



The International Nut and Dried Fruit Council (INC) is the leading international organization on health, nutrition, statistics, food safety, and international standards and regulations regarding nuts and dried fruits. INC Members include more than 800 nut and dried fruit sector companies from over 70 countries.

International Nut and Dried Fruit Council

C/de la Fruita Seca 4 · Polígono Tecnoparc
43204 Reus, Spain
inc@nutfruit.org
www.nutfruit.org



World consumption of nuts keeps growing and giving reasons for optimism. In season 2018/2019, world tree nut production has been estimated at 4.5 million metric tons, 50% up from a decade ago, and peanuts at more than 37 million MT. Health-driven consumer trends have made waves in recent years becoming largely responsible for securing this positive performance.

Allergens Toolkit

Introduction

The number of people that suffers food allergy or food intolerance to some products is increasing. Approximately 15 million people in the United States have food allergies. The Food Allergy Research & Resource Program (FARRP) currently estimates the prevalence of IgE-mediated food allergies in the United States at 3.5 - 4.0% of the overall population (1). In children, it increased by 50 percent between 1997 and 2011. As for nuts, it is estimated that the prevalence of peanut and tree nut allergy in U.S. children more than tripled between 1997 and 2008 (2). In Europe, the prevalence of food allergy/intolerance in adults is approximately 5% (3). But first, it is necessary to clarify the difference between these two concepts: food allergy and food intolerance.

What is a Food Allergy?

Food allergies are caused by an adverse immune reaction (hypersensitivity) to certain food proteins, an abnormal response to a food induced by the body's immune system. When the immune system becomes sensitized to specific food antigens (usually proteins), food allergies occur (4). In adults, the foods that most often trigger allergic reactions are fish, shellfish, peanuts and tree nuts; in children, the list includes eggs, milk, peanuts, tree nuts, soy and wheat (5).

On the other hand, **food intolerance** is a hypersensitive reaction which is non-allergic, where immunological mechanisms have not been proven or are not responsible for the reaction (e.g. gluten or sulphite sensitivity and lactose intolerance). Causes of food intolerance include: absence of an enzyme needed to fully digest a food; irritable bowel syndrome; sensitivity to food additives; recurring stress or psychological factors; celiac disease. For example, lactose intolerance is caused by a deficiency of the digestive enzyme lactase and, although it may cause great discomfort, it is not life-threatening (2, 4).

How Common are Allergies?

Adverse health consequences due to allergic reactions to food, including food intolerances, in Europe are estimated to affect about 1-3% of the population and about 4-6% in children (6). In the United States the data are similar, approximately 2% of adults and about 5% of infants and young children are affected (7).

The prevalence of peanut allergy was estimated at 0.6% while the prevalence of tree nut allergies was estimated at 0.5% (2). People diagnosed with a nut allergy have to avoid consuming the food or substance and read ingredient labels carefully. In people with nut allergies, common reactions may include:

Skin	Respiratory tract	Gastrointestinal tract
<ul style="list-style-type: none"> · Atopic dermatitis · Urticaria · Angio-oedema 	<ul style="list-style-type: none"> · Asthma · Rhinitis 	<ul style="list-style-type: none"> · Oral allergy syndrome · Abdominal pain · Colic, nausea · Vomiting · Diarrhea · Constipation · Bloating · Gastro-esophageal reflux (heartburn) · Enteropathies · Failure to thrive
Eyes	Generalized (systemic)	
<ul style="list-style-type: none"> · Conjunctivitis · Watery eyes 	<ul style="list-style-type: none"> · Anaphylaxis (with all its complications) 	
	Central nervous system	
	<ul style="list-style-type: none"> · Headache · Abnormal behavior (ADHD), rare 	

Diagnosis

Skin-prick tests and/or blood tests are the most reliable tools to determine the presence of allergen-specific immunoglobulin E, an antibody that binds to allergens and triggers the release of chemicals that cause the symptoms. If those tests are inconclusive, the allergist or immunologist may order an oral food test to see how the organism reacts to the suspected allergy-causing food (8).

