Food Safety
AUTHORITY OF IRELAND

Legislation, intake and usage of food additives in Ireland

Food Additives, Chemical Contaminants & Residues

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SUMMARY

Food additives are substances added intentionally to foodstuffs to perform certain technological functions, eg. to colour, sweeten or preserve.

Food additives are defined in Community legislation 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 intentional addition of which to food for a technological purpose in the manufacture, processing, preparation, treatment, packaging, transport or storage of such food results, or may be reasonably expected to result, in it or its by-products becoming directly or indirectly a component of such foods" (Directive 89/107/ECC Article 1).

Food additives are authorised at EU level for all the fifteen Member States, as well as for Norway and Iceland.

The Community legislation on food additives is based on the principle that only those additives that are explicitly authorised may be used. Most food additives may only be used in limited quantities in certain foodstuffs. If quantitative limits are not laid down for the use of a food additive, it must be used according to good manufacturing practice, i.e. only as much as necessary to achieve the desired technological effect.

Food additives may only be authorised if:

- there is a technological need for their use,
- they do not mislead the consumer,
- they present no hazard to the health of the consumer.

Prior to their authorisation, food additives are evaluated for their safety by the Scientific Committee on Food, an expert panel that advises the European Commission on questions relating to food.

The Community legislation on food additives consists of the following Directives:

- Council Directive 89/107/EEC, as amended by Directive 94/34/EC (commonly referred to as the Framework Directive);
- European Parliament and Council Directive 94/36/EC that lays down detailed rules on colours;
- European Parliament and Council Directive 94/35/EC, as amended by Directive 96/83/EC, that lays down detailed rules on sweeteners;
- European Parliament and Council Directive 95/2/EC, as amended by Directives 96/85/EC, 98/72/EC and 2001/5/EC, that lays down detailed rules for authorisation of all food additives other than colours and sweeteners.

Furthermore, all authorised food additives have to fulfil purity criteria, that are set out in detail in three Commission Directives:

- Directive 95/31/EC as amended by Directive 2000/51/EC and Directive 2000/52/EC for sweeteners;
- Directive 95/45/EC as amended by Directive 99/75/EC for colours;
- Directive 96/77/EC as amended by Directive 96/86/EC, Directive 2000/63/EC and Directive 2001/30 for additives other than colours and sweeteners.

The use of food additives must always be labelled on the packaging of food products by their category (anti-oxidant, preservative, colour, etc) with either their name or E number. Detailed rules on labelling of additives in foodstuffs, and on additives sold as such to food producers and consumers are laid down in Community legislation (Directive 2000/13/EC, Regulation 50/2000/EC, Directive 94/35/EC and Directive 89/107/EEC).[1]

Community legislation also requires that Member States monitor food additive intake and usage. The Food Safety Authority of Ireland commissioned the Irish Universities Nutrition Alliance (IUNA) research group, to provide data on food additive usage and food additive intake to fulfil the legal obligations of the state. The use and intake of food additives in the Irish food supply was monitored using the Irish National Food Ingredient Database (INFID) (1995-1999) and the North South Food Consumption Survey (NSFCS). The findings of this detailed analysis were that sulphites and nitrites presented intakes which could potentially exceed their ADIs and therefore require further assessment with a view to revision in their conditions of use.

This report is a comment on the legislation and does not purport to be a legal interpretation.

INTRODUCTION

Harmonisation of the use of food additives at European Community level was a priority for completion of the internal market. The framework Directive 89/107/EEC on food additives was adopted on 21 December 1988 and the three specific directives (colours, sweeteners, miscellaneous) in 1994 and 1995. Since then, the laws and regulations relating to the use of additives are the same in the fifteen Member States. This structure guarantees the free movement of foodstuffs, ensures a high level of consumer protection and offers the consumer greater freedom of choice between different foodstuffs.

Under the three specific EC Directives, 94/35/EC, 94/36/EC and 95/2/EC, Ireland and other Member States have a legal obligation to monitor the use and consumption of food additives listed in the Directives. The Food Safety Authority of Ireland commissioned the Irish Universities Nutrition Alliance (IUNA) research group, which comprises the academic nutrition units of Trinity College Dublin, University College Cork and University of Ulster Coleraine, to commence research in order to provide data on food additive usage and food additive intake to fulfil the legal obligations of the state. In accordance with these directives the use of food additives in the Irish food supply was monitored and the results were submitted to the EC in an interim report "Food additive usage patterns in Ireland and changes in food additive usage over the periods 1995/97 and 1998/99." [2]

Food safety has become a major issue over the last few years and conflicting information on the use and safety of food additives has raised concerns. This report is aimed at the food industry. It seeks to clarify issues surrounding food additives including their function, their use, possible implications for health and the legislation by which they are regulated.

This information should help the reader to understand the significance of the food additives monitoring results, which are reported in Chapter 7.

CHAPTER 1. DEFINITION OF FOOD ADDITIVES

Food additive means "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 intentional addition of which to food for a technological purpose in the manufacture, processing, preparation, treatment, packaging, transport or storage of such food results, or may be reasonably expected to result, in it or its by-products becoming directly or indirectly a component of such foods" (EC 89/107/EEC Article 1).

Food additives are natural or manufactured substances, added to foods for a variety of reasons - to restore colours lost during processing (e.g. colours), to provide sweetness in low-sugar products (e.g. sweeteners), to prevent deterioration during storage and to guard against food poisoning (e.g. preservatives). The agreed categories of food additives are listed in Table 1.1. Whether the additive comes from a natural source or is man-made, the question of safety is central to the decision as to whether or not an additive should be permitted in food. All additives must be approved before permission for use by the EU Scientific Committee on Food (SCF) (see Chapter 5).

Table 1.1 Categories of food additives

Acid	Emulsifying salt	Modified starch
Acidity regulator*	Enzyme**	Preservative
Anti-caking agent	Firming agent	Propellant gas and Packaging gas
Anti-foaming agent	Flavour enhancer	Raising agent
Anti-oxidant	Flour treatment agent	Sequestrant ***
Bulking agent	Gelling agent	Stabiliser****
Colour	Glazing agent*****	Sweetener
Emulsifier	Humectant	Thickener

* These can act as two-way acidity regulators
** Only those used as additives
*** Inclusion of these terms in this list is without prejudice to any future decision or mention thereof in the labelling of foodstuffs intended for the final consumer
**** This category also comprises foam stabilisers
***** These substances include lubricants
Note: Carriers and foaming agents were not included in this original list of categories. However, they were added in Directive 95/2/EC on food additives other than colours and sweeteners.
Source: Council Directive 89/107/EEC

The term "food additive" refers to a very specific group of substances. Other substances often thought of as additives are regulated separately. They are:

(a) processing aids - any substance not consumed as a food ingredient by itself, intentionally used in the processing of raw materials, foods or their ingredients, to fulfil a certain technological purpose during treatment or processing and which may result in the unintentional but technically unavoidable presence of residues of the substance or its derivatives in the final product, provided that these residues do not present any health risk and do not have any technological effect on the finished product

(b) substances used in the protection of plants and plant products in conformity with European Community rules relating to plant health (e.g. pesticides, herbicides)

(c) flavourings for use in foodstuffs, falling within the scope of Council Directive 88/388/EEC

(d) substances added to foodstuffs as nutrients (e.g. minerals, trace elements or vitamins).

CHAPTER 2. PROPERTIES OF FOOD ADDITIVES

Food additives are divided into categories based on their principal function. The categories are:

A) Preservatives - substances which prolong the shelf-life of foodstuffs by protecting them against deterioration caused by micro-organisms.

B) Antioxidants - substances which prolong the shelf-life of foodstuffs by protecting them against deterioration caused by oxidation, such as fat rancidity and colour changes.

