Food risk perception and responsibility in the eyes of consumers with allergic reactions to food

Abstract to the ESRC Social Contexts and Responses to Risk, Canterbury
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It was observed that even if each case of food risk is special, public policies dealing with food risk have shifted the burden onto the individual responsibility of consumers. It seems likely that this change meets with a different response in consumer groups and furthermore, a case of genetically modified food poses some questions with respect to how such public policies should be put into practice. In order to better understand these issues we have studied a perception of food risk and responsibility of those consumers who are allergic or intolerant to certain food.

A total of 800 persons, 400 allergic and 400 non-allergic, were recruited to answer a postal questionnaire study in Norway. The results suggest that experience of personal harm from food in the form of allergic or intolerant reactions can influence how people evaluate food risk. Allergic consumers were also inclined to take more individual responsibility for risk protection than consumers without allergies. Overall the results indicate that consumers are inclined to take an active role in food risk management, especially if they have been sensitised to food risk through adverse experiences.
1. Introduction.

Public policy dealing with food risk has to take into account an increasing number of consumers’ groups with special food needs. These special needs this time do not refer to personal taste or preferences, but to consumers’ need for special food or a need to avoid certain types of food in order to prevent adverse health reactions on a shorter or longer term. Examples of such groups are consumers that are allergic or intolerant to food, children or elderly people, people with gemochromatosis (excess of iron in blood) and others. Individualization of food policy may involve different consequences for the above-mentioned groups, and it can be expected that awareness about food risk, the information issue and the freedom to choose will be seen from the different context by the representatives of these consumers. The same is true with respect to responsibility for risk that is particularly important as we are talking about consumer groups that each represent a tiny section of the whole consumer group. Therefore, a construction of public policy will benefit from feedback from the representatives of the mentioned groups.

One possible approach to understand how it can be better done is based on the psychometric research. Psychometric paradigm approach applied to study food risk, has demonstrated that the main components responsible for variance in individuals’ perception are severity, “unknown” risk and number of people exposed (Sparks & Shepherd 1994; Siegrist 2003). Controllability of the hazard was also shown to be an important factor influencing food risk perception. In an UK study, an optimistic bias (and control of the risk) was estimated to be high for example for such hazards as caffeine, high sugar diet, alcohol, nutritional deficiencies and others (Sparks & Shepherd 1994). All these risks have something in common that they seem to be the result of consumers’ free choice and taking the risk is related mainly to the individual responsibility. Other types of food risk, such as GM food or pesticides are seen as “low- control” (Frewer et al 1994; Sparks et al 1994). This may imply that if labelling of GM food is introduced and consumers make their own choices about buying or not buying GM food, its acceptance will be improved. The choice to buy GM food can be motivated by personal benefits amongst others, better prices, or providing enhanced quality to improve or protect individual health.

Can relation to food risk be influenced also by specific individual conditions determining that the consumption of certain food causes an adverse reaction? Food allergy can be a good model to study this question. Food allergy has a strong component of individual responsibility as after experiencing allergy for the first time, in order to identify an allergen (or agent) in question an individual must make his own observations, record them and communicate them to a doctor who orders allergy tests. However, even after an allergen is identified, an affected person runs a risk from food consumption and he/she should be able to record a detailed list of ingredients to take responsibility for it. For this
reason, such individuals are dependent on those who produce food and regulate food safety. If a person with a food allergy or intolerance consumes a product without precise labelling (that may contain an undeclared allergen), he runs an *involuntary* risk due to his ignorance about risk. In fact, many allergic people did run involuntary risks while food labelling followed the so-called 25% rule, as only ingredients that constituted not less than 25% of the product had to be labelled.

The number of food allergic individuals is on the rise throughout the world. In this article we are interested in the perception of risk in the food allergic population; however, these risks share characteristics with several other conditions where individuals have to avoid certain food ingredients that can cause an adverse health reaction. Hence, people belonging to these groups need to be informed about food ingredients in all situations when they choose and consume food. Furthermore, a special policy approach needs to be developed for these groups. Besides those who have an allergic reaction to different allergens in food, the same problem may also be related to celiacs (people with gluten intolerance), people with gemochromatosis (those who have an excessive blood level of iron) and others.