Labeling

There is no international legislation in relation to allergens and the list of allergens covered in the legal requirements is not exactly the same between countries. For example, the Codex Alimentarius Commission Committee on Food Labeling has listed the foods and ingredients that may cause severe reactions and most cases of food hypersensitivity. In section 4.2.1.4 of General Standards for the Labeling of Prepackaged Foods it states (9): “The following foods and ingredients are known to cause hypersensitivity and shall always be declared:

- Cereals containing gluten; i.e., wheat, rye, barley, oats, spelt or their hybridized strains and products of these;
- Crustacea and products of these;
- Eggs and egg products;
- Fish and fish products;
- **Peanuts**, soybeans and products of these;
- Milk and milk products (lactose included);
- **Tree nuts and nut products**;
- and Sulphite in concentrations of 10 mg/kg or more.”

The European Union Food Information to Consumers regulation requires packaged foods to have the allergenic ingredients information emphasized in the ingredients list, and food sold loose to have allergen ingredients information available. ‘Allergens’ refers to the 14 listed in the legislation and mentioned in the table below (10).

In the United States, the Food Allergen Labeling and Consumer Protection Act (FALCPA) identifies 8 allergens (7).

Allergen	CODEX	EU	USA	JAPAN*	AUSTRALIA
Cereals containing gluten	X	X	X	X	X
Crustaceans	X	X	X	X	X
Eggs	X	X	X	X	X
Fish	X	X	X		X
Peanuts	X	X	X	X	X
Soybeans	X	X	X		X
Milk	X	X	X	X	X
Nuts	X	X	X	X	X
Celery		X			
Lupine		X			
Mollusks		X			
Mustard		X			
Sesame seeds		X			X
Sulphur dioxide and sulphites	X	X			X
Buckwheat				X	

Source: Silliker Ibérica SAU. (*) In Japan, there are 7 allergens (those listed) whose presence must be stated on the label. For others a warning is recommended but not obligatory.

Key Aspects of Allergen Management

Food operators have to implement preventive measures to avoid or minimize the possibility of cross-contamination in the framework of their Hazard Analysis Critical Control Point (HACCP) plan, and food manufacturers must clearly label any product that contains an allergen (4). The use of dedicated equipment, part of the equipment or tools for the production with allergens is recommended, especially if they are not easy to clean. If it is not possible to use a dedicated line or equipment, there are other options such as performing specific cleaning and organizing the production taking into account the allergen content. The preventive measures, in particular the specific cleaning procedures, have to be validated to ensure their efficacy.

Suppliers	<ul style="list-style-type: none"> · Obtain raw materials information
Product development	<ul style="list-style-type: none"> · Take into consideration the allergen profile or the site/line before homologation · Validate the labeling of new products
Storage area	<ul style="list-style-type: none"> · Separate and identify allergenic raw materials · Storage at the bottom of shelves
Production	<ul style="list-style-type: none"> · Consider using dedicated sites, lines, equipment or tools · Implement a production schedule taking into account the different allergen profiles · Specific cleaning procedures · Labeling verification
Employees	<ul style="list-style-type: none"> · Training about allergens
Verification	<ul style="list-style-type: none"> · Establish a control plan to ensure the accuracy of the allergen information on the label · Evaluate the risk of employee contamination (clothes, food taken to the site etc.)

There are some initiatives, such as the Voluntary Incidental Trace Allergen Labelling (VITAL®), which can help companies to perform their risk assessment. VITAL® establishes the threshold, based on scientific criteria, above which a precautionary statement must appear on the label. Where such regulations exist, the precautionary statement must comply with the food-labeling laws of the country.