C) Colours - substances which add or restore colour in a food, and include natural constituents of foodstuffs and natural sources which are normally not consumed as foodstuffs as such and not normally used as characteristic ingredients of food.

D) Sweeteners - used to impart a sweet taste to foodstuffs or as tabletop sweeteners.

E) Carriers (including carrier solvents) - substances used to dissolve, dilute, disperse or otherwise physically modify a food additive without altering its technological function (and without exerting any technological effect themselves) in order to facilitate its handling, application or use.

F) Acids - substances which increase the acidity of a foodstuff and/or impart a sour taste to it.

G) Acidity regulators - substances which alter or control the acidity or alkalinity of a foodstuff.

H) Anti-caking agents - substances which reduce the tendency of individual particles of a foodstuff to adhere to one another.

I) Anti-foaming agents - substances which prevent or reduce foaming.

J) Bulking agents - substances which contribute to the volume of a foodstuff without contributing significantly to its available energy value.

K) Emulsifiers - substances which make it possible to form or maintain a homogeneous mixture of two or more immiscible phases such as oil and water in a foodstuff.

L) Emulsifying salts - substances which convert proteins contained in cheese into a dispersed form and thereby bring about homogeneous distribution of fat and other components.

M) Firming agents - substances which make or keep tissues of fruit or vegetables firm or crisp, or interact with gelling agents to produce or strengthen a gel.

N) Flavour enhancers - substances which enhance the existing taste and/or odour of a foodstuff.

O) Foaming agents - substances which make it possible to form a homogeneous dispersion of a gaseous phase in a liquid or solid foodstuff.

P) Gelling agents - substances which give a foodstuff texture through the formation of a gel.

Q) Glazing agents (including lubricants) - substances which, when applied to the external surface of a foodstuff, impart a shiny appearance or provide a protective coating.

R) Humectants - substances which prevent foodstuffs from drying out by counteracting the effect of an atmosphere having a low degree of humidity, or promote the dissolution of a powder in an aqueous medium.

S) Modified starches - substances obtained by one or more chemical treatments of edible starches, which may have undergone a physical or enzymatic treatment, and may be acid or alkali thinned or bleached.

T) Packaging gases - gases other than air, introduced into a container before, during or after the placing of a foodstuff in that container.

U) Propellants are gases other than air, which expel a foodstuff from a container.

V) Raising agents - substances or combinations of substances which liberate gas and thereby increase the volume of a dough or a batter.

W) Sequestrants - substances which form chemical complexes with metallic ions.

X) Stabilisers - substances which make it possible to maintain the physico-chemical state of a foodstuff. Stabilisers include substances which enable the maintenance of a homogeneous dispersion of two or more immiscible substances in a foodstuff and include also substances which stabilise, retain or intensify an existing colour of a foodstuff.

Y) Thickeners - substances which increase the viscosity of a foodstuff.

Z) Flour Treatment Agents - substances other than emulsifiers which are added to flour or dough to improve its' baking quality.

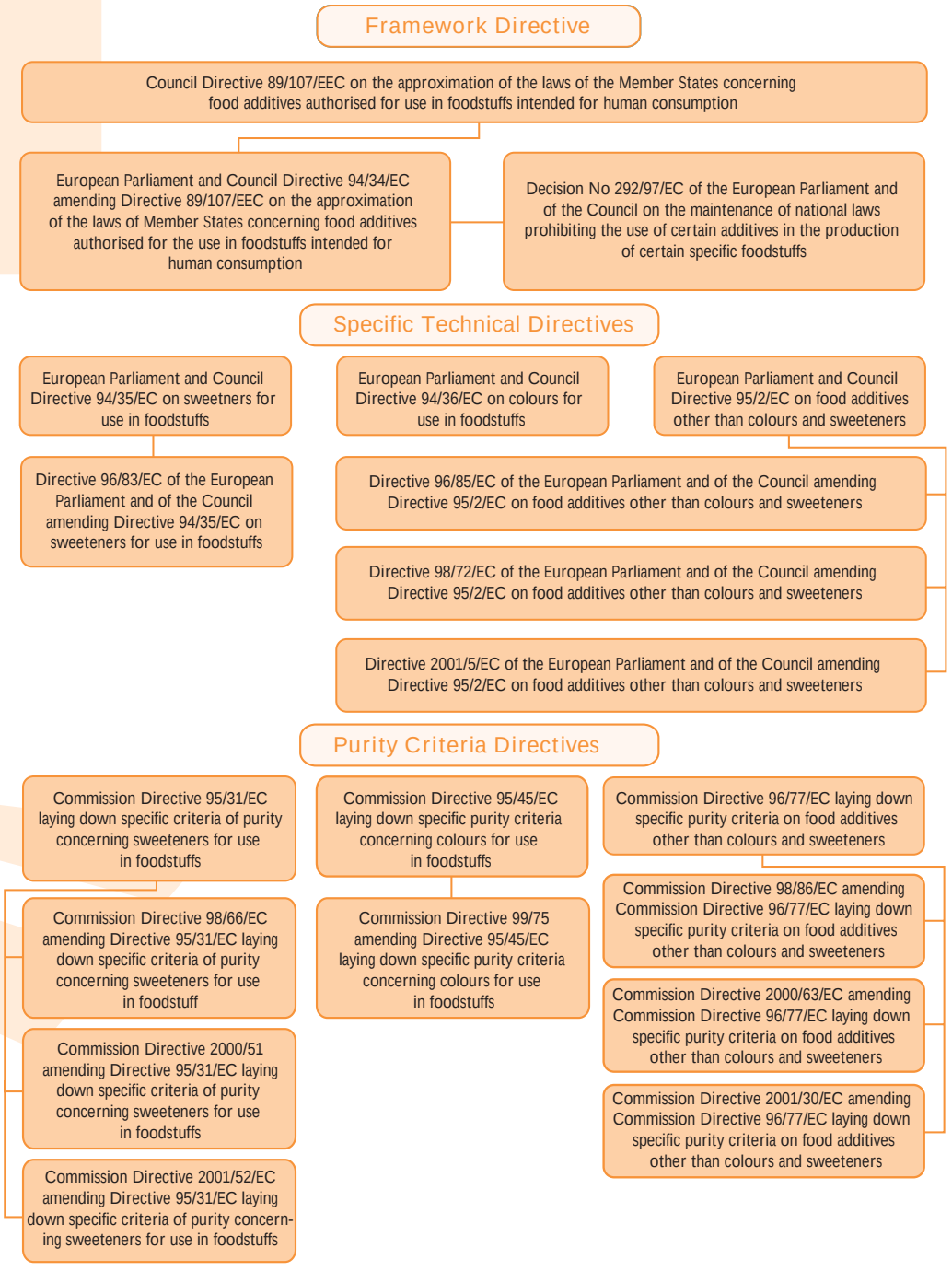
CHAPTER 3. FOOD ADDITIVE LEGISLATION

Since Ireland joined the European Community (EC) in 1973 and in particular since the advent of the internal market in Europe, the amount and scope of food legislation has expanded. All legislation agreed in Brussels by the Member States of the European Union has to be transposed into Irish law. Even though EC legislation is binding on a Member State, it is the transposition into national law that identifies who is responsible for enforcing the legislation and creates the penalties for non-observance of the regulations.

3.1 EU Legislation

A true single market for food products could not exist without harmonised rules for the authorisation and the conditions for the use of additives. In 1989, the European Community adopted a Framework Directive (89/107/EEC) which set out the criteria by which additives would be assessed and provided for the adoption of three specific technical directives establishing the list of additives which could be used (to the exclusion of all others), the foods in which they could be used and any maximum levels. The purity required for these additives is laid down in directives defining specific purity criteria. Figure 3.1. gives an overview of EU food additive legislation.

Figure 3.1. Overview of European food additive legislation currently in force*



* For future developments, see Appendix 1.

