Allergies

outlook

An end to uncertainty

Blockchain and genetic engineering might ultimately bring an end to 'may contain' food labels, which consumers find confusing, says Guy Poppy.

Even though most people have no allergic response to food, many of us know someone who does. Clearly, labelling food products with the allergens they contain is important, and that information needs to be accurate, easy to understand and used appropriately. People with a severe food allergy, and their families and friends, can then make informed choices to safeguard their health. But how informative are precautionary labels that say 'may contain nut traces' or 'made in a premises where nuts are used'? A 2015 survey found that 36% of consumers thought that a 'may contain' label meant the product would actually contain the allergen.

In September last year, the UK government introduced new labelling regulations for pre-packaged food in response to the death of teenager Natasha Ednan-Laperouse (see go.nature.com/2e91xs9). Natasha, who was severely allergic to sesame, had eaten a baguette purchased from sandwich chain Pret a Manger during an aeroplane journey from London to France, where she had a fatal allergic reaction. The product did not have any allergen advice on its wrapper because it was made on the premises, and as such this labelling was not required by law. The updated regulations, due to apply from October next year, require full ingredients labelling on all packaged food.

Natasha's Law, as the rule is known, brings substantial benefits with respect to packaged foods, but it doesn't address many of the wider labelling issues often raised by awareness groups, who think that 'may contain' labelling is overused and often ignored. The UK Anaphylaxis Campaign, for example, would like legislation on standardized allergen thresholds and risk assessments to define which wording to use, a conclusion also reached by the Integrated Approaches to Food Allergen and Allergy Risk Management (iFAAM) group funded by the European Union. Two iFAAM workshops in 2016 and 2018 flagged the lack of standardized methods and wording for allergen labelling.

In the United Kingdom, 'may contain' labelling is voluntary. The food industry uses it in an *ad hoc* and precautionary way, even for products that don't contain allergens. This reduces clarity and choice for allergic consumers, creating discrimination in a way that wouldn't be allowed by society for people with other health vulnerabilities.

Technology and innovation play a major part in global health challenges, as demonstrated by current efforts to find a vaccine against COVID-19. In the case of food allergies, two technologies spring to mind.

The first is blockchain. As a digital shared ledger, it can be used to ensure quality, standards and traceability throughout long and complex food supply chains (for example, KitKat, the chocolate biscuit, often contains ingredients from more than ten different countries). In 2018, the Food Standards Agency, a UK government department and regulator where I worked as chief scientific adviser until June 2020, successfully used blockchain in a pilot at a cattle abattoir. The year-long pilot (and a second one at a pork abattoir) demonstrated the potential of blockchain to improve traceability in the food system. If adopted more widely, blockchain could improve the accuracy of food labels and offer reassurance to people with an allergy.

No technology is a silver bullet, and blockchain is only as accurate as the information that is inputted at each stage. But it has the potential to set consumers' minds at rest and trace any issues that arise. In relation to allergy, blockchain technology could remove the need for 'may contain traces' labelling by allowing businesses to be more confident about the ingredients throughout their supply chains.

A second example is using RNA interference (RNAi) to silence genes associated with allergens. IngateyGen, a biotechnology company in Elizabeth City, North Carolina, has patented a process to produce hypoallergenic peanut plants, and the company hopes to produce other plants as part of a partnership with nearby Fayetteville State University. RNAi and gene-editing techniques (such as CRISPR–Cas9) can allow complex genetic control that would be challenging to achieve with conventional genetic modification (GM) approaches. GM has had a chequered history in many societies, with public acceptance (or otherwise) depending on societal attitudes towards risk and towards large corporations. But this older technology also has potential because of the comprehensive testing regime applied to GM crops. In 1996, for example, the presence of a Brazil nut allergen in GM soya beans was widely publicized (J. A. Nordlee *et al. N. Engl. J. Med.* **334**, 688–692; 1996), but it was detected during risk assessments and did not reach the market. Had the allergen made it into the crop as the result of conventional plant breeding, it might not have been detected before release.

Managing the risks associated with allergy is a complex task. Clear, accurate labelling of allergens is part of the solution, and technological interventions of the kind described above could offer more reassurance. But consumers, whether they have allergies or not, must continue to act responsibly when handling food that contains allergens.

This is a shared societal responsibility. We need to come together to protect the vulnerable, as we are being called on to do during the COVID-19 pandemic. Clarity is key. Some of the advice about what can or cannot be done during lockdowns caused confusion. Some individuals have not acted in a way that benefits society. In a similar vein, we need to be clear about what labels are telling us, and we must be considerate about allergenic food when in the presence of vulnerable people (for example, when eating peanuts on a plane). We need a range of options to reduce the number of tragic deaths from allergies. As is the case with most public-health challenges, we are all in this together.

"Blockchain technology could remove the need for 'may contain traces' labelling."

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