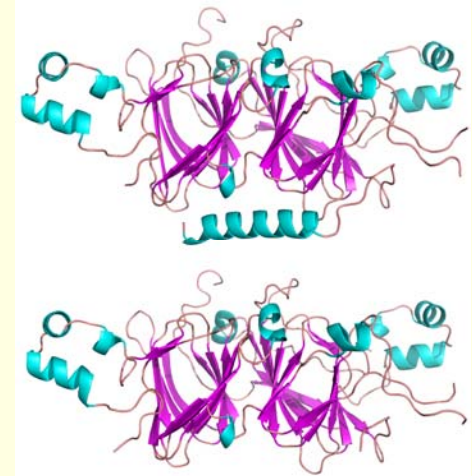




# CHEMICAL CONSTITUENTS AND ALLERGENS PLATFORM OVERVIEW



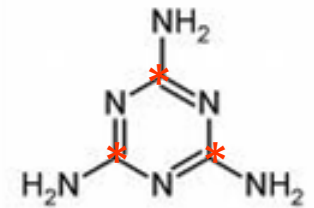
NCFST Technical Advisory  
Committee Meeting  
Thursday, May 14, 2009



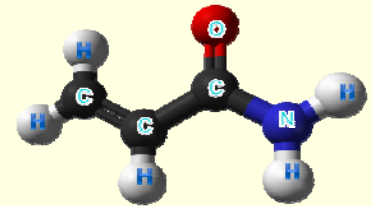
# Chemical Constituents and Allergens Platform

■ **OBJECTIVE:** Address and respond to needs & concerns of regulators, industry and consumers with respect to understanding toxins, contaminants, constituents and allergens

- Detection and analysis
- Formation
- Processing effects
- Removal and mitigation



Melamine



Acrylamide



# CC&A Platform – 2008-2009

To address & respond to needs & concerns of regulators, industry & consumers with respect to understanding

- Detection & analysis
- Formation
- Processing effects
- Removal & mitigation

## Chemical Constituents

- Toxin characterization
- Analysis
- Effects of processing on constituents
- Hot topics (e.g., furan, melamine, etc.)

## Allergens

- Cleaning and validation
- Cross-contact
- Effects of processing on antigenicity and allergenicity
- Allergen/epitope structural characterization

Chemical Inactivation of Ricin on Food-Contact Surfaces

Furan Levels in Home-Prepared Foods

Impact of Processing on Food Allergens

Best Practices for Allergen Cleaning and Validation

Platform

Program

Projects

# Cleaning and Validation to Prevent Allergen Cross-Contact



**PI:** Lauren Jackson (FDA/NCFST)

**Project Status:** Continuing

**Ranking:** 1 (7.68)

## Objectives:

1. Determine the effectiveness of dry cleaning procedures on removal of allergenic foods from a variety of food-contact surfaces
2. Study analytical methods for verifying the effectiveness of dry cleaning procedures
3. Study milk/juice cross-contact in a model dairy operation and determine the safety of cleaning solution reuse

## Benefits:

1. Will result in establishment of best practices for allergen cleaning/validation in wet and dry manufacturing environments
2. Determine the safety of cleaning solution reuse

# Impact of Processing on Food Allergens



**PI:** T.J. Fu (FDA/NCFST)

**Project Stats:** Continuing

**Ranking:** 2 (6.48)

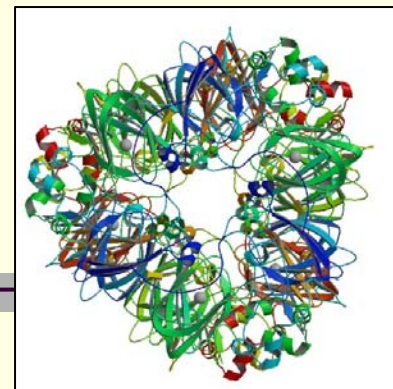
## Objectives:

1. Determine the effects of processing on allergen detection
2. Measure the impact of processing on allergenicity of food and ingredients
3. Identify processing approaches to reduce/eliminate allergenic residues from food-contact surfaces

## Benefits:

1. Will help FDA and food industry assess the allergenic potential of processed food
2. Provide baseline information with regard to FALCPA implementation and compliance
3. Project will result in effective allergen control measures

# Structural Characterization of Food Allergens



**PI:** Yuzhu Zhang (IIT/NCFST); T.J. Fu (FDA/NCFST)

**Project Stats:** New

**Ranking:** 4 (5.46)

## Objectives:

1. Determine the crystal structure of food allergens
2. Determine conformational epitopes on milk and peanut allergens
3. Measure the allergenicity of food proteins before and after elimination of conformational epitopes