The Framework Directive

'Council Directive of 21 December 1988 on the approximation of the laws of the Member States concerning food additives authorised for use in foodstuffs intended for human consumption (89/107/EEC).'

The scope of the Directive covers food additives used as ingredients during the manufacture or preparation of food and which are part of the finished product. It provides for the adoption of specific directives establishing a list of substances which may be used as food additives under the conditions of use mentioned in those lists.

It provides (a) information requirements on labelling and packaging of additives for sale both to the final consumer and manufacturer, (b) conditions for provisional authorisation for the marketing and use of unlisted additives belonging to the categories, and (c) the basis for action by Member States on listed additives which comply with the Directive but which are considered for specific reasons to carry a health risk.

The Directive requires that all permitted food additives are assessed by the European Scientific Committee for Food (SCF) for their safety against the criteria which are stated in Annex II to the Directive as follows:

1. Food additives can be approved provided that:

- a reasonable technological need can be demonstrated and the purpose cannot be achieved by other means which are economically and technologically practicable
- they present no hazard to the health of the consumer at the level of use proposed, so far as can be judged on the scientific evidence available
- they do not mislead the consumer.

2. The use of food additives may be considered only where there is evidence that the proposed use of the additive would have demonstrable advantages of benefit to the consumer. In other words it is necessary to establish the case for what is commonly referred to as 'need'.
   The use of food additives should serve one or more of the purposes set out from points (a) to (d) (see below) and only where these purposes cannot be achieved by other means which are economically and technologically practicable and do not present a hazard to the health of the consumer:

(a) to preserve the nutritional quality of the food: an intentional reduction in the nutritional quality of a food would be justified only where the food does not constitute a significant item in a normal diet or where the additive is necessary for the production of foods for groups of consumers with special dietary needs;
(b) to provide necessary ingredients or constituents for foods manufactured for groups of consumers with special dietary needs;
(c) to enhance the keeping quality or stability of a food or to improve its organoleptic properties, provided that this does not change the nature, substance or quality of the food so as to deceive the consumer;
(d) to provide aids in manufacture, processing, preparation, treatment, packing, transport or storage of food, provided that the additive is not used to disguise the effects of the use of faulty raw materials or of undesirable (including unhygienic) practices or techniques during the course of any of these activities.

3. To assess the possible harmful effects of a food additive or derivatives thereof, it must be subjected to appropriate toxicological testing and evaluation. The evaluation should also take into account, for example, any cumulative, synergistic or potentiating effect of its use and the phenomenon of human intolerance to substances foreign to the body.

4. All food additives must be kept under continuous observation (see Chapter 7) and must be re-evaluated whenever necessary in the light of changing conditions of use and new scientific information.

5. Food additives must at all times comply with the approved criteria of purity.

6. Approval for food additives (see Chapter 4) must:
(a) specify the foodstuffs to which these additives may be added and the conditions under which they may be added;
(b) be limited to the lowest level of use necessary to achieve the desired effect,
(c) take into account any acceptable daily intake, or equivalent assessment, established for the food additive and the probable daily intake of it from all sources. Where the food additive is to be used in foods eaten by special groups of consumers, account should be taken of the possible daily intake of the food additive by consumers in those groups.

The Framework Directive 89/107/EEC was amended in 1994 by **'European Parliament and Council Directive of 30 June 1994 amending Directive 89/107/EEC on the approximation of the laws of Member States concerning food additives authorised for use in foodstuffs intended for human consumption (94/34/EC).'**

The amendment provided that countries can nominate certain foods which have traditional characteristics and which, in the territory of the Member State, have not been permitted to contain certain additives. If it is subsequently agreed, the Member States concerned can continue to restrict the use of additives in these foods within their territory. This has resulted in the adoption of a Decision providing approved national derogations: '**Decision No 292/97/EC of the European Parliament and of the Council of 19 December 1996 on the maintenance of national laws prohibiting the use of certain additives in the production of certain specific foodstuffs**'

A list of fifteen 'traditional' foods (see Table 3.1.) was drawn up so that the Member States concerned may maintain prohibition of certain categories of additives on their territory. None of these fifteen traditional foods are Irish products. Similar 'non-traditional' foods must be accepted by the Member States, but require careful labelling to distinguish these products from 'traditional' foods.

Table 3.1. Products for which the Member States concerned may maintain the prohibition of certain categories of additives

Member State	Foodstuffs	Categories of additives which may continue to be banned
Germany	Traditional German beer ('Bier nach deutschem Reinheitsgebot gebraut')	All except propellant gases
Austria	Traditional Austrian 'Bergkäse'	All except preservatives
Denmark	Traditional Danish 'Kødboller'	Preservatives and colours
Denmark	Traditional Danish 'Leverpostej'	Preservatives (other than sorbic acid) and colours
Finland	Traditional Finnish 'Mämmi'	All except preservatives
France	Traditional French bread	All
France	Traditional French preserved truffles	All
France	Traditional French preserved snails	All
France	Traditional French goose and duck preserves ('confit')	All
Greece	'Feta'	All
Italy	Traditional Italian 'Salame cacciatore'	All except preservatives, antioxidants, flavour enhancers and packaging gas
Italy	Traditional Italian 'Mortadella'	All except preservatives, antioxidants, pH-adjusting agents, flavour enhancers, stabilisers and packaging gas
Italy	Traditional Italian 'Cotechino e zampone'	All except preservatives, antioxidants, pH-adjusting agents, flavour enhancers, stabilisers and packaging gas
Spain	Traditional Spanish 'Lomo embuchado'	All except preservatives and antioxidants
Sweden/ Finland	Traditional Swedish and Finnish fruit syrups	Colours

Proposed legislation:

Amendment to Framework Directive 89/107/EEC on food additives (due end of 2001).

This proposal deals with the issues surrounding enzymes and the abolition of the temporary national authorisation of food additives (see Chapter 4).

The Specific Directives

The three specific directives were adopted in 1994/95. These directives now provide the requirements for additive legislation within the whole of the European Community. They are:

- **Sweeteners**

'European Parliament and Council Directive 94/35/EC of 30 June 1994 on sweeteners for use in foodstuffs':

Council Directive 94/35/EC regulates the use and sale of sweeteners as defined in Article 1. They are listed in the Annex to the Directive and may only be used under the conditions specified therein. Sweeteners may not be used in food for infants and young children. The following sweeteners (Table 3.2.) are listed in the Annex to the Directive that specifies the foodstuffs in which they are permitted and the corresponding maximum permitted levels.

Table 3.2. List of permitted sweeteners

Bulk sweeteners		Intense sweeteners	
E 953 Isomalt	E 421 Mannitol	E 950 Acesulfame K	E 959 Neohesperidine DC
E 966 Lactitol	E 420 Sorbitol: (i) Sorbitol (ii) Sorbitol syrup	E 951 Aspartame	E 954 Saccharin and its Na, K and Ca salts
E 965 Maltitol (i) Maltitol (ii) Maltitol syrup	E 967 Xylitol	E 952 Cyclamic acid and its Na and Ca salts	E 957 Thaumatin

This Directive (94/35/EC) was amended by:

'Directive 96/83/EC of the European Parliament and of the Council of 19 December 1996 amending Directive 94/35/EC on sweeteners for use in foodstuffs.'

This amendment extends the scope of the sweeteners legislation to foods for particular nutritional use within the meaning of Council Directive 89/389/EEC. It further prohibits the use of sweeteners for food for infants and young children who are not in good health.

It also defines the term "quantum satis", meaning that no maximum level is specified. However, sweeteners shall be used in accordance with good manufacturing practice, at a dose level not higher than is necessary to achieve the intended purpose and provided the consumer is not misled.

