



FOOD ADDITIVES/ ALLERGY AND INTOLERANCE

December 1995

1. INTRODUCTION

As defined by the Codex Alimentarius Commission (a joint FAO/WHO organisation involved in preparing food standards) and the EEC Commission, a 'food additive' means *any substance not normally consumed as a food by itself and not normally used as a typical ingredient of food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may reasonably be expected to result, directly or indirectly, in it or its by-products becoming a component of or otherwise affecting the characteristics of such foods. The term does not include contaminants or substances added to food for maintaining or improving nutritional qualities.*

Although food additives are in no way uniquely related to allergic or intolerance reactions, this criticism is often made. This factsheet seeks to address this issue and put it in context.

2. TYPES OF ADDITIVES

Additives may be classified into three groups, according to the function they fulfil. Some additives fulfil more than one function.

a) Additives affecting physical or physico-chemical characteristics:

- thickeners (including starches, gums, pectin)
- emulsifiers and stabilisers
- acidulants and buffers
- clouding/weighting agents (dispersing agents)
- raising agents
- anti-caking agents
- enzymes
- encapsulants
- glazing agents

b) Additives affecting sensory characteristics:

thickeners (including starches, gums, pectin)
emulsifiers and stabilisers
acidulants and buffers
clouding/weighting agents (dispersing agents)
raising agents
anti-browning agents
sequestering agents

curing and pickling agents
humectants
flavour enhancers
colours
gelling agents
non-nutritive sweeteners
flour improvers

c) Additives affecting shelf-life:

preservatives
antioxidants
anti-browning agents
sequestering agents
curing and pickling agents
humectants

3. THE USE OF ADDITIVES

Additives have been used from earliest times. For example, the ancients preserved food with vinylguaiacol and chemically related substituted phenols (in the form of smoke), acetic acid (in the form of vinegar), sulphur dioxide (from burning sulphur), sodium chloride and other metal halides and sulphates (in the form of sea-salt and brine). They coloured food with 1-methyl-2-carboxy-3,5,6,7,8, pentahydroxyanthraquinone-7-glucoside (in the form of cochineal, the crushed insect *Coccus cacti*) and crocetin digentiobiose ester (in the form of saffron). They used gum arabic (and other exudates) as thickeners and emulsifiers.

Some of these additives were multifunctional. Some common ingredients such as smoke, salt and vinegar have also a preservation function, but also change flavour. Saffron adds flavour in addition to colour.

Most of the ancient additives are still in use. With time, their number, though not necessarily the total quantity, has increased, mainly in pursuit of the original aims but additionally in the interest of safety.

4. ADDITIVES AND HEALTH

4.1. *Definition of adverse reactions to food (allergy and intolerance)*

Adverse reactions from ingestion of food additives could be of two different types: true allergy or hypersensitivity, which results from an immunological mechanism, and intolerance or idiosyncrasy, where no immunological basis is apparent. The mechanisms of these reactions are not totally clear but it seems that virtually all the adverse reactions to food additives are manifestations of intolerance rather than allergy.

4.2. *Clinical Symptoms*

A food additive ingested by anyone susceptible to it produces symptoms which cause variable degrees of discomfort.

The most common manifestations of intolerance occur in the respiratory tract (particularly asthma and rhinitis) and the skin (usually urticaria or angiodema). Migraine, irritable bowel syndrome, psychological disturbances, urinary incontinence and arthralgia have been reported, however the association is less clear.

The popular press has given prominence to claims that additives are responsible for hyperactivity in children. Hyperactivity is mainly characterised by constant restlessness, disorganization and inattention.

The much-publicised claim by Feingold that additives induce hyperactivity in children has been refuted by a report of the American Council on Science and Health (ASCH) in 1982. Recent well-controlled scientific studies support a link between food additives and hyperactivity in only a small proportion of cases of hyperactivity in small children.

The Joint Report of the Royal College of Physicians and the British Nutrition Foundation 1984 regarding "Food Intolerance and Food Aversion" states:

"The diversity of clinical manifestations means that there is no particular diagnostic sign. Elimination diets and "blind" challenges require much time by clinician and patient, and the interpretation of results may not always be objective. It is a reflection of the difficulties of accurate diagnosis that estimates of incidence of susceptibility are variable and tentative."

