

ALLERGEN TESTING AND MANAGEMENT

Food allergies affect 220-250 million people worldwide according to the World Allergen Organisation (WAO). Affecting 5-8% of children and 1-3% of adults the prevalence of allergies continues to increase with sensitisation rates to one or more common allergens approaching 40-50% amongst schoolchildren (WAO 2011).

Food allergies make consumers' lives difficult and are potentially fatal. In the USA, it was estimated that food allergies are responsible for 30,000 emergency room visits annually, leading to 2,000 hospitalisations and 200 deaths (WAO 2011). In a worldwide survey, conducted by the WAO, the British Society for Allergy and Immunology reported the prevalence of allergic disease in the general population had remained stable over the previous 10 years while 25% of both the adult and child populations suffer from one or more allergic diseases. The majority of countries responding to the same survey reported an increase in food allergies. No country reported a decline in food allergies over the last 10 years.

More than 160 foods and food additives are known to be able to cause allergic reactions in humans. Essentially harmless, an allergen has the potential to cause an adverse reaction in the human body's immune system.

Effectively, it becomes the food manufacturer's responsibility to identify allergenic ingredients within their product recipes, plus any that have the potential to contaminate the production process, through appropriate labelling.

FOOD ALLERGY, OR INTOLERANCE?

A food allergy is not the same as food intolerance. An allergy causes oversensitivity of the body's immune system. If the immune system is not involved in the reaction to a food then it is known as food intolerance. The quantity of a food/additive that a person needs to consume before the body reacts is also much lower for food allergies, where even traces can be enough to trigger the body's immune system into action.

ON THE INCREASE?

The causes of the increase and spread of allergic reactions have not yet been fully understood. Research, record-keeping and better communication between agencies and countries, combined with better diagnostics have led to more effective detection and faster recognition of allergies.

Hypotheses about the apparent increase in food allergies consider that the number of allergens has increased and the globalisation of the food market has extended the geographic reach of allergens too.

WHAT ARE THE MAJOR ALLERGENS?

Food, or food additives, with a high allergenicity (the degree to which a compound is able to trigger an allergic reaction) include: nuts, fish, cow's milk and pindas (peanuts).

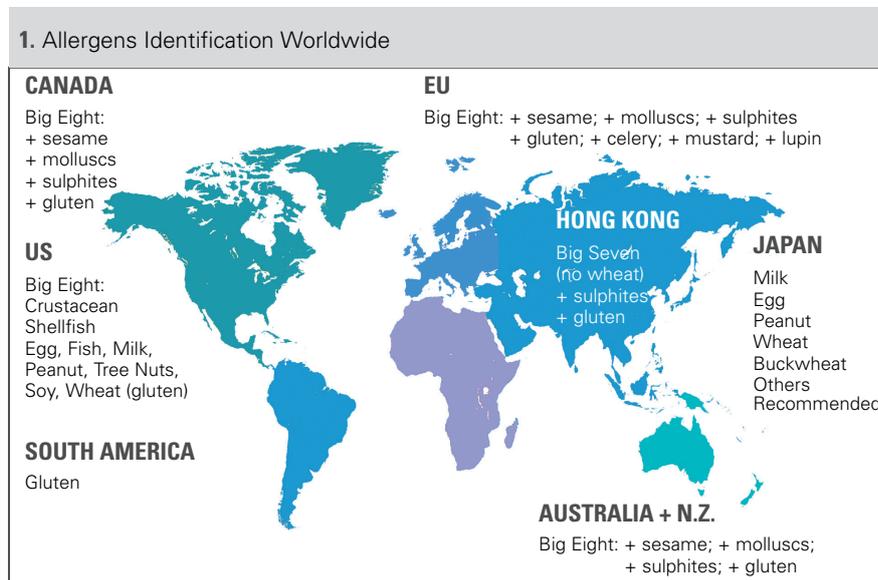
To protect consumers, many countries have identified a range of foods and additives and implemented legislation on their use and labelling to increase customer awareness and reduce risk. In

the US, the FDA requires the labelling of eight major allergens: crustacean shellfish; eggs; fish; milk; peanuts; soy; tree nuts, and wheat. Canada, the European Union (EU), Hong Kong, Australia and New Zealand use the same base list but have added further food items (see illustration 1).