It further clarifies when the presence of a sweetener in a foodstuff is permissible:

- in compound foodstuffs with no added sugar or which are energy-reduced,
- in compound dietary foodstuffs intended for a low-calorie diet and
- in compound foodstuffs with a long shelf-life, (excluding foods for infants and young children),
  - insofar as the sweetener is permitted in one of the ingredients of the compound foodstuff or
  - if the foodstuff is intended to be used solely in the preparation of a compound foodstuff which conforms to Directive 94/35/EC.

It also includes an extension to the Annex to Directive 94/35/EC, widening the permitted application of sweeteners in foodstuffs

Proposed legislation (due end of 2001):

Amendment to European Parliament and Council Directive 94/35/EC of 30 June 1994 on sweeteners for use in foodstuffs. Essentially the proposal is to include "salt of aspartame-acesulfame" and Sucralose (E 955) to the list of permitted sweeteners, rename various categories and following the reduction of the Acceptable Daily Intake (ADI) for cyclamic acid, delete its permitted use in some categories.

- **Colours**

'European Parliament and Council Directive 94/36/EC of 30 June 1994 on colours for use in foodstuffs'.

This Directive regulates the use of colours in or on food and the sale of colours and food containing colours. It does not include colours used for the colouring of the inedible external parts of foodstuffs, such as cheese coatings, sausage coatings, dried or concentrated foodstuffs and flavourings incorporated during manufacturing because of their aromatic, sapid or nutritive properties together with a secondary colouring effect, e.g. paprika and saffron. The Directive prohibits the use of colours in certain foodstuffs, including mineral water and whole milk. Permitted substances are listed in Annex I of the Directive and their specific use in Annexes II – V of the Directive as follows:

ANNEX I	List of permitted food colours
ANNEX II	Foodstuffs which may not contain added colours, except where specifically provided for in Annex III, IV or V
ANNEX III	Foodstuffs to which only certain permitted colours may be added
ANNEX IV	Colours permitted for certain uses only
ANNEX V	Colours permitted in foodstuffs other than those mentioned in Annexes II and III

- **Food Additives other than Colours and Sweeteners**

'European Parliament and Council Directive 95/2/EC of 20 February 1995 on food additives other than colours and sweeteners.'

Council Directive 95/2/EC commonly referred to as the "miscellaneous additives Directive", like the other specific directives, is based on the principle of the positive list. The different categories of additives (e.g. antioxidants, preservatives, acids, etc.) are listed and defined in Article 1(3) of the Directive. All the authorised additives falling under one of these categories are listed in the different Annexes to the Directive, specifying the conditions of use and listing the foodstuffs in which they may be used. There are six different Annexes as follows:

ANNEX I	Food additives generally permitted for use in foodstuffs (excluding those foodstuffs in which no additives are permitted. These are listed in Article 2(3) of the Directive)
ANNEX II	Foodstuffs in which a limited number of additives of Annex I may be used
ANNEX III	Conditionally permitted preservatives and antioxidants
ANNEX IV	Other permitted additives
ANNEX V	Permitted carriers and carrier solvents
ANNEX VI	Food additives permitted in foods for infants and young children

Directive 95/2/EEC was amended by three Directives as follows:

1. **'Directive 96/85/EC of the European Parliament and of the Council of 19 December 1996 amending Directive 95/2/EC on food additives other than colours and sweeteners'**

   This amending Directive permits the use of a new additive, processed eucheuma seaweed (E 407a), a thickener, and provides for its addition to Annex I of Directive 95/2/EC at quantum satis (good manufacturing practice level).

2. **'Directive 98/72/EC of the European Parliament and of the Council of 15 October 1998 amending Directive 95/2/EC on food additives other than colours and sweeteners'**

   This amending Directive adds four new additives to Annex I: (1) E 469 (enzymatically hydrolysed carboxymethylcellulose), (2) E 920 (L-cysteine, if used as a flour treatment agent) (3) E 1103 (invertase) and (4) E 1451 (acetylated oxidised starch).

3. **'Directive 2001/5/EC of the European Parliament and of the Council amending Directive 95/2/EC on food additives other than colours and sweeteners'**

This Directive makes provision for the following:

- the use of E 445 glycerol esters of wood rosin, in certain spirit drinks
- assigns the serial number E 1520 to propane-1,2-diol (propylene glycol)
- includes E 949 hydrogen, as a packaging gas and includes three propellant gasses (E 943a butane, E 943b isobutane, and E 944 propane) in vegetable oil pan sprays and water-based emulsion sprays.

The Directives Defining Specific Purity Criteria

Food additives must at all times comply with the approved criteria of purity. These criteria are outlined in the following Directives:

- **Sweeteners**

'Commission Directive 95/31/EC of 5 July 1995 laying down specific criteria of purity concerning sweeteners for use in foodstuffs'

'Directive 95/31/EEC lays down purity criteria for all sweeteners mentioned in European Parliament and Council Directive 94/35/EEC on sweeteners for use in foodstuffs.'

This directive was amended by Commission Directive 98/66/EC (see below), setting out purity criteria for isomalt (E 953).

'Commission Directive 98/66/EC of 4 September 1998 amending Directive 95/31/EC laying down specific criteria of purity concerning sweeteners for use in foodstuffs'

It was further amended by Commission Directive 2000/51, which sets out amended purity criteria for mannitol and maltitol syrup.

'Commission Directive 2000/51 amending Directive 95/31/EC laying down specific criteria of purity concerning sweeteners for use in foodstuffs'

It was further amended by Commission Directive 2001/52/EC which amends the purity criteria for mannitol (E 421) and acesulfame K (E 950).

'Commission Directive 2001/52 of 3 July 2001 amending Directive 95/31/EC laying down specific purity criteria concerning sweeteners for use in foodstuffs'

- **Colours**

'Commission Directive 95/45/EC of 26 July 1995 laying down specific purity criteria concerning colours for use in foodstuffs'

Commission Directive 95/45/EC lays down purity criteria for all colours mentioned in European Parliament and Council Directive 94/36/EC on colours for use in foodstuffs

This Directive was amended by Commission Directive 99/75/EC (see below) setting out purity criteria for mixed carotenes (E 160a (i)).

'Commission Directive 99/75/EC of 22 July 1999 amending Commission Directive 95/45/EC laying down specific purity criteria concerning colours for use in foodstuffs'

It was further amended by Commission Directive 2001/50/EC which amends the purity criteria for mixed carotenes (E 160a(i)) and beta-carotene (E 160a(ii)).

'Commission Directive 2001/50/EC of 3 July 2001 amending Directive 95/45/EC laying down specific purity criteria concerning colours for use in foodstuffs'

- **Additives other than Colours and Sweeteners**

'Commission Directive 96/77/EC of 2 December 1996 laying down specific purity criteria on food additives other than colours and sweeteners'

Commission Directive 96/77/EC covers specific purity criteria for antioxidants and preservatives. Amendment 98/86/EC (see below) to the Directive incorporates specific purity criteria for the other miscellaneous food additives, covering emulsifiers and stabilisers and Amendment 2000/63 (see below) completes the list, adding purity criteria for the remaining additives as mentioned in Directive 95/2/EC.

'Commission Directive 98/86/EC of 11 November 1998 amending Commission Directive 96/77/EC laying down specific purity criteria on food additives other than colours and sweeteners'

'Commission Directive 2000/63/EC of 5 October 2000 amending Directive 96/77/EC laying down specific purity criteria on food additives other than colours and sweeteners'

Proposed Legislation (due end of 2001):

- Amendment to Directive 96/77/EC laying down specific purity criteria on food additives other than colours and sweeteners. This proposal includes the revision of the specification for E1201 polyvinylpyrrolidone and E 1202 polvinylpolypyrrolidone. It also adds new specifications to the list of purity criteria, in particular E 504 (i) magnesium carbonate, E 650 zinc acetate, E 943a butane, E 943b isobutane, E 944 propane and E 949 hydrogen.
- A further amendment to Directive 96/77/EC will amend the purity criteria for the phosphate additives.