## Benefits:

1. Enhance our understanding of the molecular basis of protein allergenicity
2. Provide a novel approach for development of foods with reduced allergenicity

# Best Practices for Cleaning/Sanitation of Nut Butter Processing Equipment

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**PI:** Lauren Jackson (FDA/NCFST), Lou Tortorello (FDA/NCFST)

**Project Stats:** New

**Ranking:** 5 (5.46)

## **Objectives:**

1. Determine the effectiveness of a variety of cleaning and sanitizing procedures for inactivating microbial hazards and removing allergenic food residues on nut processing equipment
2. Develop guidelines for effective cleaning and sanitizing of nut processing equipment

**Benefits:** Establish best practices for cleaning/sanitizing nut processing equipment to prevent microbial cross-contamination and allergen cross-contact

# Chemical Inactivation of Protein Toxins on Food-Contact Surfaces



**PI:** Lauren Jackson (FDA/NCFST); William Tolleson (FDA/NCTR); William Melchior (FDA/NCTR); Jack Cappozzo (IIT/NCFST)

**Project Status:** Continuing (NCFPD Funded)

**Ranking:** 3 (6.29)

## **Objectives:**

1. Identify cleaning/sanitizing treatments that result in inactivation of protein toxins (abrin and ricin) on food-contact surfaces in the presence and absence of food matrices.
2. Identify surrogates that can be used to study chemical inactivation of ricin and abrin
3. Compare ELISA detection to a cytotoxicity assay and an activity-based assay for measuring loss of abrin/ricin activity

## **Benefits:**

1. Provide guidance for effective inactivation of ricin and abrin in the presence of different classes of foods
2. Identify surrogates that could be used to validate inactivation procedures

# Washing Methods for Reducing the Levels of Chemical Hazards Associated with Fresh Produce



**PI:** Jack Cappozzo (IIT/NCFST)

**Project Status:** New

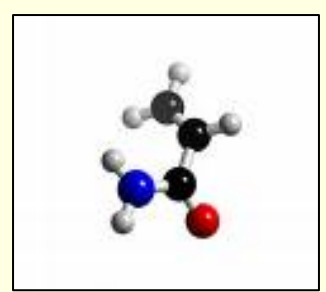
**Ranking:** 6 (5.21)

## **Objectives:**

1. Measure the stability of a variety of pesticides on produce
2. Determine the effectiveness of washing treatments alone on removal of pesticide residues on produce
3. Determine the efficacy of washing + ultrasonic treatment for removal of pesticide residues on produce

**Benefits:** Will enable the industry and government stakeholders identify risk mitigation strategies that can ensure the safety of produce

# Use of Ultrasound Processing to Reduce Acrylamide Formation in Food



**PI:** Jack Cappozzo (IIT/NCFST)

**Project Status:** New

**Ranking:** 7 (5.17)

## **Objectives:**

1. Study the effectiveness of enzyme (asparaginase) + ultrasound pretreatments on acrylamide formation in fried potato products
2. Determine the effectiveness of ultrasound-aided frying on acrylamide formation in fried potato products

**Benefits:** Will enable the industry and government stakeholders identify risk mitigation strategies that can reduce acrylamide in cooked potato products

# Detection of Clostridium Botulinum Toxin in Food Matrices by LC-MS-MS



**PI:** Jack Cappozzo (IIT/NCFST)

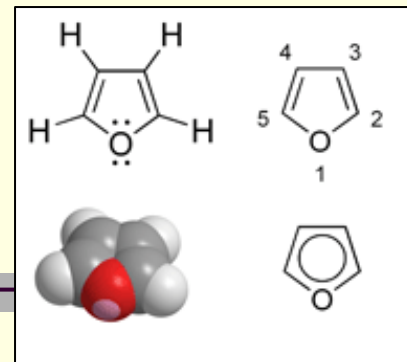
**Project Status:** New

**Ranking:** 8 (5.08)

**Objective:** Develop an LC/MS/MS method for detecting the presence of *C. botulinum* toxin in a variety of food matrices

**Benefits:** Will result in a method for confirming the presence of *C. botulinum* toxin in foods that is reliable and can provide results in <1 day.

# Furan Levels in Home-Prepared Foods



**PI:** Lauren Jackson (FDA/NCFST)

**Project Status:** Continuing

**Ranking:** 9 (3.70)

## Objectives:

1. Compare SPME/GC to a direct headspace method for determining furan levels in foods
2. Measure furan levels in food products
3. Determine the effects of cooking/preparation conditions on furan levels in selected foods.

## Benefits:

1. May result in methods for reducing furan levels during home food preparation
2. Allow for a better estimate of human exposure to furan from home-prepared foods