Furthermore, additives to be used in foodstuffs for infants, and young children are evaluated in the EEC separately from other additives, by a specific procedure

4.3. *Frequency of adverse reactions*

Assessing the frequency of allergy or intolerance to food additives, poses a considerable problem. According to the Working Group Report of the EEC, (Scientific Committee for Food, Report III/556/81, 1981) there is no doubt about the existence of such reactions to individual food additives, particularly urticaria and respiratory reactions which can be provoked by several commonly used food colours, preservatives and antioxidants. However, for most additives, no history of causing adverse reactions is known.

Difficulty in obtaining evidence of susceptibility is that data are mainly obtained from

highly selected groups of patients with skin or respiratory disorders. Food additives, if they have any influence on the condition, may exacerbate a pre-existing intolerance caused by an entirely different agent.

The Working Group Report of the EEC, 1981, reports some estimates of intolerance incidence and from a variety of studies in several countries it draws the following conclusion:

"Therefore when attempting to quantify the problem of adverse reactions to food additives, it is only possible, on the basis of present information, to suggest a wide range of possible frequencies, and only for the most common manifestations, of 0.03% to 0.15%".

A more recent study carried out on behalf of the British Government confirms that the occurrences of intolerance reactions to additives is low and in the general population is in the range of 0.01-0.26%.

4.4. *Adverse Reactions in Context*

The estimate of 0.03 - 0.15% intolerance to additives should be viewed in the context of intolerance to other food and food ingredients. To estimate the incidence of such intolerance is as difficult as it is for additives, and for the same reasons. Estimates therefore vary widely: between 0.3 and 20%.

The most common allergy among young children, estimated at between 0.2 and 7.5%, is to cow's milk protein. Among adults the commonest allergies are to cow's milk, eggs, fish and shellfish, wheat and wheat products and soya.

A significant proportion of the world's population can only tolerate small amounts of milk. This is because they lack the enzyme, lactase, necessary to digest lactose. This lactase-deficiency reaches 90% of some ethnic groups but is less than 10% among European Caucasians.

There is no food or ingredient which does not have an adverse effect on somebody and additives are a diverse group of substances with no form or function common to all. The assertion that some people are intolerant to all additives but to nothing else is both contrary to reason and without evidence.

5. CONTROL OF ADDITIVES

The use of additives is strictly regulated in all developed countries. The regulatory mechanisms differ in detail from one area to another but all aim to ensure safety by defining what additives may be used, in what amount, in what type of food and based on technological need. Examples are:

5.1. Regulation in the EEC

Regulations are based on the toxicological evaluations of the Scientific Committee for Food of the European Union. This committee is composed of acknowledged experts from all the member countries. They rely on their own work, and on guidance from the Joint FAO/WHO Expert Committee on Food Additives and the World Health Organisation.

Once permitted, an additive goes on the list of permitted additives and is given a number prefixed by the letter "E". The presence of an additive in food must be stated on packaging after its category name, either by its "E" number or its scientific name, e.g. "E330" or "citric acid". An E number indicates that the additive is approved for use throughout the EEC. It also enables consumers, by use of a key, to identify an additive whatever their language.

Recently, the E.U. adopted three specific directives regulating the use of all additives in foodstuffs.

5.2. Regulation in the US

Additives are regulated by the Food and Drug Administration. Those in common use before 1958 are classified as "GRAS" (General Regarded as Safe) and are excluded from the legal definition of additives.

Additives which are not classified as GRAS under the old 1958 rules are controlled by regulations made under a 1958 Food Additive Amendment to the Food, Drug and Cosmetic Act. These regulations specify what toxicological criteria are necessary for additive clearance and include special requirements (the "Delaney Clause") for additives suspected of causing cancer. If there are sound grounds for concern, an additive can be delisted under either the old or new systems of clearance.

5.3. Regulation in Australia

In Australia, the system of approval is slightly different but it embodies the same principles of control. No new additive is approved for use in food before its safety has been established by the National Health and Medical Research Council (NH & MRC), and it is then adopted into the Australian Food Standards Code for national use. All ingredients and additives in food are controlled by the Food Standards Code and the State Health Departments and are permitted only in foods where stated so in the code.

6. IOCCC POSITION

Additives are used primarily to make food products safe, convenient and attractive.

They may only be used when the regulatory authorities are satisfied that they are both safe and necessary for their purpose.

A very small minority of people are intolerant to individual additives. Intolerance to food additives is less frequent than allergic reactions to certain foods or components of food (e.g. milk protein).

A listing of ingredients allows those who are intolerant to certain ingredients to avoid food which contains them.

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