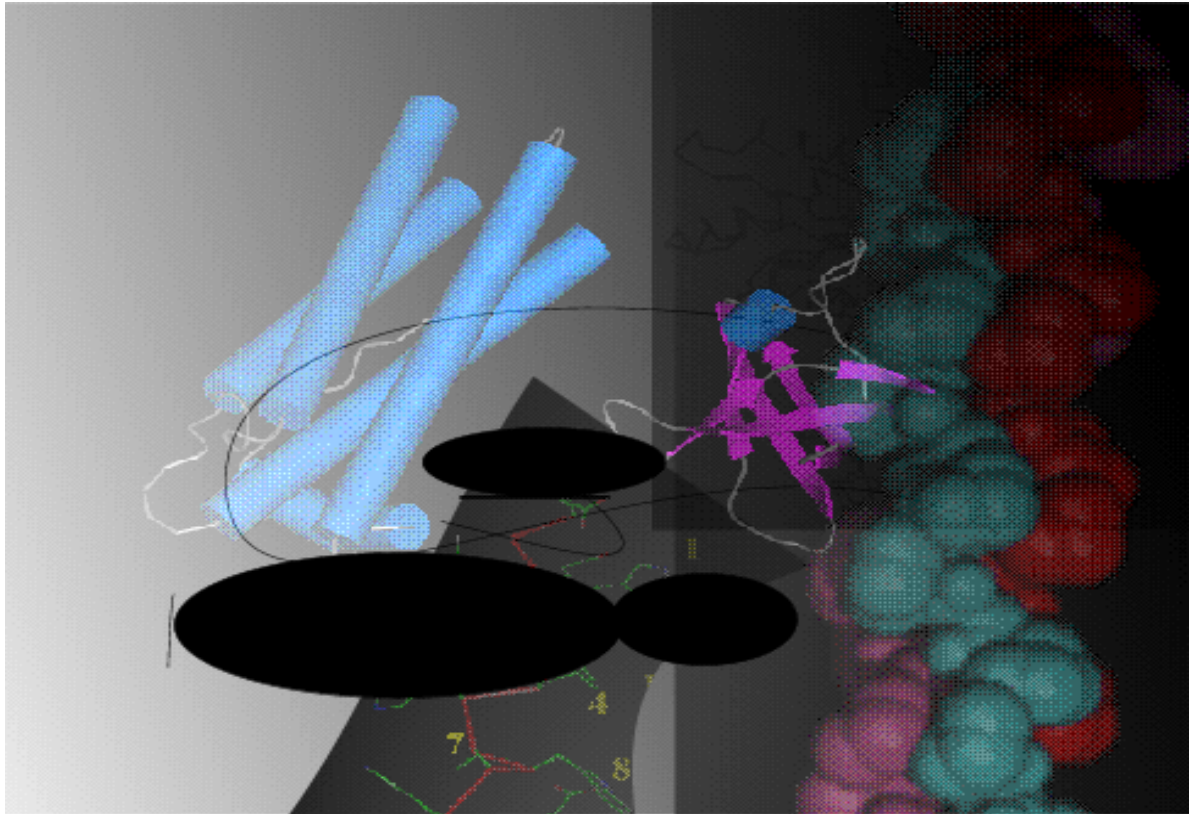


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Food Safety, Allergens and HACCP

A Primer for Food Processors



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Department of Food Science and Human Nutrition
College of Agriculture, Forestry & Life Sciences
224 Poole Agricultural Center
Box 340371
Clemson, SC 29634-037
Phone: (864) 656-5694 Fax: (864) 656-0331

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Felix Barron and Vivian Haley-Zitlin
Food Science and Human Nutrition Department
Clemson University

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INTRODUCTION

Most people working in the food service and food processing industries may remember an incident involving several deaths and dozens of sick people as a result of eating undercooked hamburgers contaminated with *E. coli* 0157:H7, a pathogen or injurious bacteria.

Shortly after this foodborne incident, the food industry, in particular meat, poultry and seafood processors, experienced an accelerated change of food laws and regulations related to food safety control. Currently, these industries have to comply with federal regulations (USDA and FDA) pertaining to HACCP, which stands for Hazard Analysis and Critical Control Points Systems.

HACCP is a science-based method with the main purpose of preventing contamination in foods. It focuses only on controlling the food safety aspects in a food processing operation as well as the other parts of the food chain, from farm to table.

The implementation of HACCP essentially consists on applying seven principles to every step in a food operation. The focus is on identifying and controlling three major types of health hazards: biological, chemical and physical. Pathogenic bacteria, pesticides and metal fragments are examples of these hazards respectively.

Food allergens, also health hazards, are usually proteins present in foods that can cause an allergic reaction in people; therefore, they should be controlled as part of a HACCP plan. The FDA has identified the following problem areas in the manufacture of foods that may result

in undeclared food allergens: (1) products that contain one or more allergenic ingredients, but whose label does not declare the ingredient in the ingredient label; (2) products that become contaminated with an allergenic ingredient due to the firm's failure to exercise adequate control procedures; (3) products that are contaminated with an allergenic ingredient due to the nature of the product or the process; (4) products that contain a flavor ingredient that has an allergenic component, but whose label only declares the flavor; and (5) products that contain a processing aid that has an allergenic component, but whose label does not declare it. According to FDA the following foods can cause serious allergic reactions in some individuals and account for more than 90 percent of all food allergies: peanuts, soybeans, milk, eggs, fish, crustacea, tree nuts and wheat. The FDA has issued an inspection guide to assist inspectors on preventing undeclared food allergens in food placed in commerce.

