTER

U.S. Department of Agriculture
Agricultural Research Service
The Western Regional Research Center
800 Buchanan Street
Albany, CA 94710

Volume III, Issue 1

January 1997

New Research at the Western Regional Research Center

Industry often asks to be informed of Federal research in its earliest stages. In order to meet this request, we are preparing two special issues of *The Center* which highlight some of the newer projects at WRRC. Most of the projects highlighted do not yet have substantive results to report nor have patents been filed on any of this work. We hope that by sharing our plans with you at this early stage, we can stimulate interest in future collaborations.

Control of Pathogens on Food Surfaces

Bacterial contamination of poultry, fruits and vegetables is a major concern to the public, food processors and food safety researchers. *Salmonella* species and *Campylobacter jejuni* in poultry, for example, account for many cases of food-borne illness in the U.S. each year. Two new projects have been initiated at WRRC to identify and describe the biological and chemical processes which influence the attachment of pathogens to food surfaces. The two projects will work closely together.

The first project is focused on understanding and controlling the biological aspects of attachment. There are numerous environmental changes that may have an effect on attachment during food processing (e.g., temperature, pH, disinfectants, other microbes). Currently, researchers at WRRC are developing biochemical, microbiological, immunochemical and molecular biological approaches for determining the types of interactions that occur between pathogens and food surfaces during or after food processing.

In this project, anti-pathogen monoclonal antibodies and/or phage display antibody libraries will be produced and used to detect and monitor the amount and location of pathogens on food surfaces, the bacterial molecules involved in attachment, and screened for their ability to inhibit attachment. Information gained in these initial studies will be used to assist in developing model compounds to interfere with pathogen attachment. Methods are being developed to examine, biofilm formation on food surfaces, and to measure the types and viability of pathogens on food surfaces treated with candidate inhibitors or disinfectants.

The second project focuses on gaining an understanding of attachment in chemical terms and developing methods to control attachment. Possible approaches for controlling attachment could involve modifying food surfaces to prevent attachment, or targeting the bacteria themselves with specific reagents that interfere with, or down-regulate, the ability of bacteria to attach. Computational chemistry methods and combinatorial synthesis are expected to play important roles in these studies, along with spectroscopic techniques.

The projects will also develop new technologies for rapidly detecting and identifying pathogens based on laser-desorption and pyrolysis mass spectrometry. WRRC has acquired a new laser desorption mass spectrometer (MALDI-TOF) to pursue such studies. In preliminary work, twenty strains of *Salmonella*, *Campylobacter* and *E. coli*, analyzed directly from culture plates, yielded chemical profiles with surprising specificity in under three minutes per sample.

Contact for biological approaches:
Robert Mandrell
510/559-5829
E-mail: mandrell@pw.usda.gov

Contact for chemical approaches:
William F. Haddon
510/559-5803
E-mail: haddon@pw.usda.gov

Chemical and Physical Control of Microorganisms in Processing Water

WRRC researchers are developing chemical and physical technologies for controlling microorganisms in food processing water. The goal of this project is to help ensure product safety and quality while allowing for the reuse of water to minimize pollution and conserve energy.

The project has already developed applications of chlorine dioxide for poultry processing. Although work on chemical treatments continues, a new emphasis is combining chemical with physical means of treating water. Approaches to be utilized may involve removing solids by dissolved-air-filtration, membrane filtrations and disinfection.

In particular, WRRC researchers are working on a filtration process for the disinfection and reuse of cooling brine in bacon plants. If successful, the process could save bacon manufacturers from discharging brine and reduce pollution. It may also improve bacon quality. An in-plant testing protocol has received approval from the Food Safety and Inspection Service (FSIS) for filtration of bacon brine. The techniques developed may be applicable to the processing of other food products including poultry, other meats, fruits and vegetables.

For more information contact:

Lee-Shin Tsai
510/559-5878
E-mail: lstasai@pw.usda.gov

WRRC Patent Activity September 1996 -- January 1997

U.S. Patents Issued:

November 13, 1996, No.5,580,942;
Hypoallergenic Natural Rubber Products From Parthenium Argentatum (Gray) And Other Non-Hevea Brasiliensis Species
Inventor: Katrina Cornish

January 21, 1997, No.5,595,595;
Aquagel-Based Lightweight Concrete;
Inventor: Gregory M. Glenn

U.S. Patents Allowed:

December 10, 1996
Glutenin Genes And Their Uses
Inventors: Ann E. Blechl,
Olin D. Anderson

U.S. Patent Applications Filed:

November 26, 1996
Altering dough Viscoelasticity With Modified Glutenins
Inventor: Olin D. Anderson

December 20, 1996
Stable Germicidal Film-Forming Teat-Dip Solutions
Inventors: Ferenc Pallos,
Thomas C. Hemling,
Dominic W. S. Wong, Attila E. Pavlath

U.S. Provisional Applications Filed:

September 12, 1996
Restructured Fruit And Vegetable products And Processing Methods
Inventors: Tara H. McHugh,
Charles C. Huxsoll

Licenses Granted:

Hypoallergenic Natural Rubber Products From Parthenium Argentatum (Gray) And Other Non-Hevea Brasiliensis Species; granted to Yulex Corporation, Philadelphia, Pennsylvania; January 15, 1997

How Do Businesses Get Access to These Technologies?

WRRC is seeking private companies interested in licensing technologies which have been patented or for which a patent application has been filed. For other projects we are looking for companies interested in becoming our partners in Cooperative Research and Development Agreements (CRADAs). CRADA partners have the first right to negotiate an exclusive license for each invention which is made as part of the CRADA. We encourage small and minority-owned business to take part in our technology transfer programs.

The Center is a quarterly newsletter compiled by WRRC to alert potential partners of technology transfer opportunities.

Antoinette A. Betschart
Director
Phone: 510/559-5600
Fax: 510/559-5963
E-mail: abetschart@pw.usda.gov
mbsteinbock@pw.usda.gov

Martha Bair Steinbock
Technology Transfer Coordinator
Phone: 510/559-5641
Fax: 510/559-5963
E-mail: