

Public protection – reliable allergen risk management

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Abstract. Consumers with potentially fatal food allergies are dependent on correct product labelling to protect their health. The food industry is responsible for providing every detail consumers need to make informed decisions. Considering public health, food suppliers have to monitor the presence of allergens, prevent cross-contamination and label products accurately. Allergen labelling of food products, drinks and non pre-packed food and drink products is clearly defined with legal regulations. To achieve this, a complete understanding of each product's allergenic ingredients is needed and cross-contamination of food with allergens must be avoided. Raw materials need to be checked, every ingredient must be verified and every single allergen has to be stipulated. A mislabeled product could be recalled at potential cost, financially damaging business and at the same time, negatively impacting brand and reputation.

1. Introduction

Food allergens affect the health and life of people with hypersensitivity caused by some food components, and such allergens are identified as a severe food safety hazard and their management is one of the fundamental areas of food safety management systems [1,2].

The Codex Alimentarius Commission (CAC) of the Food and Agriculture Organization/the World Health Organization (FAO/WHO) [3] recommends that allergen information should be placed on labels of food products. Furthermore, legal regulations in the United States (US) [4], the European Union (EU) [5] and in Serbia [6], define 14 food allergens that can cause allergic reactions or intolerance, and their distribution and that of food derivatives which contain them can trigger allergic reactions impose an obligation on food producers to label food in regard to food allergens. In European countries, the prevalence of food allergy is 1-3% of adults and 4-6% of children, while in the US, 4% of adults and 8% of children under the age of 18 suffer with food allergies [7].

2. The fourteen food allergens

The 14 listed allergens are, according to [5]:

1. Cereals containing gluten, namely wheat (such as spelt and Khorasan wheat), rye, barley, oats and their hybridised strains and products thereof, except: a) wheat based glucose syrups including dextrose b) wheat based maltodextrins c) glucose syrups based on barley d) cereals used for making alcoholic distillates including ethyl alcohol of agricultural origin;
2. Crustaceans and products thereof (for example prawns, lobster, crabs and crayfish);
3. Egg and products thereof;



4. Fish and products thereof, except: a) fish gelatine used as carrier for vitamin or carotenoid preparations b) fish gelatine or Isinglass used as a fining agent in beer and wine.
5. Peanuts and products thereof;
6. Soybeans and products thereof, except: a) fully refined soybean oil and fat b) natural mixed tocopherols (E306), natural D-alpha tocopherols, natural D-alpha tocopherol acetate and natural D-alpha tocopherol succinate from soybean sources c) vegetable oils derived phytosterols and phytosterol esters from soybean sources d) plant stanol ester produced from vegetable oil sterols from soybean sources;
7. Milk and products thereof (including lactose), except: a) whey used for making alcoholic distillates including ethyl alcohol of agricultural origin b) lactitol;
8. Nuts (namely almond, hazelnut, walnut, cashew, pecan nut, Brazil nut, pistachio nut and Macadamia nut (Queensland nut) and products thereof, except for nuts used for making alcoholic distillates including ethyl alcohol of agricultural origin;
9. Celery and products thereof;
10. Mustard and products thereof;
11. Sesame seeds and products thereof;
12. Sulphur dioxide and/ or sulphites at concentrations of more than 10mg/kg or 10mg/L (litre) in terms of the total SO₂ which are to be calculated for products as proposed ready for consumption or as reconstituted according to the instructions of the manufacturers;
13. Lupin and products thereof;
14. 14 Molluscs and products thereof (for example mussels, clams, oysters, scallops, snails and squid).

Eggs, fish, milk, peanuts, soy, shellfish, tree nuts, and wheat are the “big 8” food allergens, which have triggered more than 90% of the food allergy reactions in the US [8].

3. Allergen management in catering

Applying the basic principles of food safety management in the catering industry is based on understanding the nutritional allergies and food production processes leading to the development of systems that can support the production of food which contains or does not contain a particular allergen in circumstances where the risk for the consumer is minimized [9].

A modern approach to food safety management in the catering industry is most often based on the need for a particular risk to be completely preempted and reduced to an acceptable level, before it actually occurs in practice. Allergies and intolerances to foods are one of the security risks which are widely discussed in the food industry. The general view is that in the case of allergenic foods, it is unrealistic to talk about the possibility of zero risk [10,11], which makes it extremely important to set standards in the catering industry that will minimize this risk.

Precisely defined and consistent safety management standards for allergens lead to a consistent and sustainable food safety management in the food industry [12], but also in the production of products for consumption in catering facilities. Allergenic foods can be risky in two cases: when they are directly taken into the body alone or as an integral part of another product, or by cross-contamination of non-allergenic foods with allergenic ones during the food production process [13].

4. Risk management in the catering industry

In the area of risk management of allergenic foods in the food and catering industries, there is an irrational desire for zero risk tolerance that entails a complete avoidance of any food that is potentially a causative allergen [14]. However, the risk of cross-contamination by allergens during food production is present despite the efforts of food producers to comply with all the requirements of good hygiene and good manufacturing practice.