3.2 National Legislation

The Minister for Health and Children is the competent authority for national legislation on food additives.

EU Directives transposed into Irish law	Irish Statutory Instruments
• Council Directive 89/107/EEC on the approximation of Member States laws on food additives authorised for human consumption • European Parliament and Council Directive 94/34/EC amending Directive 89/107/EEC on the approximation of the laws of Member States concerning food additives authorised for use in foodstuffs intended for human consumption • Council Directive 94/35/EC on sweeteners for use in foodstuffs • Council Directive 94/36/EC on colours for use in foodstuffs • Commission Directive 95/31/EC laying down specific criteria of purity concerning sweeteners for use in foodstuffs • Commission Directive 95/45/EC laying down specific purity criteria concerning colours for use in foodstuffs • Directive 96/83/EC of the European Parliament and of the Council of 19 December 1996 amending Directive 94/35/EC on sweeteners for use in foodstuffs • Commission Directive 98/66/EC of 4 September 1998 amending Directive 95/31/EC laying down specific criteria of purity concerning sweeteners for use in foodstuffs • Commission Directive 99/75/EC amending Commission Directive 95/45/EC laying down specific purity criteria concerning colours for use in foodstuffs	European Communities (Additives, Colours and Sweeteners in Foodstuffs) Regulations, 2000 (S.I. No 437 of 2000)

EU Directives transposed into Irish law	Irish Statutory Instruments
• European Parliament and Council Directive 95/2/EC on food additives other than colours and sweeteners • Directive 96/85/EC of the European Parliament and of the Council amending Directive 95/2/EC on food additives other than colours and sweeteners • Directive 98/72/EC of the European Parliament and of the Council amending Directive 95/2/EC on food additives other than colours and sweeteners	European Communities (Food Additives other than Colours and Sweeteners) Regulations, 1999 (S.I. No 288 of 1999)
• Commission Directive 96/77/EC laying down specific purity criteria on food additives other than colours and sweeteners • Commission Directive 98/86/EC of 11 November 1998 amending Commission Directive 96/77/EC laying down specific purity criteria on food additives other than colours and sweeteners	European Communities (Purity Criteria on Food Additives other than Colours and Sweeteners) Regulations, 1998 (S.I. No 541 of 1998) European Communities (Purity Criteria on Food Additives other than Colours and Sweeteners) (Amendment) Regulations, 2000 (S.I. No 438 of 2000)

EU Directives transposed into Irish law	Irish Statutory Instruments
• Commission Directive 2000/51 amending Directive 95/31/EC laying down specific criteria of purity concerning sweeteners for use in foodstuffs	European Communities (Purity Criteria on Food Additives other than Colours and Sweeteners) Regulations, 1998 (S.I. No 541 of 1998)
• Directive 2001/5/EC of the European Parliament and of the Council amending Directive 95/2/EC on food additives other than colours and sweeteners	To be transposed
• Commission Directive 2000/63/EC amending Directive 96/77/EC laying down specific purity criteria on food additives other than colours and sweeteners	European Communities (Purity Criteria on Food Additives other than Colours and Sweeteners) (Amendment) Regulations, 2001 (S.I. No 343 of 2001)
• Commission Directive 2001/50/EC amending Directive 95/45/EC laying down specific purity criteria concerning colours for use in foodstuffs	To be transposed
• Commission Directive 2001/52/EC amending Directive 95/31/EC laying down specific criteria of purity concerning sweeteners for use in foodstuffs	To be transposed
• Decision No 292/97/EC of the European Parliament and of the Council on the maintenance of national laws prohibiting the use of certain additives in the production of certain specific foodstuffs	Transposition not required

CHAPTER 4. APPROVAL OF A NEW ADDITIVE

The European Commission has produced a document outlining the correct procedure that an applicant should follow when applying for the approval of a new additive. [3]

If the European Commission agrees that there are legitimate grounds for the use of a new additive, it will request the necessary scientific data from the applicant. Once submitted, the data will be forwarded to the EU Scientific Committee for Food (SCF) for a safety evaluation. This process may take several months. If approved by the SCF, the Commission will then initiate the necessary procedure to add the substance to the appropriate directive. This can take a further 12 - 18 months. Only when the amended legislation has been passed will the substance then be permitted.

The Directives allow a Member State to grant temporary authorisation for an additive marketed in their territory. The maximum authorisation is 2 years, after which, if the substance has not been added to the directive, sales must cease.

4.1 Evaluation by the SCF Leading to EU-wide Approval

The safety evaluation is carried out by the SCF on the basis of evidence submitted to it by the applicant. The SCF has produced guidelines which the applicant must use when carrying out safety tests prior to submitting the application for approval (see Chapter 5). Where any tests are carried out using different or modified procedures to those laid down in the guidelines, valid reasons for such changes must be presented for appraisal by the Committee. Even the most straightforward evaluation can take some time, and it is not unusual for a complex case which requires additional data/trials etc. to take several years. The safety of existing additives may also be considered by the SCF, either in the light of new toxicological data which has become available or as part of a routine review.[4]

Once the safety of an additive has been established by the SCF, the European Commission considers the case and produces a proposal for approval which it presents to the Council of Ministers (i.e. the 15 Member States Governments) and the European Parliament. This can include conditions under which the additive may be used, in particular the types of food and the maximum level of use. The Council and the Parliament reach a joint conclusion through what is known as the co-decision procedure. The end result is an EC Directive or a regulation which instructs all Member States to make the necessary changes to their national legislation.[4]

4.2 Temporary National Authorisation Prior to Application for EU-wide Approval

An applicant can ask for national authorisation in one or more Member States. This is intended as a temporary measure which allows new additives to be used in the Member State(s) concerned, during the relatively long period while they are being assessed and approved under the co-decision procedure. This approval would be for two years, during which time an application can be made for approval across the EU. The SCF will then consider the application, using the same procedure as for a direct application. If European approval is not then given, the additive must be withdrawn.[4]

In Ireland, the Food Safety Authority of Ireland is the competent authority for temporary authorisations of food additives. There are no temporary authorisations for food additives in Ireland at present.

[4] Reproduced with kind permission of the Food Standards Agency 1999, see references.

CHAPTER 5. FOOD ADDITIVE SAFETY EVALUATION

The manufacturer of a new additive must not only produce evidence that there is a real need for the substance, but also commission research into the safety of that substance. This research must include toxicological tests (tests to determine whether a substance is harmful). In these tests, the additive is administered to laboratory animals, usually mixed with their diet, but at much higher concentrations than would occur in human food. Such tests are designed to give information on any possible effects from short-term or long-term exposure to the proposed additive. Some effects include whether it may have any potential to cause cancer (carcinogenicity), or to affect male or female reproduction or the development of the embryo or the foetus if consumed by a pregnant woman (teratogenicity). Other effects include the mutagenic potential of the compound (mutagenicity); that is its ability to interfere with genetic material in the body, which could lead to the development of cancer or adverse effects in future generations.[4]

The SCF produced revised guidelines (Guidance on submissions for food additive evaluations)[5] in July 2001. This document gives guidance to petitioners and other interested parties wishing to introduce new additives into the EU market, or seeking to revise existing provisions regulating individual additives already authorised within the EU, or seeking confirmation that an already approved additive made from a new source or by a new method of production is acceptable. It gives guidance on the administrative and technical data required, on the range of toxicological tests generally required for new food additives, and on the format for formal submissions on additives (hereafter referred to as "dossiers") to the European Commission. The information submitted is required either for the European Commission and/or for the Scientific Committee on Food.

