



**GOING
FURTHER**

FOOD ADDITIVES

All the answers to your questions





The story of food additives

Additives: a new word for a long-established usage

Since the dawn of time, mankind has used ingredients to ensure the quality of food: to preserve, to bring texture, to colour food... For instance: the use of sea salt for the preservation of meat and fish, in Ancient Egypt carob was used to bring consistency, spices were added for colour. At the time, no one would have described saffron as «colouring» or apple pulp as «texturizer».

In the 19th century, advances in knowledge have allowed for the isolation and production of ingredients previously used only experimentally.

The knowledge around food additives has revolutionized our lifestyle and eating habits. In particular, they make it possible to consume a full range of food groups on a daily basis, without having to purchase them daily. Today, when we add a little starch to a meat sauce, we are taking advantage of the thickening property of the starch present in the potato.

Some food additives have the role of preserving nutritional qualities of foods, for example by limiting the oxidation of vitamins or the degradation of amino acids. Without salt, vinegar or saltpetre (potassium nitrate), nutrient deficiencies would have decimated populations.



Key dates

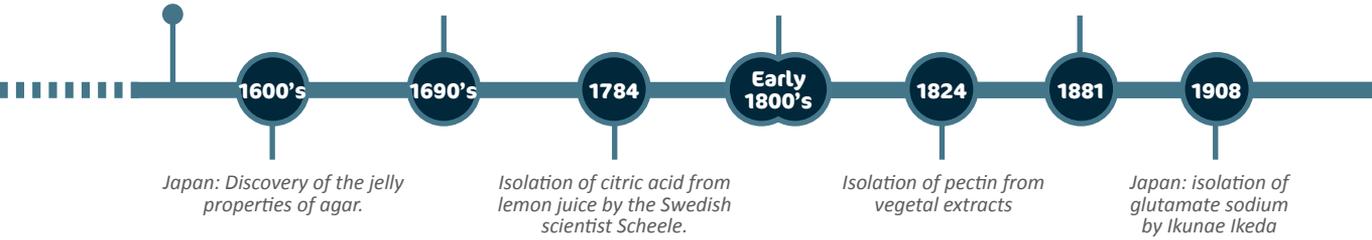
Ancient times

Use of sea salt to preserve meat and fish, use of spices to colour food.

France: the famous "biscuit rose de Reims" gets its pink colour from carmine.

Use of sulphites to preserve wines

Extraction of alginate from brown algae by the English scientist Standfort.





Food additives are the legacy of centuries of culinary experiences!

EU Regulation

This leaflet is based on the EU definition of “food additive”, which designates those ingredients used in small quantities for their technological role in food. The key principles: a positive list, a pre-market authorization based on the demonstration of safety and usefulness of the food additive so that its use does not mislead the consumer. Approximately 335 food additives (Regulation n°1333/2008) are currently allowed for use in food. The legislation sets also their specifications (Regulation n°231/2012) and defines the foods products in which they are allowed for use.



Key dates

France: decree on coloration and preservation of pastries and confectioneries

1910

Europe: first directive on preservatives in foodstuffs

1962

1964

Molecular gastronomy – food additives inspired great Chefs: spherification, flocculation, gelling or emulsion

Early
1990's

Europe: rosemary extracts authorized as antioxydant.

2008

2010

Europe: first directive on colouring substances authorized in foodstuffs.

Europe: harmonisation of the food additives regulations.

Europe: better regulation: one single regulation on food additives (n°1333/2008).



The ABC's of food additives

Definitions and uses

A*cids*

They increase the acidity of a commodity or improve the organoleptic quality of a product by giving it an acidic flavour. Examples: ascorbic acid, citric acid, acetic acid. Use: In canned vegetables, acidifiers can reduce the heat treatment for fragile vegetables by lowering the pH. Acids are also used in fruit pastes, confectionery and jams.

A*ntioxidants*

How many of us have ever used lemon juice to protect a fruit salad from turning brown? Unknowingly, we have used the antioxidant properties of ascorbic and citric acids contained within the lemon juice. The most commonly used antioxidants are ascorbic acid and tocopherols, known to the general public as vitamins C and E. Example of use: rosemary extracts which protect omega-3 fatty acids from oxidation.

B*aking powder*

Sold as a mixture of carbonates, it is incorporated into pastries or other bread products. It releases gas upon heating and inflates a dough very efficiently.

C*olours*

They make it possible to obtain the desired colour for certain foods, or to enhance its original colour attenuated by cooking or exposure to light, air or moisture. Food colours are often of plant (beetroot red, curcumin, carotenes, chlorophyll, paprika extract...), animal or mineral origin. Use: desserts, candies, confectionery...

