

## Food Additives and Cancer

### Origin of the myth

A commonly held belief is that all, or some, food additives are extremely harmful, cause cancer, and should be avoided. Many health food companies benefit from propagating this myth and assuring the public that their foods are free from artificial additives and preservatives. The additives people tend to fear most are those with unpronounceable names, long chemical names or those where names are replaced by a combination of letters and numbers.

### Current evidence

#### What is a food additive?

The first question that must be answered is: what is a food additive? With so many ingredients added to all foods, which ones are meant to be there; which ones are the bad ones and which should be avoided? Salt and sugar have been used for centuries to preserve foods: are they additives? In short, anything that is added to food, during processing is considered an additive. In the case of ice-cream, one of the additives is air.

#### Why do we use additives?

Additives serve a wide variety of uses. For example, preservatives protect foods against deterioration and prevent growth of fungi and bacteria. Other additives help improve the texture and consistency of foods, keep them flowing freely when poured, or prevent them from drying out. Flavourings restore taste losses or can enhance the flavour or aroma of food. Emulsifiers ensure that oil and water in foods do not separate.

According to Food Standards Australia New Zealand (FSANZ), additives serve three purposes:<sup>1</sup>

- Improve the taste or appearance of a processed food
- Improve the keeping quality or stability of a food
- Preserve food when this is the most practical way of extending its storage life

#### Are all additives artificial?

Many additives have unpronounceable or complex chemical names. It is often assumed that long chemical names indicate that an additive is artificial. This is not always true. Take the following list of ingredients:

- acetaldehyde
- ethanol
- propan-1-ol
- ethyl pentanoate
- ethyl hexanoate
- ethyl-2-methyl butanoate
- 2 methyl butyl acetate

These are just a few of the chemicals that flavour an apple.<sup>2</sup>



Many natural and commonly occurring products are used as food additives. Salt, sugar, vinegar and some vitamins are used as preservatives. Many food colourings and flavourings are obtained from foods. The food additive 300 is vitamin C; 101 is Vitamin B2 (riboflavin) and grapeskin extract has the number 163.<sup>1</sup>

### Safety and dose

The use of food additives in Australia is regulated by Food Standard Australia and New Zealand (FSANZ). FSANZ does not approve an additive unless extensive testing has been undertaken and it has been shown that no harmful effects are expected from consumption. For a chemical to be approved it must be demonstrated that it is safe, there are good reasons to use it, it will be used in the lowest possible quantity and that consumers will be clearly informed when it is added (through labelling).<sup>1</sup>

FSANZ also sets the *Acceptable Daily Intake* (ADI) for each additive – that is, the amount that can be eaten every day over a lifetime without risk of harm. The ADI is determined by reviewing available data and finding a level at which no toxic effect is observed. A large safety factor is included in the ADI, which means that the level at which no toxic effect is observed is multiplied, often by more than 100, to produce the ADI.<sup>1</sup>

FSANZ also estimate the expected daily intake – how much an average person is likely to consume of the chemical from the food supply. This assessment is compared to the ADI and determines how much of the chemical can be added to food. The expected daily intake is modified in response to changes in food consumption patterns. For example, when FSANZ found that 5% of children in between the ages of 2 and 11 years were consuming more than the expected daily intake of an artificial sweetener named cyclamate, they reduced the maximum amount allowed in flavoured drinks by almost half.<sup>1</sup>

Many consumers are not comforted by the fact that they are eating an ingredient at a fraction of the level at which it causes observable toxic effects. Some argue that an ingredient with ANY toxic effects at ANY level should be avoided. It is worth noting that chemicals which are necessary at lower levels, such as salt or vitamin A, can be extremely harmful if the dose taken is too high.