"Almost any substance at a high enough level will produce some adverse effect in animals. Evaluation of safety requires that this potential adverse effect be identified and that adequate toxicological data be available to determine the level at which human exposure to the substance can be considered safe".[6]

If an additive is deemed acceptable for food use, an Acceptable Daily Intake (ADI) is normally set. The concept of ADI was established by the Joint Expert Committee on Food Additives (JECFA), an international expert scientific committee that is administered jointly by the Food and Agriculture Organisation of the United Nations (FAO) and the World Health Organisation (WHO). ADI is defined as "an estimate of the amount of food additive, expressed on a body weight basis, that can be ingested daily over a lifetime without appreciable health risk."

[4] Reproduced with kind permission of the Food Standards Agency 1999, see references.

ADI is expressed on a milligram per kilogram bodyweight per day basis (mg/kg bw/day) and is used extensively by regulatory and advisory bodies throughout the world, such as the World Health Organisation (WHO), the European Commission's Scientific Committee for Food (SCF) and the UK's Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT).

The ADI is expressed in a range, from zero to an upper limit, which is considered to be the zone of acceptability of the substance. JECFA expresses the ADI in this way to emphasise that the acceptable level it establishes is an upper limit and to encourage the lowest levels of use that are technologically feasible.

Substances that accumulate in the body are not suitable for use as food additives. Therefore, ADI's are established only for those compounds that are substantially cleared from the body within 24 hours.[6]

The substance is put through toxicological studies, usually on rodent species, to determine the levels at which the substance affects the subject, and the effects will be noted. The highest level at which no effect is observed is called the NOAEL (No-Observed-Adverse-Effect-Level). An ADI is derived by dividing the NOAEL obtained from these studies, by an appropriate "safety" factor, which is intended to take account of species to species differences and to reduce further still, the possibility of risk to humans. This safety factor is commonly 100 (assuming that human beings are 10 times more sensitive than test animals and that the different levels of sensitivity within the human population is in a 10 fold range), but may be as much as 1,000 (if, for example, the toxic effect in animals is found to be particularly severe) or as low as 10 (where it has been found that humans are less likely than animals to be affected).[4]

[4] Reproduced with kind permission of the Food Standards Agency 1999, see references.

CHAPTER 6. LABELLING

6.1 General Labelling

In addition to a thorough safety evaluation and a demonstrated purpose, EU and Irish food additive legislation require that where foods and beverages contain additives, the additives must be listed on the label of the food packaging. General labelling provisions for food are laid down in Council Directive 2000/13/EC (see Appendix 2).

The general labelling provisions require that the ingredients of a prepackaged food must be listed on the label. The term ingredient includes additives and any other substance used in the manufacture or preparation of a foodstuff which is still present in the finished product, even if in altered form.

The following are not regarded as ingredients:

1. Additives:
- whose presence in a given food-stuff is solely due to the fact that they were contained in one or more ingredients of that foodstuff, provided that they serve no technological function in the finished product (carry over additives)
- which are used as processing aids

2. Substances used in the quantities strictly necessary as solvents or media for additives or flavouring

The labelling must include the purpose of the additive (see Table 6.1.) as well as the name of the additive or its assigned E number (see Appendix 3).

An E number means that an additive has been thoroughly assessed by the SCF and has been accepted as safe all across the EU. The system of E numbering has been used for many years, in order to identify additives simply across the range of languages in the EU.

E.g. sulphur dioxide which is a preservative commonly used in sausages must be listed as either:
- Preservative: Sulphur Dioxide or
- Preservative (E 220)

If the additive belongs to more than one category, the category name given shall correspond to its main function in that particular food. Additives which perform the same function in a food could be grouped together for ingredient listing purposes e.g. Colours: a, b and c.

Table 6.1.

Categories of ingredients which must be designated by the name of their category followed by their specific name or European Communities number (E number)	
Acid	Flour treatment agent
Acidity regulator	Gelling agent
Anti-caking agent	Glazing agent
Anti-foaming agent	Humectant
Anti-oxidant	Modified starch *
Bulking agent	Preservative
Colour	Propellant gas
Emulsifier	Raising agent
Emulsifying salts**	Stabiliser
Firming agent	Sweetener
Flavour enhancer	Thickener

*The specific name or E number need not be indicated

** Only for processed cheeses and products based on processed cheeses.

6.2 Carryover Additives

Additives that are present in a food because they were contained in one of the ingredients only need to be indicated in the list of ingredients if they perform a significant technological function in the final food. Whether or not the additive performs a technological function in the final product will depend both on the ingredient containing the additive and the food to which it is added. e.g. preservatives used in fruit puree will not necessarily perform the same function when the fruit is added to a pasteurised yoghurt. It is currently proposed to exempt sulphites from this rule (see proposed legislation, page 25).

6.3 Compound Ingredients

A compound ingredient is an ingredient which is made up of several other ingredients, e.g. mayonnaise. The ingredients of the compound ingredient may be shown on the list of ingredients without making reference to the name of the compound ingredient. Alternatively, a compound ingredient can be included in the list of ingredients under its own specific name provided it is followed immediately by a list of its ingredients e.g. mayonnaise (egg, oil, water, salt, etc.).

Listing the ingredients of a compound ingredient is not required where:

- The compound ingredient is less than 25% of the finished product. e.g. if chocolate chips in a biscuit make up less than 25% of the finished product then the ingredients of the chocolate chip need not be detailed on the label. The indication 'chocolate chip' in the list of ingredients will suffice. This exemption does not apply in the case of additives.
- The compound ingredient is identified by one of the permitted names listed under Annex 1 of the Directive, e.g. mixed herbs.
- Where the foodstuffs are not required to carry a list of ingredients or where certain foods are permitted to omit certain information on the label.

Proposed legislation:

It is proposed that "Directive 2000/13/EC of the European Parliament and Council on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs" be amended to abolish the 25% rule, to establish a list of allergens which will have to appear on the labelling of foodstuffs, and to remove the possibility of using the name of the category for certain ingredients. This proposal specifically affects the labelling requirements for sulphites, which will not only have to be labelled when used as food additives, but also when used as processing aids or when present due to carry-over from other ingredients.

6.4 Genetically Modified Additives/ Flavourings and Additives/Flavourings produced from Genetically Modified Organisms (Specified Additives and Flavourings)

Commission Regulation (EC) No 50/2000 on the labelling of foodstuffs and food ingredients containing additives and flavourings that have been genetically modified or produced from genetically modified organisms provides for specific additional labelling requirements for food and food ingredients intended for final consumers and mass caterers. Additives and flavourings that have been genetically modified or produced from genetically modified organisms are referred to as specified additives and flavourings.

These specified additives and flavourings are only subject to additional labelling requirements when they are not equivalent to their traditional counterparts. Not equivalent means containing protein or DNA resulting from genetic modification. This means that if no protein or DNA resulting from genetic modification is present in the specified additive or flavouring, no additional labelling is required.

Additional specific labelling requirements outlined in Regulation 50/2000 are as follows:

- The labelling must inform the final consumer and mass caterers if the specified additives or flavourings contain material which is not present in the existing equivalent additives or flavourings and which may affect the health of certain sections of the population or gives rise to ethical concerns.
- The labelling must inform the final consumer and mass caterers of any

characteristic or property that results in the specified additives or flavourings not longer being equivalent to existing additives and flavourings (i.e. containing protein or DNA as a result of genetic modification). In this case, the wording "produced from genetically modified" must appear in the list of ingredients, in parentheses, immediately after the indication of the additive or flavouring in question.

- The labelling must inform the final consumer and mass caterers of the presence of an additive or flavouring that is or contains a genetically modified organism. In this case, the wording "genetically modified" must appear in the list of ingredients immediately after the indication of the additive or flavouring in question.

Alternatively, the wordings "produced from genetically modified" or "genetically modified" may appear in a prominently displayed footnote to the list of ingredients, linked to the additive or the flavouring concerned by an asterisk (*). It shall be printed in a font that is at least of the same size as that used for the list of ingredients itself. For specified foodstuffs for which there is no list of ingredients, this wording shall appear clearly on the product's label.

