Enzymes used in cleaning products and food 'are potent allergens', warns study

[**Haroon Siddique**](https://www.theguardian.com/profile/haroonsiddique)

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Research says genetically modified enzymes, which allow products to be still labelled as ‘natural’, should be tested like potentially hazardous chemicals

Genetically modified enzymes used in food, perfumes, medicine and cleaning products are “potent allergens” and should be tested like other potentially hazardous chemicals, experts have said.

There has been an explosion in the use of enzymes to boost flavours and aromas, including in low-fat foods, helping to create a sector worth about $10bn (£7.7bn), according to [a study published in Occupational & Environmental Medicine](http://oem.bmj.com/lookup/doi/10.1136/oemed-2015-103442).

Some techniques allow the products to be labelled as “natural” in Europe and the US but the researchers warn that genetically engineering the enzyme protein may change its allergenic properties.

They measured specific antibodies to artificially created enzymes in blood samples from 813 workers, employed in the food, drinks, chemicals, detergents and pharmaceutical industries.

The employees had worked in their respective industries for periods ranging from three months to 10 years and had been exposed to an average of two to four genetically modified enzymes in the workplace.

As commercial tests are only available for naturally occurring enzymes, the research team created their own diagnostic test to discern whether antibodies to 12 different genetically modified enzymes were present in each blood sample.

Analysis showed that 23% of the employees had specific antibodies to the genetically modified enzymes to which they were routinely exposed during working hours.

The German and British authors admitted that their study was hampered by commercial secrecy, which prevented them from gaining access to the formulations used.

Nevertheless, they concluded: “Genetically engineered enzymes are potent allergens eliciting immediate-type sensitisation ... The assessment of allergenicity should be mandatory for all new products ... Enzymes should be tested like any other potentially hazardous chemical.”

The highest levels of sensitisation was produced by alpha amylase, with antibodies showing up in 44% of workers exposed to it, followed by stainzyme (41%) and pancreatinin (35%). These three genetically modified enzymes are all predominantly used in detergents, cleaning products and homecare products.

In a subgroup of 134 people, who were tested for skin reactions and lung power and quizzed in detail about other potential risk factors, 36% said they had symptoms of rhinitis or asthma that were related to their job.

As this subgroup was not randomly selected from all workers tested, possible selection bias could not be excluded. The authors stressed the need for independent future studies.

The paper says that the growth of enzyme technology has been driven by a combination of new developments in industrial processing, consumer demand for low-fat foods and “natural” tastes.

Flavours produced by the synthesis of aromatic compounds in microbial/fungal systems can be classified as natural under European and US law.

As well as artificially created flavourings and fragrances, industrial applications for enzyme technology range from cheese ripening through speeding up the baking process to enhancing the power of detergents and medicines.