### Controversial additives

#### *Monosodium Glutamate (MSG)*

Monosodium Glutamate (MSG, or 621) is often added to food as a flavour enhancer. The sodium component is identical to sodium from table salt. Glutamate is an amino acid – the building block of protein – that is found in many proteins that are commonly eaten. MSG occurs naturally in many protein-rich foods, and is harvested from sugar cane for use as a food additive.<sup>3</sup>

FSANZ conducted a thorough safety assessment of Monosodium Glutamate (MSG, or 621). In this assessment, MSG was explored as a possible cause of *Chinese restaurant syndrome* and asthmatic attacks. Symptoms of *Chinese restaurant syndrome* include numbness, weakness, drowsiness, nausea and headache. Evidence remains inconclusive, and the studies which do establish a link suggest that it only exists for a small percentage of the population. Evidence for the link between asthma and MSG is also inconclusive, because results from different studies conflict.<sup>4</sup>

Animal studies indicate that the ADI for MSG is 16 000 mg (16 grams) per kilo of body weight per day (mg/kg/day). A report published in the European Journal of Clinical Nutrition suggests that amongst extreme users of MSG, intake is 30 mg/kg/day, which is well within the ADI. The same report reviewed a study in which humans were given doses of free glutamate of 147 grams

a day or more, without any adverse effects. Extreme users of MSG are thought to consume 2-3 grams of MSG a day.<sup>5</sup>

#### *Sodium Benzoate and food colourings*

Sodium benzoate (211) is used as a food colouring and preservative. Food colourings, particularly those in foods commonly consumed by children, often cause concern to parents

Food colours must be approved by FSANZ before they are used in Australia. Additives receive approval only once it is demonstrated that no harmful effects are expected to result from their intended use. FSANZ also determines whether the additive is safe at levels likely to be consumed over a lifetime, and recommends a maximum level permitted for use in certain foods. Therefore it is unlikely that commonly consumed levels of sodium benzoate and synthetic food colourings cause cancer.

The UK Southampton study published in November 2007 in *The Lancet* (a highly respected medical journal) examined the effects of sodium benzoate on the hyperactivity of children aged 3 and 8-9 years. It was found that children taking the mix of colourings and the preservative, at levels much higher than would normally be achieved in the diet, had increased hyperactivity when compared with the children who did not have the colourings and preservatives.<sup>6</sup>

Adverse reactions to food additives, such as behavioural changes, rashes, irritable bowel symptoms and behavioural changes, affect only a small proportion of the population.

A recent survey by FSANZ found that the concentration of added colours in food in Australia is very low – mostly less than 25% of the maximum permitted levels. Estimated dietary exposure is less than 10% of the ADI, even among high consumers of added food colours.

Furthermore, the FSANZ survey found that the average concentration of added food colour in Australia was well below that used in the UK Southampton study, and that Australian children consumed much lower levels of food colours than the amounts used in the study.

Colourings and preservatives that may cause adverse reactions are commonly found in foods that are recommended only occasionally for children, such as soft drinks and confectionary. A healthy diet, with fresh fruit and vegetables, will minimise exposure to these colourings and preservatives.

#### *Sodium Nitrate and Sodium Nitrite*

Nitrites and nitrates are used as a preservative and add colour and flavour to processed meats. Processed meats are those meats that are commonly eaten cold and are pink or red in colour.

The International Agency for the Research of Cancer (IARC) has reviewed ingested nitrates and nitrites and classified them as 'probably carcinogenic to humans' by the IARC. Nitrites and nitrates have been linked to bowel cancer, one of the most common cancers in men and women in Australia.<sup>7</sup>

### **Summary**

Although evidence suggests that most additives and preservatives themselves are not cancer causing, it is important to remember that obesity is a major cause of cancer and many other diseases. Processed foods, which tend to contain more additives, are often less healthy and should be eaten less often. The best recipe for health is to maximise intake of whole, fresh foods. These foods are free from additives and reduce the risk of cancer and other lifestyle diseases.

## Is the evidence conclusive?

Absolute safety is impossible to prove. Although vigorous tests have been conducted to assess the safety of additives approved for use in Australia, there is always a possibility that sometime in the future a series of studies will demonstrate that a particular chemical is, in fact, harmful in the doses taken by the general population.

## References

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