Preventive measures validation can be difficult due to the following issues: The first is that current regulations do not establish a threshold (this is true for the most part although there are some exceptions; the sulphur dioxide and the sulphites threshold in the EU is 10 ppm, for instance), the second issue is that there are no official methods of allergen detection described in the regulations (11).



Chart courtesy of Silliker Ibérica SAU.

New Findings

A landmark study called LEAP (Learning Early About Peanut Allergy) provided strong evidence that early introduction of peanuts may help prevent the development of peanut allergy in children. The study was published in 2015 and their results showed that in children between 4 and 11 months of age at high risk for peanut allergy, sustained consumption of peanut beginning in the first 11 months of life was highly effective in preventing the development of peanut allergy, compared with infants who avoided peanut consumption (12).

Resources

- **Alimentarius, C.** (1997). General Principles of Food Hygiene. CAC/RCP 1-1969. World Health Organization, Geneva, Switzerland, 1-31. Guidelines for the Validation of Food Safety Control Measures CAC/GL 69 - 2008.
- **British Dietetic Association (BDA).** (2014). Allergen Toolkit for Healthcare Catering.
- **Centers for Disease Control and Prevention (CDC).** Allergies.
- **Food and Agriculture Organization of the United Nations (FAO).** (1985). General Standard for the Labelling of Prepackaged Foods Codex Stan 1-1985.
- **Food Allergy Research and Education (FARE).** Tree Nut Allergy.
- **Global Standard Food Safety Issue 7.** (2015). Understanding Allergen Management.
- **NCASS-Nationwide Caterers Association Allergen Toolkit.** (2014).
- **Stiefel, G., Anagnostou, K., Boyle, R. J., Brathwaite, N., Ewan, P., Fox, A. T., ... & Clark, A. T.** (2017). BSACI guideline for the diagnosis and management of peanut and tree nut allergy. *Clinical & Experimental Allergy*, 47(6), 719-739.
- **U.S. Food & Drug Administration (FDA).** (2006). Food Allergen Labeling And Consumer Protection Act of 2004 Questions and Answers.
- **World Allergy Organization (WAO).** (2011). White Book on Allergy.
- **World Health Organization.** (2006). International Food Safety Authorities Network (INFOSAN) Information Note No. 3/2006 - Food Allergies.

References

1. **Food Allergy Research and Resource Program.** University of Nebraska.
2. **Food Allergy Research and Education (FARE).** Facts and Statistics.
3. **Madsen, C.** (1997). Prevalence of food allergy/intolerance in Europe. *Environmental toxicology and pharmacology*, 4 (1-2), 163-167.
4. **Europe, F. D.** (2013). Guidance on Food Allergen Management for Food Manufacturers.
5. **Medline Plus.** Food Allergy.
6. **European Food Safety Authority (EFSA).** (2004). Opinion of the Scientific Panel on Dietetic Products, Nutrition and Allergies on a Request from the Commission Relating to the Evaluation of Allergenic Foods for Labelling Purposes (Request Nº EFSA-Q-2003-016).
7. **U.S. Food & Drug Administration (FDA).** (2004). Food Allergen Labeling and Consumer Protection Act of 2004 (FALCPA) (Public Law 108-282).
8. **Nuts for Life.** (2006). Nuts and Allergy.
9. **Codex Alimentarius.** (1985). Labelling of Prepackaged Foods (CODEX STAN 1-1985).
10. **EU Regulation No. 1169/2011 on the provision of food information to consumers (EU FIC).**
11. **Voluntary Incidental Trace Allergen Labelling (VITAL).** The VITAL Program.
12. **Learning Early About Peanut Allergy.** (2015).

Acknowledgements: We would like to thank the American Peanut Council, Dr. Steve L. Taylor and Dr. Joseph Baumert, from the University of Nebraska-Lincoln, Food Allergy Research and Resource Program, and Mr. Carlos de Pablos, from Silliker Ibérica S.A.U./Merieux NutriSciences for their collaboration and support in the development of this toolkit.