

DEMYSTIFYING THOSE E NUMBERS

Food additives, especially E numbers, are widely perceived by consumers as artificial and harmful. However, the fact is that they are an essential ingredient in numerous products, many have “natural” origins and none of them pose a risk to health.

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The list of food additives drawn up by the food safety arm of the European Union includes substances synthesized through chemical reactions whose levels and usage are strictly limited as well as natural compounds which frequently have no usage restrictions. One thing is certain: all E numbers are

safe for human consumption as long they are used within their defined limits.

Amounts

Substances used to adjust food texture include natural compounds and their artificially modified equivalents. Texture is one of the main indicators of food quality listed by the International Organization for Standardization (ISO), which cover all rheological and structural food attributes perceptible by mechanical, tactile and, where appropriate, visual and auditory receptors. Ingredients play an important role in creating and/or preserving texture of industrially-produced foods;



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they increasingly include functional additives which enhance appearance, flavor, smell and stability. Substances added to food to alter its texture include thickeners, stabilizers, gelling compounds, emulsifiers and substances interacting to create or preserve the desired structure. Stabilizing, thickening and gelling substances are hydrocolloids – high molecular mass polymers dissolved or suspended in water. Polysaccharide hydrocolloids include various plant substances (gum arabic, gum karaya), seaweed extracts (agar, alginates, carrageenan), seeds (pectin, cellulose, starch), beans (guar gum, locust bean gum), konjac root gum, and gums synthesized by microorganisms (xanthan, gellan). Pectins, cellulose and starches are modified to

make them more soluble and increase their gelling and thickening properties in different environments. Other thickeners include protein hydrocolloids such as gelatin and soya proteins. Depending on the thickening agent, food can contain hydrocolloids at levels ranging from 0.1% for low-methoxyl pectins up to around 5% for gelatin.

In 2010, the European Commission introduced a requirement to re-evaluate the risks of 316 food additives registered prior to 2009. The safety re-evaluation of texture agents is due for completion by the European Food Safety Authority (EFSA) by the end of 2018. Products covered so far include pectins, modified celluloses, xanthan, tara and konjac gums, mod-

Who chooses additives?

In Poland, food additives are regulated by Regulation (EC) no. 1333/2008 of the European Parliament and of the Council of 16 December 2008 on the use of food additives with subsequent amendments, in particular regulation no. 1129/2011. The regulations replace previous Polish legislation covering the use of food additives. The European list currently includes approx. 320 substances, while the equivalent list in the US covers approx. 1500 compounds. Each food additive designated the E symbol must be assessed in terms of its safety. In the EU, the assessment is carried out by the European Food Safety Authority (EFSA). European food law allows for adding specific substances to the list of permitted additives after obtaining reliable results of extensive toxicology studies confirming their safety within available scientific knowledge. The results are used to determine the acceptable daily intake (ADI).

ified starch, agar, locust bean gum, guar gum, gum karaya and gum arabic. The substances were found to be toxicologically safe and non-carcinogenic, with no reproductive or developmental toxicology, therefore no acceptable daily intake (ADI) limits were set. In some cases it was noted that there is insufficient scientific evidence to allow the use of certain thickeners in dietary foods for special medical purposes and formulae for infants and children as they have the potential to cause intestinal complaints. The panel concluded that locust bean gum and guar gum should not be used in products for infants and children. It was also found that high consumption of most thickeners can cause digestive and intestinal discomfort due to the fermentation processes in the digestive tract.

Thickeners on the line

Originally, thickeners were mainly used for purely technological reasons, such as improving viscosity and water binding properties, preventing syneresis and improving the texture of food. Molecular gastronomy widely uses polysaccharides, giving chefs a vast range of options to give dishes the desired shape and texture by adjusting consistency, firmness and crunch. Hydrocolloids are also used as a filler to lower prices of products such as processed meat by reducing the volume of the more expensive component (meat) and replacing it with compounds able to bind high volumes of water. The use of thickeners instead of fats to reduce the calorie count of foods is also on the rise. According to the World Health Organization, around two billion of people around the globe are overweight, with around 650,000 suffering from obesity. Cardiovascular disease is the main cause of death worldwide, and its incidence is affected by lifestyle, including diet. Since polysaccharides aren't digested in the small in-

testine, their consumption does not lead to increased weight; this makes them increasingly desirable food additives. As well as creating a feeling of satiety and reducing hunger, the compounds stimulate peristalsis and support a healthy gut microflora.

Healthy pectin

EFSA's re-evaluation documentation and numerous studies confirm that texture additives are safe and have no adverse effects on human health apart from occasional discomfort following excessive consumption. EFSA also publishes health claims – documents outlining the effects of a given factor on health, confirmed by extensive scientific evidence. Health-promoting properties have only been confirmed in a few texture-enhancing substances so far. Reliable scientific evidence confirms that consuming around 10g pectins with a meal or 4g hydroxypropyl methylcellulose (hypromellose or HPMC) on its own contributes to reducing postprandial glycaemia. According to EFSA's health claims, it is possible to maintain the correct levels of blood cholesterol by consuming 6g pectin, 10g guar gum, 4g konjac-derived glucomannan or 5g HPMC every day. It has also been shown that konjac-derived glucomannan contributes to overall weight loss when it is consumed in 1g portions three times a day with one or two glasses of water. Additionally, consuming slow-digestible starch (SDS) causes a lower spike of postprandial glycaemia than eating products containing low levels of SDS. Resistant starch constituting a minimum 14% of starch in a given product contributes to lowering the levels of postprandial glycaemia. However, this kind of starch is yet to be isolated as a food additive. Modified starches listed as permitted food additives are easily absorbed, which is linked to a rapid spiking of postprandial glycaemia and makes them unsuitable for diabetics. Functional foods, defined as those which have additional or enhanced benefits over and above their nutritional value and whose health benefits have been verified by scientific research, are products containing varying levels of pectins, HPMC, guar gum and konjac-derived glucomannan.

It's also worth noting that pectins and cellulose are elements of nutritional fiber, which is the main component of pomace – the solid remains of fruit after pressing for juice or oil. The use of pomace is very low in Poland, and the byproduct is largely used as fodder or fertilizer or composted. With growing awareness of the benefits of nutrition and consumers becoming increasingly interested in replacing artificial additives with natural products, pectins have a huge potential in replacing modified or exotic ingredients.

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