2. Risk from food allergens, whose responsibility?

Food allergy and intolerance cases have been described from ancient times. As early as 2000 years ago, Titus Incretius Carus said that “the food for one may be poison to another” (Tutenberg 1999). Indications exist that Hippocrates (in 400 B.C.) had patients with sensitivity to cows’ milk.

The symptoms of a food allergy can involve the gastrointestinal tract (nausea, vomiting, cramping), the skin (urticaria, pruritis, itching) and the respiratory tract (rhinitis, asthma, oedema), and they can be of different degrees of seriousness. In some cases a food allergy can lead to the most serious condition, an anaphylactic shock when the cardiovascular system is also affected. When an anaphylactic shock happens, without treatment, an affected person can be dead within a few minutes after the ingestion of the offending food (Taylor 1999). However, a common manifestation of a food allergy is the so-called oral allergy syndrome which is quite mild and is confined to pharyngeal itching and swelling. Common food allergens have been identified that are responsible for about 90% of all reactions. These are cows’ milk (and dairy products), crustaceans, eggs, fish, peanuts, soybeans, nuts (and nut products), celery (and celery products), mustard, sulphur dioxide and sulphites at a concentration of more than 10mg/kg (EC 2002). At the same time about 170 types of other foods are known to cause allergic reactions in a few individuals.
For the first time a concept of allergy was formulated in 1906 by Pirquet, who defined it as an abnormal reactivity from the part of an organism that represents an antigen/antibody reaction or other type of immune reaction (Tutenberg 1999). Today the mechanism of allergic reaction is more understood. The most diffused type of food allergy (immediate hypersensitivity), is mediated by a specific class of antibody, immunoglobulins E (IgE). Some individuals are predisposed to the development of allergies, and the predisposition is at least partly determined genetically. These individuals can produce IgE antibodies that are specific for and can recognise certain antigens or proteins. Most food allergens are proteins and when an individual is exposed to one of the allergens, this stimulates the formation of specific IgE. The IgE antibodies are then attached to the special mast cells in various tissues and basophiles in the blood. At this point the affected individual is sensitised to the food. Typical allergy symptoms appear after any next exposure to the allergen, followed by the reaction of the allergen with antibodies, and the release of the mediators of the allergic response, like histamine.

It is considered that about 1 to 2% of population suffer from a food allergy (Taylor et al. 1999; Birkedvedt & Kørner Bueso 1999), but among children the percentage is higher, at 5 to 8 %. In some countries, for example Germany, about 5 to 7% of the general population are affected by food allergy (Tutenberg 1999). In Norway it was reported that 1-2% of the population and 5% of children have food allergic conditions, and one individual in 500 is a celiac (gluten intolerance) (Birketvedt & Kørner Bueso 1999). A recent EU-funded project, Protall, has reported that one in 100 adults and one in 10 children in the EU have some type of food allergy (Protall 2001). There are however changes in the numbers of people affected by an allergy and intolerance.

For a long time food allergens were an issue that slipped the attention of the authorities, medical doctors and food producers. Many countries still do not have an official register of the cases of food allergy (this is being changed now), but in some countries, for example Sweden, the National Food Administration has registered food allergy cases for about 15 years (SCOOP 1997). In all cases the causative food has been analysed and the allergen identified (ibid). According to the data from the questionnaires that we sent to representatives of Norwegian authorities, the cases of food allergy were not yet registered in 2001 (Gaivoronskaia & Hvinden, unpublished research). For this reason it is impossible to judge if the number of food allergy cases in the country is increasing or to know about the distribution of allergies to different allergens. Undoubtedly, the lack of a registration system for the cases of hazard (allergy or intolerance) can have an influence on the distribution of responsibilities of stakeholders.

An important part of the responsibility for avoiding food allergy is supposed to rest with the affected individual. To show it let us have a look at the plan for individual notes suggested in an official
brochure for people with food allergies by the Norwegian authorities (fig.1). It advises people to write down the symptoms after consuming specific ingredients of food, for example nuts, milk or other potential allergens. Different types of allergens are listed and an individual has to mark those that he/she does not tolerate. Finally, the conclusions must be made as to what types of food to avoid and how to find alternatives to these types of food. Following this advice means taking serious individual responsibility for choosing food and control of food risk, but in order to use the plan one should know exactly ingredients of food. For this reason individuals with allergy depend further on labelling information provided by the food producers and authorities. At the same time, in order not to mislead consumers, the individual plan should include the list of all common allergens. As we can see from this particular scheme, it failed to include such important allergens as soybeans and peanuts, which are now considered the foods that cause a major increase in allergic reactions.

