

CHAPTER 8

Reactions to food additives

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The purpose of a food additive is to make a food look, taste or smell better and to improve its texture or keeping qualities. Labels must indicate the presence of colouring agents, preservatives, antioxidants, emulsifiers, stabilizers, sweeteners and a number of other agents. Code numbers have therefore been issued with the prefix 'E' if the substance has been approved by the European Community. The main categories are as follows: keeping properties, i.e. preservatives, antioxidants, acidity regulators (E200–321); food appearance, i.e. colours (E100–180); and modified consistency or texture, i.e. emulsifiers, stabilizers, thickeners, sweeteners (E322–495).

Because of the occasional development of adverse reactions to some of these substances (probably affecting less than one in a 1000 people) [1], unrealistic campaigns have been mounted to exclude them all. Without them, neither a common loaf of bread nor a bottle of wine could be produced. While they have a substantial safety margin for the general public, however, a few substances can undoubtedly cause problems for some individuals. The mechanism is unknown but seldom seems to involve IgE.

The sulphiting agents have been invaluable in preventing the oxidation of the oils and fat in food and in preventing the discolouration which results from enzyme effects, but they can cause adverse reactions in some circumstances, including flushing, itching of the mouth and skin, and asthma. About 5% of those with asthma can have an attack provoked by sulphites, to a degree which can be life threatening [2]. Their use in 'fresh' fruit and vegetables has now been banned in the United States but substantial quantities are present in wine and other drinks, in shrimps and processed potatoes, and even in some nebulized drugs. Adverse effects are also seen with nitrites, which give preserved meats their pink colour but can also cause flushing and giddiness through their vasodilating effects. Sodium nitrite can be encountered in food in amounts of 20 mg, which can cause headaches, skin rashes, and gastrointestinal symptoms [3]. The antioxidants butylated hydroxyanisole and butylated hydroxytoluene can aggravate urticaria in occasional cases [4]. Benzoates and sorbic acid can do the same or

cause rashes on contact with the skin [5,6]. A number of flavouring substances (which are not covered by regulating authorities at present) can also provoke an exacerbation of pre-existing eczema [7].

Many of the accusations concerning the potential adverse effects of food additives have concerned the flavour enhancer monosodium glutamate, but the chest pain which has been described is probably due to the oesophageal effect of a high concentration of an irritant substance, since a similar symptom has also been attributed to spiced tomato [8]. It has also been suggested that the sensation of bloating may be caused by fluid retention, possibly linked with the high sodium content of particular foods, and glutamate has also been reported as causing asthma [8]. Public concern about glutamate rose sharply for a while but virtually disappeared (as did self-diagnosed reactions to it) as soon as the media lost interest.

Adverse reactions have also been attributed to colouring agents, especially the coal tar dyes (E102 = tartrazine, E110 = sunset yellow, E123 = amaranth red, E127 = erythrosine, and E133 = brilliant blue). About 60 tons of these substances have been manufactured each year in the United States, but this figure is declining and tartrazine is now banned in Scandinavia. Objective studies have shown that tartrazine can occasionally provoke urticaria [10] and it has been banned in Sweden. One group of investigators carried out extensive tests, however, and could find only two cases in which tartrazine or other azo dyes were capable of causing an attack [11].

A more controversial claim concerning tartrazine and other colouring agents is that it causes hyperactivity and childhood behaviour disorders. Since the first report that some 70% of hyperactive children benefited from a diet free of preservatives, salicylates and artificial flavours [12], the helpful effects of dietary restriction have been endorsed to a greater or lesser extent in some but denied in other studies [13–15]. In spite of the assumption of an allergic cause for hyperactivity [16], little or no evidence has been produced of a biochemical, pharmacological or immunological abnormality that could support this concept. It is important to recognize that hyperactive behaviour has many causes, which are often neglected when undue attention is focused on diet. Blind challenge tests are therefore an essential part of management. Those parents who suspect food intolerance in their

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child may nevertheless reject the evidence of negative challenge tests and insist on keeping their children on restricted diets [14, 17].

The natural history of food additive reactions vary, but there is good evidence, based on challenge tests, that patients can lose their reactivity in time [18]. In children who have been shown to develop urticaria after a food additive challenge, the same reaction seldom recurs when a challenge is repeated after an interval [17]. This may mean that, because of a delay in testing, some transient reactions are never proven and are therefore underdiagnosed. It emphasizes, however, the importance of ensuring that a suspected reaction is still present before dietary exclusion measures are introduced by way of treatment.

In some cases, it is also possible that it may require the potentiating effects of exercise, mental stress, or in the case of asthma, the inhalation of an additional irritant substance [19] before the adverse effects of food additives can be clearly demonstrated. Attempts to develop definitive tests for diagnosing food-additive reactions, whether IgE-mediated or not, have still to be developed.

In summary, there is no evidence to support the claim that any of these substances cause a large number of illnesses or that a return to 'natural' foods would be of prophylactic value. On the contrary, if additives which improve the keeping qualities of food are removed, this will add to the danger of food-transmitted infection, which is still some thousands of times more common than all forms of reaction caused by food additives. The food industry has nevertheless responded to public concern, and in many cases has avoided additives or reduced their use to a minimum. Food labelling has also been of value for those people who have a known sensitivity. A remaining matter of concern is that many vulnerable people with vague symptoms have been led to adopt inadequate, restricted diets in the misguided belief that food, or food additives, have caused their illness. The same applies to parents who are worried about behaviour problems in their children and impose an obsessional dietary regime on an already disturbed child. While increased parental attention can be beneficial in such cases, food restriction can only be justified if its relevance can be objectively confirmed.

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