6.5 Additional Labelling Requirements for Sweeteners

Article 5 of **'European Parliament and Council Directive 94/35/EC on sweeteners for use in foodstuffs'** requires additional labelling for sweeteners as follows:

1. The sales description of a table-top sweetener must include the term '. . - based table-top sweetener', using the name(s) of the sweetening substance(s) used in its composition.
2. The labelling of a table-top sweetener containing polyols and/or aspartame must bear the following warnings:
   - polyols: 'excessive consumption may induce laxative effects',
   - aspartame: 'contains a source of phenylalanine'.
3. **'Commission Directive 94/54/EC of 18 November 1994 concerning the compulsory indication on the labelling of certain foodstuffs of particulars other than those provided for in Council Directive 79/112/EEC'** as amended by Directive 96/21/EC provides additional labelling provisions concerning the details that must appear on the label of a food containing a sweetener to make its presence clear as follows:
   - Foodstuffs containing a sweetener or sweeteners (as authorised by Directive 94/35/EC) must be labelled "with sweeteners(s)" near the name of the food
   - Foodstuffs containing both an added sugar or sugars and a sweetener or sweeteners (as authorised by Directive 94/35/EC) must be labelled "with sugar(s) and sweeteners(s)" near the name of the food
   - Foodstuffs containing aspartame must be labelled "contains a source of phenylalanine"
   - Foodstuffs containing more than 10% added polyols must be labelled "excessive consumption may produce laxative effects".

CHAPTER 7. MONITORING

EU Member States are legally required to monitor food additive intake and usage. "All food additives must be kept under continuous observation and must be re-evaluated whenever necessary in the light of changing conditions of use and new scientific information" (Council Directive1989/107, Annex II, Point 4).

Each of the three specific directives specifies detailed requirements regarding the monitoring and surveillance of the additives governed by each directive. As required by these three specific directives, the European Commission has prepared a report on usage and intake of additives within the European Union and has presented its findings to the European Parliament and Council in October 2001. This report comprises individual reports on intake submitted by each Member State.

Food Additives Monitoring in Ireland

The Food Safety Authority of Ireland commissioned the Irish Universities Nutrition Alliance (IUNA) research group, which comprises the academic nutrition units of Trinity College Dublin, University College Cork and University of Ulster Coleraine, to commence research in order to provide data on food additive usage and food additive intake to fulfil the legal obligations of the state under the relevant EU Directives (94/35/EC, 94/36/EC and 95/2/EC).

• Monitoring of additive usage

The use of food additives in the Irish food supply was monitored using the Irish National Food Ingredient Database (INFID) (1995-1999). [7]

INFID was initiated to collaborate with the retail sector and industry to gather food label information on all ingredients used in a generally representative sample of processed Irish foods. This database has multiple uses, one of which is a characterisation of the pattern of food additive usage in branded foods available to Irish consumers. The first database with 4,057 brand foods was completed in 1997 and over the period 1998-1999 the number of foods in the database was increased to a final number of approximately 5,684. The sub-sample of foods to ascertain changes in food additive usage was approximately 1,000.

Results

- 68% of foods in INFID recorded use of at least one additive.
- Of the 300 additives permitted for use in the EU, 54% were present in foods in INFID (Table 7.1)
- The most commonly used additive categories are colours and emulsifiers, which represent 18 and 13% of additive usage respectively. Both of these are distributed in >50% of food groups in the Irish food supply (Table 7.3).
- A number of additive categories such as anti-foaming agents, sequestrants and humectants represent <1% of overall additive usage (Table 7.3).
- Patterns of use of each individual additive category are illustrated in Tables 7.4 – 7.26, which indicate the additives used to perform each additive function and the number of brand foods in which they are present.
- The distribution of additives in food groups in the Irish food supply is illustrated in Table 7.27. As the number of brands in food groups varies widely (i.e. desserts – 252 brand foods; liver, liver pâte – 10 brand foods) the distribution of additives in food groups was expressed as both the number of brands containing additives and the % brands which contain additives within each food group.
- Changes in trends of additive usage during the period 1995/97 to 1998/99 are illustrated in Figure 7.1. Approximately 1,000 common foods were monitored in 1995/97 and 1998/99. Figure 7.1 illustrates an overall minimal change in additive usage between the two time periods.
- However, there was a trend towards a slight increase in the use of acids, emulsifiers and raising agents in 1998/99 compared to 1995/97. This was mainly accounted for by an increase in the use of E 471, E 322 and E 476 (emulsifiers); E 330 and E 300 (acids) and E 503 and E 450 (raising agents).
- The increase in the use of emulsifiers was mainly accounted for by an increase in their use in chocolate confectionery (E 471, E 322 and E 376). There was also a slight increase in the use of E 322 in baby food and a trend towards more specific labelling with regard to carryover additives (E 322, E 471) in the margarine ingredient of meat pies and pastries. The increase in the use of acids was primarily accounted for by an increase in the use of E 300 in non-alcoholic flavoured drinks and an increase in the use of E 330 in fine bakery wares, preserves, confectionery, sauces and seasonings. The trend towards an increase in raising agents (E 503, E 450) was accounted for by an increase in their use in fine bakery wares.

- There was a trend towards a slight decrease in the use of colours and antioxidants in 1998/99 compared to 1995/97. This was primarily accounted for by a decrease in the use of E 320 (antioxidants) and E 122 and E 160b (colours).

- The decrease in the use of E 320 was mainly accounted for by a decrease in its use in dehydrated soups and broths, together with a slight decrease in its use in confectionery and fine bakery wares. A decrease in the use of E 122 in fruit preserves accounted for the decline on the use of E 122, and the decrease in the use of E 1606 was mainly accounted for by a decrease in its use in marmalade together with a decrease in its use in non-alcoholic flavoured drinks, fine bakery wares, dehydrated soups and broths, cake mixes, seasonings and condiments and beverage whiteners.

- There was a shift towards more specific labelling of the colour caramel in 1998/99 compared to 1995/97. Rather than labelling caramel as E 150, the manufacturers tended to label the exact form of caramel used i.e. E 150a (plain caramel), E 150c (ammonia caramel) or E 150d (sulphite ammonia caramel).

Table 7.1
Additives present in the Irish food supply as recorded in INFID

E number	Name
E 100	Curcumin
E 101	Riboflavin, Riboflavin-5'-phosphate
E 102	Tartrazine
E 104	Quinoline yellow
E 110	Sunset yellow FCF, Orange Yellow S
E 120	Cochineal, Carminic Acid, Carmines
E 122	Azorubine, Carmoisine
E 123	Amaranth
E 124	Ponceau 4R, Cochineal Red A
E 127	Erythrosine
E 128	Red 2G
E 129	Allura red
E 131	Patent blue V
E 132	Indigotine, Indigo Carmine
E 133	Brilliant blue FCF
E 140	Chlorophylls and Chlorophyllins
E 141	Copper complexes of chlorophyll/chlorophyllins
E 142	Green S
E 150a	Plain caramel
E 150b	Caustic sulphite caramel
E 150c	Ammonia caramel
E 150d	Sulphite ammonia caramel
E 151	Brilliant black BN, Black PN
E 153	Vegetable carbon
E 155	Brown HT
E 160a	Carotenes, Mixed carotenes, Beta-carotene
E 160b	Annatto, Bixin, Norbixin
E 160c	Paprika extract, Capsanthin, Capsorubin
E 160e	Beta-apo-8'–carotenal (C30)
E 160f	Ethyl ester of beta-apo-8-carotenoic acid
E 161b	Lutein
E 161g	Canthaxanthin
E 162	Beetroot red (betanin)
E 163	Anthocyanins
E 170	Calcium carbonate