Predictive modeling in risk management of allergenic foods is significantly hampered by a poorly defined method of declaring the foods where the zero risk tolerance for allergens imposes on food producers, while labeling the food products, to use the term “may contain” [15]. Some stakeholders

are not convinced that the new labelling legislation provides sufficient information to food allergic consumers [16]. Due to fear of cross-contamination, in the absence of accurate precautionary i.e. “may contain” labelling, food allergic consumers are uncertain about product safety, and cannot always clearly understand or interpret the information on the food labels [17]. For food allergic consumers, unintentional exposure to allergens when eating outside in restaurants or catering outlets outside the home is particularly problematic, as unintentional exposures to problematic allergens can occur. The need to establish a reliable system for declaring, labeling and marketing of foods has caused a necessary step ahead in science, such as the determination of eliciting doses (ED) of allergenic food ingredients, which vary depending on individual predispositions and geographical determinants. For the safety of consumers, as the initial EDs of proteins in allergenic foods, the highest ones found by the research group of Allergen Bureau VITAL scientists in Australia were deemed suitable [14].

The VITAL 2.0 program has established reference doses of total allergenic protein intake and defined an action network of risk levels for allergenic foods, calculated using reference doses and reference quantities of food intake/portion size. By determining the reference doses, an effective basis of communication within the risk management of allergenic foods has been set up, which has enabled detailed identification, characterization and significantly easier risk management, weighting and selection, i.e. a detailed risk analysis.

Communication researchers have found that risk communication plays an important role in controlling and preventing negative consequences such as food allergy reactions in restaurants. Establishing proper communication between and among customers and food service employees could be one of the first and most important steps in preventing food allergy reactions in restaurants [18,19]. Proper communication among stakeholders would initiate increased attention to food preparation by service staff when serving customers with food allergies. Although there are other food allergy-related publications available, no research has been published regarding food allergy risk communication.

Researchers found that restaurant staff lacked knowledge regarding food allergens in the menu, ways to prevent cross contact, and the severity of food allergy reactions [20]. One study from the United Kingdom revealed that about 21% of the peanut-free meals that were prepared immediately after peanut-containing meals were contaminated with peanut or peanut protein. Researchers also found that restaurant employees' confidence levels were high even though their knowledge about serving customers with food allergies was not adequate [21]. Specifically, 70% of the respondents in this study felt that they could guarantee a safe meal, while 35% thought that fryer heat could destroy allergens and 25% thought it was safe to remove allergens from a finished meal [21].

Strict avoidance of food allergens and early recognition and response to allergic reactions are extremely important for individuals with food allergies to prevent fatal food allergy reactions [22]. To prevent potential food allergy reactions, customers with food allergies have used various strategies prior to and while dining out. For example, customers chose restaurants with which they were familiar and where they were known by the staff; avoided establishments and cuisines that are considered high-risk such as buffets or ethnic restaurants, and; checked online menus, ingredients, and allergen information before dining out [23].

Despite these prevention strategies, customers with food allergies have experienced communication challenges when dining out because some restaurant staff had insufficient knowledge about food allergies, did not understand special requests, or were not aware of the severity of food allergy reactions [23]. There is a lack of legislation or training guidelines focusing on the risk management of food allergies [11] and risk communication-related issues in restaurants. Yet most food handlers perceive the foodservice industry as a low-risk business, and this perception negatively affects their safe food-handling behaviors [24]. Therefore, food allergy risk communication can be used as a tool to reduce the chance of food allergy reactions caused by the mistakes of restaurant staff when serving customers with food allergies [25].

5. Conclusion

The main features of food allergens (a large number of foods that contain allergens, the minimum amount needed to trigger a reaction, the various spectra of symptoms and the small number of people suffering from food allergies) pose a great challenge to food manufacturers in developing a safety management plan. Safety management of food allergens must be focused on careful risk analysis throughout each segment of the food chain in the catering industry. Guidelines that point to potential risks must be ensured so that food allergens are either clearly and precisely defined or are not present in quantities that will endanger the health of consumers. All segments of the food chain in the catering facility must be monitored, from the design, through the source of foodstuffs, declarations and labeling within the supply, up to the safe food consumption and established accountability.

Foods that contain allergens have specific, characteristics health and safety risks. However, risks caused by allergens can be controlled and minimized using the developed methodologies within the context of other risks. The key basis for security management of allergens in a catering facility is communication – good consumer-to-customer and employee-supplier communication and interpersonal communication. However, the risks which are not under the control of allergen management are: 1) undeclared or wrongly declared allergens, and; 2) unverified allergies. Allergens in foods that are not properly labeled or are not recognizably highlighted can cause significant failures in the safety management system. Another risk that is almost impossible to avoid is that of the first occurrence of an allergic reaction. Because of this risk, there has to be a person in the catering facility at all times who has been trained to recognize such symptoms and respond to them properly and timely.

The factor that is most difficult to control and which can significantly affect food safety system is the human factor. Therefore, one of the primary management tasks in catering facilities is providing appropriate education and training to raise awareness of employees about the risks that could arise from allergenic foods and culinary products.

6. References

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