

Should we worry about food additives & E numbers?

- Food additives are substances that are added to food in order to improve various properties, such as taste, appearance or shelf-life.
- E numbers are food additives that have been investigated and approved for use.
- Many E numbers are of natural origin.
- There is a potential link between some colour additives and hyperactivity in children.
- Intolerances or allergies to foods and food additives are rarer than media coverage suggests.

Most people consider food additives and E numbers as something bad. However, a substance that has been given an E number has been carefully considered and then approved for use. In fact many E number additives are of natural origin. A lot of the negative press that E numbers receive comes from possible links with harmful health effects, especially hyperactivity in children.

What are food additives?

A food additive is formally defined as “any substance not normally consumed as a food in itself and not normally used as a characteristic ingredient of food, whether or not it has nutritive value”.

The use of food additives is nothing new; the salting of meat for preservation has been known and practised for centuries. They are added to food to preserve it, to add flavour, or to improve taste or appearance. Food additives may be either natural or man-made substances, or a mixture of both. The benefits of food additives are sometimes overlooked. The benefits include: longer shelf-lives, tastier and more flavoursome food, cheaper and more consistent food.

There is a growing public demand to replace synthetic (man-made) food additives with natural ingredients. This demand is usually based on the mistaken belief that all naturally occurring chemicals are safe and that man-made chemicals are not. There is also a misconception that organic foods do not contain any additives. In fact, in the EU there are 47 E number additives that are permitted to be used in organic food.

Did you know?









The ‘E’ in E numbers stands for ‘Europe’.



Did you know?

Many E numbers are only permitted to be added to specific foods. E127, also known as erythrosine, is a red dye and is only permitted for use in glacé cherries.

Food additive uses

Food additive	Uses & benefits	Example
Preservatives	Preservatives prolong the shelf-life of food by slowing bacterial degradation. This means that food is kept safe to eat for a longer period of time.	 Sulphur dioxide (E220) has been used to preserve wine for hundreds of years.
Flavour enhancers	These are substances that have no flavour or taste but instead bring out and improve the flavours of the foods to which they are added.	 Monosodium glutamate (E621) is used to enhance the flavour of crisps.
Sweeteners	Sweeteners are sugar substitutes. Foods suitable for diabetics often contain sweeteners.	 Sweeteners such as aspartame (E951) are used in 'diet' versions of soft drinks.
Emulsifiers and thickeners	These are used to help the mixing process for foods that do not normally mix well, such as oil and vinegar in salad dressings. They also stabilise mixtures, i.e. ensure that the oil and vinegar don't separate to form two layers but stay mixed together. Thickeners are used in foods such as ice-cream to make it more viscous.	 Xanthan gum (E415) and guar gum (E412) are used as stabilisers and thickeners in mayonnaise.
Antioxidants	Antioxidants slow down the process by which foods 'go off'. They delay oxidation in oils and fats.	 Antioxidants such as ascorbic acid (E300, also known as vitamin C) and sodium ascorbate (E301) are commonly used in cured meats and pastries to prevent them from going rancid.
Colours	Colours are added to food to make it more visually appealing or to restore the original colour of the food after processing. They can be natural or synthetic chemicals.	 Colours, both natural (eg E161b, also known as lutein) and synthetic (eg E102, also known as tartrazine) can be used to produce bright colours in sweets and other foods.
Raising agents	Raising agents release gas when a food mixture is heated. The gas can be steam (generated from liquid in the ingredients or food), air (added mechanically during food preparation) or carbon dioxide (produced chemically or biologically).	 Bicarbonate of soda (E500) is often used as a raising agent in baking.
Flavourings	Flavourings are different from flavour enhancers and can be natural or man-made substances. Lots of flavourings are developed from substances found naturally in foods. The use of flavouring agents is not currently controlled in the same way as other additives. They do not have E numbers.	 Vanilla is a commonly used flavouring in ice-cream.

Should we worry about food additives?