The previous food labelling system (Directive 2000/13/EC) allowed producers not to list ingredients constituting less than 25% of the whole product, additionally many food additives were not included on the labelling. However, some of additives, for example, the sulphites that are added to many foods and wines can often cause an allergic reaction.

Norway followed the same labelling regulation and recent information that appeared on the website of the Norwegian Food Safety Authority (SNT) confirmed that the “… present regulation is such that not all ingredients are labelled. But soon new changes in regulation will demand fuller labelling of ingredients with the additional labelling demand in respect to the specific allergens’ ingredients … Information that allergens such as milk, egg, gluten and others are not present in the products that usually contain them, must be used only if it can be guaranteed that this information is correct.” (SNT 2003).

It is of importance that this regulation ignored such categories of products as fresh, unpacked bread. The explanatory booklet for allergic people published some years before by the Norwegian authorities notes “compound food products with un-labelled ingredients (e.g. fresh bread from bakeries) should be always used with caution. Employees should know the ingredients, but if there is uncertainty it should be evaluated an option not to buy the product” (our translation, Birketvedt & Kørner Bueso 1999). This very vague description does not clarify whose responsibility it is to secure food safety for allergic people and whose responsibility it is to provide to provide information about food ingredients. Most of all, it suggests that controlling risk is the individual’s own responsibility.

However, the case of unlabelled bread can have serious consequences. Many people have an allergy to soybeans, lupine or other common ingredients in bread, while others suffer from intolerance to gluten (protein in wheat) and they run risk in case if ingredients of bread are not declared.
Fig.1. Scheme for people with a food allergy or intolerance. Norwegian title “This happens when I eat something that I do not tolerate”. (Birketvedt & Kørner 1999).

A new EU labelling directive (2003/89/EC) has considerably reduced the possibility of consuming allergens unknowingly. As David Byrne, the EU Commissioner for Health and Consumer Protection, stated: “The complete labelling of ingredients is a direct response to repeated requests from consumers for better information about the composition of foods they purchase. This is a very clear example of the European Union working concretely in favour of citizen’s day-to-day needs. I am particularly committed to a revised labelling regime that gives consumers much more information about potential allergens” (EC 2002).
Hence, it can be concluded that while the burden of risk assessment and management of food allergy has laid for a long time with affected individuals they were not provided with enough information in order to take preventive actions. At the same time, as the registration of the cases of food allergy was fragmented and in many countries non-existent, it was impossible to trace the cases of an allergy to the specific food products and producers.

The legal basis for the responsibility of producers, authorities and other stakeholders was founded with a new EU labelling regime, among others by the Directive 2003/89/EC (EC 2003). Another important step to the distribution of responsibility onto these stakeholders was the improvement in testing for allergens (SCOOP 1997; Protall 2001) and the initiation of the system for registration of the cases of food allergy in many European countries.

It would be of importance to understand how consumers perceive allergens and other food risks and the responsibility for them. In particularly, this question arises in respect to GM food, which is often pointed out to be associated with introducing the risk of new allergens. To understand these issues we have designed a questionnaire which helped us to give an outlook into the attitudes and perception of food risk in allergic consumers.

2. Description of the questionnaire survey.

The data needed to provide insights into the above-mentioned questions were obtained from our survey that was performed by the opinion poll company Norfakta, during winter 2003. A sample of respondents in Norway was randomly selected based on telephone number. When the respondents were contacted by telephone, they were asked if they had an allergy or intolerance to food and if they were willing to respond the questionnaire on food risk. The questionnaires were then sent by post to the recruits and after 3 to 4 weeks the answers were collected. A total of 800 people, 400 allergic and 400 non-allergic, were recruited. The response rate was 63% for the allergic people and 59% for non-allergic. Distribution of consumers according to age, education, and sex is presented below (fig.2)

Respondents were asked about food risk in general and to give their evaluation of a number of specific food risks. Subsequently they were asked whether the present food labelling permits respondents to control food risk.