E*mulsifiers*

Emulsifiers are mostly lecithin and mono-and diglycerides of fatty acids or salts of fatty acids, that make fats and water miscible. The best known is lecithin, which is found in egg yolk: without it, Mayonnaise would be runny!

E*mulsifying salts*

They are used in the manufacture of melted cheeses to disperse proteins and lipids in order to obtain a homogeneous product. Use: "Laughing cow"[®]Cheese

F*ood additives*

According to the EU regulation, they are added in small quantities to a commodity to achieve a desired technological effect such as ensuring safe quality (preservative, antioxidant, packaging gas), improving appearance and taste (colour, sweetener, flavour enhancer, acid), conferring a particular texture (thickener, gelling agent, baking powder) or ensuring stability (coating agent, emulsifier, anti-caking agent, stabilizer).

Preservatives

They protect against the damage caused by pathogen microorganisms. Some have been known for centuries such as acetic acid (vinegar) or potassium nitrate (saltpetre). They help to preserve our food without changing the taste or the nutritional properties.

Regulation

In the European Union, food additives have been regulated since the 1960's. The current regulation (Regulation n°1333/2008) maintains the key principles of a positive list and pre-market authorisation. All food additives authorised before 2009 are reassessed by the European Food Safety Authority (EFSA). Outside the EU, food additives may be regulated at a national level with a different definition and approach. At the global level, the *Codex Alimentarius* provides a database, called the Codex General Standard on Food Additives. It sets the conditions under which food additives may be used in food. The Joint FAO/WHO Expert Committee on Food Additives (JECFA) is responsible for assessing safety and usefulness of food additives to be adopted by the Codex Alimentarius Commission.

Sweeteners

It is necessary to distinguish between polyols (xylitol, maltitol...), that are non-cariogenic and two times less caloric than sucrose (sugar), and intense sweeteners (stevia extracts, aspartame, saccharin, acesulfame K...), that have a sweetening power up to 300 times that of sucrose. Use: they are only permitted to replace sugars in low energy foods, non-cariogenic foods and foods with no added sugar, or to preserve food instead of sugars, or for foods for specific groups.

Technological effect

It is the effect a food additive has on the food product. For example, an anti-caking agent prevents clumps in a powder product. To date, the EU regulation has established 27 functional categories of food additives.

Texturizing agents

Pectin, gum arabic, guar gum, alginates, agar and locust bean gum have thickening, gelling or stabilizing properties. When reducing the levels of sugars or fats added to food, these ingredients are useful to bring texture and smoothness.





Answers to key questions

+ *What is an ADI? How food additives are used?*

The **Acceptable Daily Intake (ADI)**, expressed in milligrams of substance per kilogram of body weight and per day, corresponds to the amount of the food additive that can be ingested daily throughout a lifetime without health risk: it is therefore valid for children and for adults. The ADI is established by scientists and it is based on available toxicological data assessment. There are two cases.

In the first case, experts identify from a series of studies the highest dose that does not induce effect on the most sensitive animal species. To extrapolate to human, they take a large margin of safety (at least 100), which aims to take into account the inter-species difference between man and animal as well as differences in sensitivity between human beings. The EU regulation imposes conditions of use for the food additive, that guarantee a safe consumption for the consumer, below the quantified ADI.

In the second case, there are no effects observed in the toxicological studies, even at the highest doses. The scientists therefore consider that there is no need to assign a quantified ADI. This is referred to as an unspecified ADI. Almost a third of the authorised food additives have an unspecified ADI, such as acetic acid, ascorbic acid, lecithin, gum arabic and mono and diglycerides of fatty acids. They are to be used at the strictly necessary quantity needed to obtain the desired technological effect.

In both cases, the goal of ensuring consumer safety is achieved.

+ *Who controls the consumption of food additives?*

Member States of the European Union are responsible to monitor the level of consumption of food additives, to ensure that consumption within their population remains below the ADI. In case this monitoring shows that the ADI of a food additive has been exceeded, the authorities may review the conditions of use. They may decide to reduce the maximum authorized amount of the food additive, or limit its use to certain types of foodstuffs only. The safety of the consumer is ensured.

+ *Why are there so many food additives?*

Are food business operators free to use them as they wish?

There are about 335 food additives allowed in Europe and classified into 27 functional categories. This diversity is a guarantee of safety and food quality. It is more efficient and safer to use several substances in small quantities rather than a limited number of food additives whose cumulative consumption could exceed their respective ADI.

Food business operators must use the food additive that is the most suited to achieve the desired technological effect while taking into account the specificities of the manufacturing process. Additionally, for each food product category, the food additives allowed for use are specified.



