

## Some food additives explained

12 October 2009

Food additives are used to enhance flavour, texture, shelf-life and nutritional properties of the foods we eat. As consumer interest about this often misunderstood topic continues to thrive, the key facts about a range of food additives are outlined below.

### What are food additives?

Food additives are substances that are added to foods to serve specific technical purposes, and are grouped depending on the function they perform when added to foods, e.g. stabilisers, thickeners, gelling agents, anti-caking agents, glazing agents, packaging gases and propellants.<sup>1</sup> Only substances that are not normally consumed as a food in itself and that are not normally used as a characteristic ingredient of food, qualify as additives. In the European Union (EU), three directives establish the list of additives which could be used (to the exclusion of others), the foods in which they could be used and any maximum levels.<sup>2-4</sup> Additives approved as safe for use in food are given an E-number (E for Europe), which is also a simple and convenient way to label permitted additives across the range of languages in the EU.

### Stabilisers

Many foods contain mixtures of oil and water, known as emulsions. Emulsions are formed using substances called emulsifiers, which allow water and oil to be mixed together. Stabilisers are used in foods, such as mayonnaise, vinaigrettes and ice creams to prevent emulsions from separating and thus, help to maintain the physical and textural properties of foods.<sup>5</sup> Common stabilisers include locust bean gum (E410) and alginates (E400 – 404).<sup>6</sup>

### Thickeners

Thickeners are added to fluid foods to increase viscosity, and are usually composed of carbohydrates e.g., hydroxypropyl methyl cellulose (E464).<sup>6</sup> Carbohydrate-based thickeners cause fluids to thicken during heating, when the starch granules from which carbohydrates are composed adsorb water and swell. This process results in the trapping of water molecules by the starch granule, causing the fluid to thicken. Thickeners are added to a wide range of foods including sauces and gravies.

### Gelling Agents

Gelling agents are used to thicken and stabilise liquid foods, thus giving them texture. Although they perform a very similar purpose to thickeners, as the name suggests, gelling agents form gels. Gelling agents are generally proteins or carbohydrates, which when dissolved in liquid foods form a three-dimensional cross-linked network within the liquid. This creates a unique food, which is solid in appearance, yet is mostly composed of liquid, e.g. jellies, jams and confectionery. Common gelling agents include pectin

(E440) and carrageenan (E407).<sup>6</sup>

## Anticaking Agents

Powdered or granular foods are liable to moisture absorption, causing the particles to become sticky and form clumps, known as caking. Caking makes it very difficult to use powdered or granular foods as they can no longer be weighed, spread or mixed evenly. Anti-caking substances work by coating food particles and absorbing excess moisture. This repelling of moisture from the food surface helps to prevent caking and retain the food's free-flowing characteristics. One of the most commonly used anti-caking agents is calcium silicate (E552), which is used to prevent caking in baking powder and table salts.<sup>6</sup>

## Glazing Agents

Glazing agents (also known as polishing agents), are used to impart a shiny, polished and protective coating to foods, such as confectionery, fruits and bakery products. Common glazing agents include; beeswax (E901), Carnauba wax (E903) and fatty acids (E570).<sup>6</sup>

## Packaging Gases

Packaging gases are used to modify the atmosphere in which foods are packed in order to control ripening, inhibit chemical changes and prevent spoilage. This is achieved using a technique known as Modified Atmosphere Packaging (MAP), whereby the air within the packaging is replaced with a mixture of pure gases, e.g. oxygen (E948), carbon dioxide (E290) and nitrogen (E941).<sup>6</sup> Depending on the food and the desired effect, different formulations of gases are 'flushed' into the packaging. For example, mixtures of carbon dioxide (30-60%) and nitrogen (40-70%) can inhibit the growth of many micro-organisms and may be used to reduce microbial spoilage of meats and fish, whilst combinations of carbon dioxide (20-30%) and oxygen (70-80%) may be used to help prevent the discolouration of red meats.<sup>7</sup>

## Propellants

Pressurised aerosol containers are used to dispense fluid food products in the form of a liquid, foam or spray. The use of propellants provides the necessary pressure to force the fluid food out of the aerosol container. The most commonly used propellants include nitrogen (E941), nitrous oxide (E942) and carbon dioxide (E290).<sup>6</sup> The latter propellants are generally used to dispense foam and spray type products, such as whipped creams, cheese and mustard. This is because nitrous oxide and carbon dioxide tend to dissolve in the fluid food and expand during its release from the container, causing the formation of a spray or foam. Nitrogen does not exhibit such properties and thus is used to dispense foods that are required in a liquid form, e.g. oils and syrups.<sup>8</sup>

## Further information

EUFIC backgrounder - Food Additives: [www.eufic.org/article/en/expid/basics-food-additives](http://www.eufic.org/article/en/expid/basics-food-additives)

## References

1. [EUROPA \(The European Union On-line\), Food Safety – From the Farm to the Fork section](#), accessed 27 September 2009.
2. European Parliament and Council Directive 94/35/EC (1994) on sweeteners for use in foodstuffs. Official Journal of the European Communities L237, 10.9.94, 3-12.
3. European Parliament and Council Directive 94/36/EC (1994) on colours for use in foodstuffs. Official Journal of the European Communities L237, 10.9.94, 13-29.
4. European Parliament and Council Directive 95/2/EC (1995) on food additives other than colours or sweeteners. Official Journal of the European Communities L61, 18.3.95, 1-40.
5. [The Food Standards Agency, Safer Eating section](#), accessed 27 September 2009.
6. [Federation of European Food Additives, Food Enzymes and Food Cultures Industries, The Varieties section](#), accessed 27 September 2009.
7. Robertson GL (2005). Food Packaging – Principle and Practice. Taylor and Francis Ltd, p. 313-331.
8. Fennema OR (1996). Food Chemistry – Food Science and Technology. Marcel Dekker Inc, p. 811–812.