MANAGING ALLERGENS

In many countries the law requires that allergens present in food be labelled to reduce the risk of accidental consumption. In addition, the risk of cross-contamination must be considered and safeguards put in place to minimise the possibility.

Allergen management requires an integrated approach and effective communication of allergen information throughout the supply chain. Good Manufacturing Practices (GMPs) assume the development and implementation of a prevention plan, so that the presence of critical allergens in the final product is prevented. HACCP plans aim to identify the critical points in a product's manufacture where additional measures



can be taken to minimise the presence of allergens in the final product. In the event that HACCP and GMP practices suggest that the implementation of those additional measures may not be enough to exclude the risk of cross contamination, then appropriate labelling must be introduced.

ALLERGEN LABELLING

Product labelling should help the consumer to make an informed choice about the product they are buying. Given that there is no cure for food allergies, sensitive consumers need to rely on avoidance, and this is dependent on accurate product labels.

Regulating food allergen labelling has been a complex process. In almost every market, legislation requires the mandatory declaration of allergenic compounds that are intentionally added into the product as part of its recipe.

The two main methods of labelling are the 'Contains' warning immediately after the ingredient statement and the listing of an allergen in parentheses immediately after the actual ingredient that contains the allergen. Local rules apply and manufacturers should always clarify the requirements for a given allergen in the product's destination market.

Where the possibility of cross contamination has been identified, through HACCP and GMP, then precautionary labelling advises consumers that a priority/critical allergen may be accidentally present in a food where it is not listed as an ingredient. This should only be used where cross contact is likely to occur and health risks may be anticipated.

While there is good cause for the use of "may contain" or similar warnings, they should only be employed when the risks have been assessed on a case by case basis. Overuse of these warnings in an inconsistent manner significantly reduces their effect, thereby exposing consumers to increased risk.

TESTING TIMES

The only way to be sure that the supply chain is operating effectively and as planned is product testing. Food manufacturers need to check not just the process flow, but the entire flow of materials, for cross contamination. Separation of a non-allergen process line from the personnel and equipment of an allergen product line is the best approach, but, if this cannot be achieved, then eliminating the risk of cross contamination is paramount.

Finished product and food contact surface testing verifies that HACCP and GMP practices and processes are in place and effectively implemented. There are currently four methods for testing:

ELISA (enzyme linked immunosorbent assay) testing can deliver a quantitative analysis relatively quickly (1-2 hours) and kits are available covering eight major allergenic compounds. Care should be taken with the interpretation of results and in some cases confirmation of the positive result might be necessary.

Dipstick & lateral flow testing can detect allergenic compounds as low as 5ppm. With a very rapid test time (5-10 minutes) it is easy to use, portable and available for many allergenic compounds.

PCR testing is a DNA based method. It can deliver very accurate results and is available for various allergens but it is high cost (equipment and staff), includes the risk of cross contamination, requiring specific DNA primer and primer design.

Mass spectrometry testing is highly sensitive and delivers qualitative and quantitative analyses. Equally, the implementation costs (equipment and staff) are high, it is time consuming and still under development.

Testing can be conducted either in-house or by an independent third party. Be sure to select the most appropriate testing method for the finished product being tested and that the chosen ELISA test kit detects processed allergens and not just the native forms.

HARMONISED APPROACH

Despite a range of national and regional legislation, the food industry can still be

frustrated by the lack of a harmonised approach to the issue of allergens, their identification, management and labelling.

However, the New Zealand and Australia Allergen Bureau has developed the Voluntary Incidental Trace Allergen Labelling system, VITAL. This systematic risk-based approach allows manufacturers to assess the impact of allergen cross contact and also assess the necessity and appropriateness of precautionary labelling.

According to the Food and Drink Federation (FDF) the industry has been asking for action levels for years. The need for consistency around allergen management principles and strategies, has led to the development of specific guidelines for allergen management practices published by FoodDrinkEurope in January 2013, with the aim of harmonising allergen management at a European level. At present no consistent figures are agreed and used across the food industry.

TRAIN & SUPERVISE

Experience has shown that the most important action the food industry can take is to ensure that all employees are trained in the allergen control programme. Most companies devise comprehensive and potentially effective programmes, but fail to train and supervise personnel to ensure its implementation.

With 160 foods and additives that can cause an allergic reaction in humans it is difficult to produce an item that someone in the world is not allergic to. The food industry needs to ensure that all ingredients are properly declared on packaging and prevent undeclared ingredients from contaminating products.

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