+ Do food additives cause allergies?

Part of the food additive safety assessment includes a review of the allergenic potential of each food additive.

The majority of food additives do not cause allergies. Due to their potential side effects on sensitive people, sulphites must be declared on the food labels when above 10 mg/kg or 10 mg/L (EU Regulation n°1169/2011).

The food additives which are derived from allergenic foods such as cereals containing gluten, crustaceans, eggs, fishes, peanuts, soya, milk, nuts, celery, mustard, sesame seeds, lupine and mollusks are considered as allergenic, thus their presences are highlighted in bold on the labels. For example, lysozyme which is derived from egg whites is used as a preservative in some ripened cheeses and is labelled as such: “lysozyme (**egg**)”.

If there is scientific evidence proving the ingredient does not provoke side effects in sensitive people, then the ingredient is exempted from allergenic labelling. Hence, lactitol derived from milk and used as a sweetener has been demonstrated to be safe regarding allergenic effect and intolerance.

Some colours like tartrazin (E102), orange-yellow (E110) or amaranth (E123) have been suspected to cause side effects. The European Food Safety Authority (EFSA) concluded in 2010 their oral consumption, alone or mixed, is not probably to cause side effects into humans considering the actual consumption levels. (Source: EFSA Journal 2010;8(10):1778)

+ Are food additives used by manufacturers written on the label?

Yes. According the EU regulation the operator can choose to indicate the E number or the name of the food additive in the ingredients list. An exception exists for packaging gases, a food additive category. As the gas escapes when the package is opened, the EU regulation requires to mention “packaged in a protective atmosphere”, in order to inform the consumer that a packaging gas has been used to increase the durability of the food.

+ Do organic food products contain food additives?

Yes. Almost fifty food additives are authorized in the EU for use in organic food products. Potassium metabisulphite, monocalcium phosphate, agar, pectin, tocopherol or rosemary extracts, hydroxypropyl methyl cellulose, vegetable carbon, sulphites in wine, nitrites are some of them. The positive list of authorized food additives in organic products is regularly updated, it is in the EU regulation on organic production.



QUIZ

Which colours from natural origin are used and authorized in our foods:

- 1 Paprika extract
- 2 Chlorophyll
- 3 Carmine
- 4 Vegetable carbon
- 5 Annatto

Answers: all.
1 Frankfurter sausage
2 Sugar free chewing gum
3 Strawberry yogurt
4 French Morbier cheese
5 English Red Leicester cheese

Since the Ancient times, mankind has used colors from vegetable origin to improve the appearance of food. Yellow from saffron, orange from curcuma, red from sandal wood, blue or purple from sunflower, green from parsley...

Did you know?

+ *Glutamate: a Japanese discovery*

In the beginning of the 20th century, the Japanese Professor Kikunae Ikeda spent two years in Germany for his studies. He became interested in food products which were unknown to him: tomatoes, cheese, asparagus and meat.

He noticed a new taste in these foods which was neither salty, sweet, bitter or acidic: he named it umami. Back in Japan, he identified the flavour in broth prepared with dried Kombu algae (*Laminaria Japonica*). In 1908, he succeeded in extracting the molecule responsible for this new flavour: he just discovered monosodium glutamate.

+ *Carrageenan in Irish moss*

More than 600 years ago, the Irish people from Carrageen County in Ireland began using the "Irish moss" for flans. This dried algae jellified with milk due to the presence of carrageenan. Later, Irish immigrants to the new world discovered their "Irish moss" growing along the coasts of Massachusetts. Today, carrageenan is authorized as a food additive.

+ *Agar: "the food of Gods"*

This alga is called kanten or "food of Gods". In the 17th century, a Japanese cook found algae in the snow. He had the idea to boil it and got a firm jelly. He just created the red algae jelly process. This process was later used by Japanese monks who mastered the art. Japan would keep its use secret until the end of World War 2, when it was revealed to the world. The word "agar", from Malay origin, has been adopted for its commercialization in the West.

+ *Carats from carob*

Within the pod, carob beans are separated by pulpous partitions. One pod can contain from 15 to 20 carob beans. Its pale-yellow pulp is floury and sweet when the seed is mature. The locust bean gum possesses thickening properties and is authorized as a food additive. Did you know the word "carat" which is used as a mass measurement for gold and diamond, is derived from carob? It corresponds to a carob seed weight (1 carat = 200 mg).



The French specialty food ingredients association
Find out more on www.synpa.org
<https://www.linkedin.com/company/synpa-les-ingredients-alimentaires-de-specialite>