Respondents were asked their opinion about the responsibility of individuals, producers and authorities for different food risks. We consider here the answers about natural allergens and allergens from GM food.
Finally respondents were asked about their willingness to buy a specific GM product, soybeans without soybeans allergens. For all these questions response alternative were “definitely not”, “probably not”, “probably”, “definitely” and “do not know”. For the comparison of food risks the possible answers ranged from “very little risk” to “very high risk”.

![Fig.2. Distribution of consumers according gender, age, education and relation to food allergy.](image)

3. Results

It follows from our results that consumers with an allergy or intolerance more often perceive food in general to be associated with risk than consumers without an allergy: 66% of allergic consumers versus 52% of the non-allergic think that food is risky.

When the two groups are asked to evaluate the list of specific food risks, the difference between allergic and not allergic consumers was observed in the perception of risk from natural allergens but
not of allergenicity risk from GM food (fig.3). Ranking different food risks has also shown that both groups considered the risks from natural allergens and from GM food are less serious than those from salmonella, prions or pesticides.

![Fig. 3. Ranking of food risks, from the left: sugar, natural allergens, GM food, allergens in GM food, prions, pesticides, Salmonella, antibiotics, hormones.](image)

The majority of consumers in both groups (about 70%) considered that present labelling does not help them to control food risks. Answers about responsibility for food risk (fig.4)) suggest that the two groups differ in their judgements about individual responsibility with respect to the natural allergens (63% of allergic versus 49% not allergic people considered natural allergens to be individual responsibility). At the same time about the same percent of allergic and not allergic consumers (about 70%) attribute responsibility for natural allergens risk to the food producers. People in the allergic group are less convinced (in comparison to their judgments on individual responsibility) when they express a positive opinion about the authorities’ responsibility for natural allergens risk (40% of positive answers).
Fig. 4. Consumer's opinion about responsibilities for food risk: natural allergens; N= 250 Allergy, N= 232 No allergy.

Responsibility for allergens in GM food is seen differently from natural allergens but again allergic people are more inclined to take individual responsibility for this risk. 32% of allergic consumers and 20% of non-allergic consumers consider risk from GM food allergens to be an individual responsibility. As with natural allergens, a considerable part of allergic and non-allergic consumers feel that allergens risk from GM food is the food producers’ responsibility (77% and 74%). At the same time approximately the same percent of consumers in both groups think that authorities should be responsible for allergens from GM food.

Finally, allergic people are more disposed than non-allergic to buy a GM product with a benefit of particular relevance for them (genetically engineered with the purpose to eliminate allergen). At the same time, almost a half of allergic consumers think that they would not buy a GM product and about 10% answer that they do not know if they would buy one.
Fig. 5. Consumer’s opinion about responsibilities for food risk: GM food with possible allergens; N= 252. Allergy, N= 232. No allergy.

Fig. 5. Will you buy GM food produced not to contain allergen? N= 249. Allergy, N=237. No allergy.
4. Discussion.

The observed difference between allergic and not allergic group in perception of food risk in general may be due to the fact that personal experience makes the hazard threat much more salient. In our case experience with allergic reaction or food intolerance (and harm) is probably an important factor in the evaluation of food risk.

If risk is seen as more serious, the expected difference between consumers with adverse food reaction and others is that the first group is more cautious choosing their food. They are motivated then to ask for more information and to analyze available labels. Arguably consumers with food allergy have to be engaged in self-protection action. Psychological theories used to explain consumers’ risk prevention are based on the rationality of the consumer as a decision-maker who weighs the benefits of the self-protection against the costs and adopts the action if the outcome is favourable (Weinstein 1988). Consequent stages of risk prevention are according Weinstein framed in terms of beliefs people held about risk situation. Not all described stages may be useful to analyze risk prevention from food allergens, but the first stage (being aware about risk) and the third stage – acceptance of personal susceptibility - can be helpful to explain the process that results in taking a self-protection action. One of the conclusions from this theory is that a lack of self protection action mostly stems from not being aware that risk exists (ibid).