FOOD ALLERGIES AND FOOD INTOLERANCES

Food Allergy

Food allergy - immune system reaction to a substance in food; also called food sensitivity or food hypersensitivity.

Basic Facts:

Food allergy is a misunderstood term. Food Allergy Center surveys indicate that many more households believe a household member has a food allergy (14 to 17 percent) than is confirmed on controlled research studies.

True food allergies are most common in childhood. Approximately 5 percent of children have food allergies, but many children outgrow their food allergies. It is estimated that less than 2 percent of adults have food allergies. Adults rarely lose their allergies. Identification of the food causing the allergy, followed by removal from the diet is the prudent course of action in most instances.

How does an allergy occur?

1. Proteins from food (called allergens or antigens) are taken up from the gastrointestinal tract into the blood.
2. The body's immune system reacts with the allergens.
3. The body produces defensive agents such as antibodies (IgE) and histamines creating a physiological response.

A food allergy reaction occurs consistently after a particular food is eaten.

Food Intolerances

Food intolerance - adverse reaction to foods or food substances that does not involve the immune system. May be caused by reactions to chemicals in foods (MSG or sulfur in foods); enzyme deficiencies (lactose intolerance); diseases of the digestive system (obstructions); or idiosyncratic or even psychological reactions to foods. The following are some examples: sulfites; food additives, such as Tartrazine and MSG; and lactose intolerance (carbohydrate intolerance)

Sulfite Intolerance

May be caused by foods with high and intermediate levels of sulfites. Most likely to occur in the asthmatic

population. Reactions are dependent upon sulfite levels in food, individual sensitivity, and the food itself. Symptoms may include: bronchospasm, wheezing, dyspnea, acute asthma and anaphylaxis and loss of consciousness.

Basic Facts:

Sulfites are commonly added to foods to prevent browning, oxidation and microbial growth and as a bleaching agent. Since 1985, four deaths due to sulfur-containing compounds have been confirmed.

FDA banned sulfite uses on fresh fruits and vegetables other than potatoes that are served raw (since 1986). Labeling is required on packaged foods that have sulfite added as a preservative and on alcoholic beverages that contain 10 ppm or more sulfite.

Food processors need to know that sulfites destroy thiamin and are not allowed in foods that are significant sources of thiamin (meats, crab and some fish). More information on labeling is available at the FDA web site listed in the references.

Food Additives

Food additives are substances added to foods to perform some function. These include, among others, such substances as Tartrazine (FD&C No. 5) and MSG. Tartrazine is used commercially in soft drinks, yellow- or orange-colored foods, and medicines. Symptoms of tartrazine sensitivity may include hives, nausea, headaches and asthma. Persons with

sensitivity to acetylsalicylic acid (ASA) may have a reaction to tartrazine.

MSG is a naturally occurring substance that is present in tomatoes, mushrooms and cheese. Its use as a food additive is controversial but thought safe for most people. Reactions to MSG typically occur between 1 and 14 hours after ingestion and may include headache, nausea, abdominal distress, flushing and tightness around the face and chest.

Additional food additives, which have been linked with food intolerances, include azo dyes and other coloring agents, as well as preservatives. Some common examples of preservatives are benzoic acid, BHA and BHT, and sodium nitrate.

DIAGNOSIS OF FOOD ALLERGIES

There is no simple test for food allergies. The presence of an allergen or allergic reaction may be identified by one or a combination of several procedures.

Diagnosis of a food allergen can start with an inspection of the individual's medical and personal history. Physical symptoms should be identified, accompanied by the time of ingestion of the suspected food and start-time and duration of the symptoms. Suspected foods and the quantity consumed should be noted. This information can be coupled with the individual's family history to formulate a hypothesis on the allergen present.

A precise identification of food allergens will usually not only include a physical exam and thorough medical history but analysis of a food diary and

immunologic tests, which aid in the identification of the allergenic food(s). Immunologic tests include RAST (radioallergosorbent test), ELISA (enzyme-linked immunosorbent assay) and skin-prick tests. These tests narrow the field by eliminating potential allergens from consideration.

Identification of the suspected allergen(s) may then be eliminated from the diet (elimination diet). A food challenge follows, in which foods suspected of causing the allergic reaction are reintroduced one at a time, under medical supervision.

Evaluation by physicians with training in allergy and immunology is recommended for food allergy diagnosis.

GLOSSARY

Anaphylaxis: a severe allergic reaction to an antigen, causing airway closure, low blood pressure and lung spasms. In the absence of treatment, this condition ultimately leads to life-threatening shock (collapse due to insufficient blood flow in the body) and death.

Antibodies: naturally produced substances in the blood, which destroy or neutralize specific toxins or 'foreign bodies', such as viruses. They are produced by the white blood cells known as lymphocytes in response to exposure to antigens.

Bronchospasm: contraction of smooth muscles in the walls of the bronchi and bronchioles, causing narrowing of the airways.

Dyspnea: labored or difficult breathing.

Enzymes: complex proteins that act as catalysts in biochemical reactions.

Histamine: a chemical present in cells that is released during an allergic reaction.

Idiosyncrasy: a structural or behavioral characteristic peculiar to an individual or group.

Immune response: the reaction of the body to an antigen, such as an infectious agent, or to the tissues of another individual, as in the rejection of an organ transplant.

Immune system: the body's complicated natural defense against disruption caused by invading infections and cancers.

Intolerance: adverse reaction to a food, drug or other substance.

Sensitivity: the degree to which an organism is affected by a drug.

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