Lots of us are concerned about food additives and are particularly worried about a link with hyperactivity in children. Some foods and food ingredients, including additives, can also give rise to adverse allergic reactions but the rate of these reactions is, in fact, much lower than you might expect.

Do food additives cause hyperactivity in children?

There are on-going studies looking into the effects of colours and preservatives on children's behaviour. These studies are difficult to carry out because there are so many factors affect the behaviour of children. It is difficult to untangle all of the different factors and single out the effects of food additives.

A 2007 study from the University of Southampton showed a potential link between some colour additives and hyperactivity in children. The colours studied were: Sunset Yellow (E110), Quinoline Yellow (E104), Carmoisine (E122), Allura Red (E129), Tartrazine (E102) and Ponceau 4R (E124). These have become known as the 'Southampton Six'.

The European Food Safety Authority (EFSA) has since reviewed the use of these colours. They concluded that there was not enough evidence to change the approval status of these additives but in some cases the Acceptable Daily Intake (ADI) was lowered. The European directive on additives was updated, and as of 2010 any food containing these colours must carry a warning on the label stating that the additives in the product may have an adverse effect on activity and attention in children.

As a result of the Southampton study many food manufacturers have stopped using these colours, but if you want to avoid them you will be able to by checking the ingredients listed on the product label. However, it is important to remember that the behaviour of children is the result of many different factors, and food additives may play only a relatively small role.

Are some people allergic to food additives?

About 1 in 20 people report that they have an intolerance or allergy to a food additive, but studies have shown that the actual rate is closer to 1 in 10,000 individuals. So many people may think that their symptoms are caused by food additives, but the symptoms may actually be caused by something else.

Some people have medical conditions which mean that they must avoid certain additives. For example, people with phenylketonuria (PKU) must avoid the sweetener aspartame, which contains a source of phenylalanine, because they cannot properly metabolise it. Some additives, particularly sodium metabisulphite (E223) and other sulphites release an irritating gas (sulphur dioxide) that can aggravate asthma.



The 'Southampton Six'

Sunset Yellow (E110)
Quinoline Yellow (E104)
Carmoisine (E122)
Allura Red (E129)
Tartrazine (E102)
Ponceau 4R (E124)

Monosodium glutamate (MSG)

Intolerance to the flavour enhancer monosodium glutamate (MSG) is often reported but the evidence mostly anecdotal. There have been many studies on the effects of MSG but the intolerance has never been conclusively proved. The EU considers MSG and other glutamates to be safe at the levels permitted in food. Most people associate MSG with Chinese food, but you may be surprised to learn that MSG is present in many other foods as well. These include parmesan cheese, crisps and soy sauce.

Approval of food additives

Food additives are very carefully scrutinised before they are allowed to be used in Europe. The safety of food additives is rigorously evaluated and then regularly reviewed. This process is overseen by the European Commission who assign an E number and an Acceptable Daily Intake (ADI) to every food additive they approve. The ADI is the amount of additive considered safe to consume every day, throughout a lifetime. Safety factors are included in the calculation to ensure that the intake of the additive is many orders of magnitude below its potentially harmful level. Some people, particularly children, may consume unusual diets, for example one consisting of only a single item of food. These diets are also considered when estimating the potential effects of an additive.

Further Reading

- List of E numbers:
<http://www.food.gov.uk/policy-advice/additivesbranch/enumberlist>
- UK Food Standards Agency (FSA) website on Food Additives and E numbers:
<http://www.food.gov.uk/policy-advice/additivesbranch/>
- European Food Safety Authority (EFSA) Food Additives website:
<http://www.efsa.europa.eu/en/topics/topic/additives.htm>
- EFSA 'Frequently Asked Questions' on the 'Southampton Six' colour additives:
<http://www.efsa.europa.eu/en/faqs/faqfoodcolours.htm>



Did you know?

Glutamates naturally occur in tomatoes, peas, potatoes and corn.

This Note was produced by a working party of the Environment, Health and Safety Committee (EHSC) of the Royal Society of Chemistry.

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