As we have mentioned it appears from our results about risk ranking that all consumers understand food risk quite well with the exception of low estimation of risk from much sugar. This undervaluation is a classical example of the influence of voluntary character of risk on risk perception that has been suggested in psychometric research (Slovic et al. 1981). In fact, a high consumption of sugar in Norway proves that people do not perceive this eating habit as associated with high risk. A factor that may contribute to such a perception is the sensation of pleasure (benefit) that is experienced by individuals when they consumer sweet or sweetened products. At the same time the adverse consequences of this eating habit are long-term and this might have influence risk perception as well.

Being aware about risk in case of food allergy and in many other food risk cases does not depend only on the person him/herself. Awareness and responsibility for it will be a result of how other
stakeholders in the food chain, among them producers and the authorities, are willing and able to create a transparent and democratic system.

It is interesting to observe that for a long time consumers’ organizations did not include food allergens as a focus on their agenda and did not referred to the fact that the 25 % food labelling rule omitted the possibility to be aware about risk for food allergic or intolerant consumers. At the same time consumers’ awareness about risk from GM food, often associated with similar allergenic risk, reached a high political loading as consumers concerns were expressed in Europe and in the other parts of the world. If the authorities are silent about the fact that GM food is on sale in supermarkets and this food is unlabelled, important elements of democracy, the right to know and the right to choose, are violated. Furthermore, individuals are prevented to be engaged in self-protective actions against GM food risk (or any other) if they are not aware about its presence.

The picture of public awareness about GM food is not homogenous, and in Europe people seem to be aware about GM food, but in the US it is not the case. The results of the recent survey on public perception of GM food among Americans confirmed that people mainly have heard “some”, “not much” or “not at all” about GM food (Hallman et al. 2003). About a quarter of all respondents were unaware that they are eating GM food and general knowledge about GM food was low (ibid).

Our data on risk ranking indicate that risk from pesticides, salmonella and prions are considered to be the most serious risks by both groups of consumers, and this opinion is in agreement with the opinion of many experts about the situation in food safety in the world. However, according to recent EU evaluations in Norway and other countries, risks from salmonella, pesticides, and prions in Norway are lower or at the same level with the European medium level of risk. This suggests that the mechanism behind the high risk perception in these cases should be investigated further.

Natural allergens and allergens from GM food are considered to be risks of medium seriousness. However, there is a considerable undervaluation of risk from sugar and this implies that more work should be done with the explanation of the consequences of this and other voluntary food risks. Individualization of food policy demands that public understanding of the consequences of the voluntary food risk should be taken into the focus of attention on political agenda.

At the same time according to the opinion of consumers, responsibility for risk is attributed also to other stakeholders. Food producers and authorities are held responsible for food risk, and differences are observed in how allergic and non-allergic groups evaluate a responsibility for different types of food risks. In the case of natural allergens for example, a considerable proportion of allergic
consumers feel that the responsibility for natural allergens is both individual and with the producers. GM food allergens on the other hand, are by allergic consumers regarded more as a producer and authority responsibility but about one third of allergic consumers still consider it to be an individual responsibility.

Consumer opinion was divided in respect to the solution to the problem of allergens by introducing GM food with reduced or eliminated allergenic potential. Allergic individuals were more positive than non-allergic in general, but only 37% think that they will buy such food. On this basis, one may suggest that additional possibilities (focus groups or public consultations) are explored, in order to ask the opinion on this issue of the consumer groups with an allergy or intolerance.

Therefore it appears that an individualization of food safety policy, providing more channels of information, and, a more appropriate food labelling (already adopted by the EU) will be welcomed by allergic consumers and other consumers who have a necessity to avoid particular food ingredients.

5. Literature:

Birketvedt K., Kørner Bueso A. 1999, ”Når ”bare litt” er altfor mye… Å lage mat til en med matvareallergi/-intoleranse “, Norges Astma og Allergiforbund, Statens Råd for ernæring og fysisk aktivitet, Oslo.


Protall, EU project 2001, http://www.ifr.ac.uk/PROTALL/DEFAULT.HTML

SCOOP 1997, SCOOP task 7.2 on the occurrence of severe food allergies in the EU (results sent to us by Swedish Food Administration).