E number	Name
E 171	Titanium dioxide
E 172	Iron oxides and hydroxides
E 173	Aluminium
E 200	Sorbic acid
E 202	Potassium sorbate
E 203	Calcium sorbate
E 210	Benzoic acid
E 211	Sodium benzoate
E 214	Ethyl-4-hydroxybenzoate
E 218	Methyl-4-hydroxybenzoate
E 220	Sulphur dioxide
E 221	Sodium sulphite
E 223	Sodium metabisulphite
E 224	Potassium metabisulphite
E 234	Nisin
E 249	Potassium nitrite
E 250	Sodium nitrite
E 251	Sodium nitrate
E 252	Potassium nitrate
E 260	Acetic acid
E 262	Sodium acetates
E 263	Calcium acetate
E 270	Lactic acid
E 282	Calcium propionate
E 290	Carbon dioxide
E 296	Malic acid
E 297	Fumaric acid
E 300	L-Ascorbic acid
E 301	L-Sodium ascorbate
E 302	L-Calcium ascorbate
E 304	Fatty acid esters of ascorbic acid
E 306	Tocopherol-rich extracts
E 307	Alpha-Tocopherol (synthetic)
E 310	Propyl gallate
E 316	Sodium erythorbate
E 320	Butylated hydroxyanisole
E 321	Butylated hydroxytoluene

E number	Name
E 322	Lecithin
E 325	Sodium lactate
E 327	Calcium lactate
E 330	Citric acid
E 331	Sodium citrates
E 331c	Trisodium citrates
E 332	Potassium citrates
E 333	Calcium citrates
E 334	L-Tartaric acid
E 336	Potassium-L-tartrates
E 338	Phosphoric acid
E 339	Sodium phosphates
E 340	Potassium phosphates
E 341	Calcium phosphates
E 355	Adipic acid
E 385	Calcium disodium EDTA
E 401	Sodium alginate
E 404	Calcium alginate
E 405	Propane- 1,2-diol alginate
E 406	Agar
E 407	Carrageenan
E 410	Locust bean gum
E 412	Guar gum
E 413	Tragacanth
E 414	Acacia (gum arabic)
E 415	Xanthan gum
E 418	Gellan gum
E 420	Sorbitol, sorbitol syrup
E 421	Mannitol
E 422	Glycerol
E 433	Polyoxyethylene sorbitan monooleate
E 434	Polyoxyethylene sorbitan monopalmitate
E 435	Polyoxyethylene sorbitan monostearate
E 440	Pectins
E 442	Ammonium phosphatides
E 450	Sodium, potassium and calcium diphosphates
E 451	Sodium and potassium triphosphates

E number	Name
E 452	Sodium, potassium and calcium polyphosphates
E 460	Cellulose
E 461	Methyl cellulose
E 464	Hydroxypropyl methly cellulose
E 466	Carboxy / Sodium methyl cellulose
E 470(b)	Magnesium salts of fatty acids
E 471	Mono- and diglycerides of fatty acids
E 472a	Acetic acid esters of mono- & diglycerides of fatty acids
E 472b	Lactic acid esters of mono- diglycerides of fatty acids
E 472c	Citric acid esters of mono- diglycerides of fatty acids
E 472e	Mono- & diacetyl tartaric acid esters of mono- & diglycerides of fatty acids
E 473	Sucrose esters of fatty acids
E 475	Polyglycerol esters of fatty acids
E 476	Polyglycerol polyricinoleate
E 477	Propane-1, 2-diol esters of fatty acids
E 481	Sodium stearoyl-2-lactylate
E 482	Calcium stearoyl-2-lactylate
E 492	Sorbitan tristearate
E 500	Sodium carbonate, sodium hydrogen carbonate, sodium sesquicarbonate
E 501	Potassium carbonate, potassium hydrogen carbonate
E 503	Ammonium carbonate, ammonium hydrogen carbonate
E 504	Magnesium carbonate, magnesium hydroxide carbonate
E 507	Hydrochloric acid
E 508	Potassium chloride
E 509	Calcium chloride
E 516	Calcium sulphate
E 529	Calcium oxide
E 530	Magnesium oxide
E 535	Sodium ferrocyanide
E 541	Sodium aluminium phosphate, acidic
E 551	Silicon dioxide
E 552	Calcium silicate
E 554	Sodium aluminium silicate
E 555	Potassium aluminium silicate
E 575	Glucono – delta – lactone
E 585	Ferrous lactate
E 620	Glutamic acid

E number	Name
E 621	Monosodium glutamate
E 627	Disodium guanylate
E 631	Disodium inosinate
E 635	Sodium 5' ribonucleotides
E 900	Dimethyl polysiloxane
E 901	Bees wax, white and yellow
E 903	Carnauba wax
E 904	Shellac
E 920	L-Cysteine hydrochloride
E 950	Acesulfame potassium, Acesulfame K
E 951	Aspartame
E 952	Cyclamic acid and its Na and Ca salts
E 954	Saccharin and its Na, K and Ca salts
E 1200	Polydextrose
E 1414	Acetylated distarch phosphate
E 1422	Acetylated distarch adipate

Table 7.2
Additives not present in the Irish food supply as recorded in INFID

E number	Name
E 154	Brown FK
E 160d	Lycopene
E 174	Silver
E 175	Gold
E 180	Litholrubine BK
E 201	Sodium sorbate
E 212	Potassium benzoate
E 213	Calcium benzoate
E 215	Ethyl-4-hydroxybenzoate (sodium salt)
E 216	Propyl-4-hydroxybenzoate
E 217	Propyl-4-hydroxybenzoate (sodium salt)
E 219	Methyl-4-hydroxybenzoate (sodium salt)
E 222	Sodium hydrogen sulphite
E 226	Calcium sulphite
E 227	Calcium hydrogen sulphite
E 228	Potassium hydrogen sulphite

E number	Name
E 230	Biphenyl, Diphenyl
E 231	Orthophenyl phenol
E 232	Sodium orthophenyl phenol
E 233	Thiabendazole
E 235	Natamycin
E 239	Hexamethylene tetramine
E 242	Dimethyl dicarbonate
E 261	Potassium acetate
E 280	Propionic acid
E 281	Sodium propionate
E 283	Potassium propionate
E 284	Boric acid
E 285	Sodium tetraborate (borax)
E 308	Gamma-Tocopherol (synthetic)
E 309	Delta-Tocopherol (synthetic)
E 311	Octyl gallate
E 312	Dodecyl gallate
E 315	Erythorbic acid
E 326	Potassium lactate
E 335	Sodium-L-tartrates
E 337	Sodium potassium tartrate
E 350	Sodium malates, sodium hydrogen malate
E 351	Potassium malate
E 352	Calcium malates, calcium hydrogen malate
E 353	Metatartaric acid
E 354	Calcium tartrate
E 356	Sodium adipate
E 357	Potassium adipate
E 363	Succinic acid
E 365	Sodium fumarates
E 366	Potassium fumarates
E 367	Calcium fumarates
E 380	Triammonium citrate
E 400	Alginic acid
E 402	Potassium alginate
E 403	Ammonium alginate
E 417	Tara gum

E number	Name
E 431	Polyoxyethylene (40) stearate
E 432	Polyoxyethylene sorbitan monolaurate
E 436	Polyoxyethylene sorbitan tristearate
E 444	Sucrose acetate isobutyrate
E 445	Glycerol esters of wood rosins
E 463	Hydroxypropyl cellulose
E 465	Ethyl methyl cellulose
E 470a	Sodium, potassium & calcium salts of fatty acids
E 472d	Tartaric acid esters of mono- & diglycerides of fatty acids
E 472f	Mixed acetic & tartaric acids esters of mono- & diglycerides of fatty acids
E 474	Sucroglycerides
E 479b	Thermally oxidized soya bean oil interacted with mono- & di-glycerides of fatty acids
E 483	Stearyl tartrate
E 491	Sorbitan monostearate
E 493	Sorbitan monolaurate
E 494	Sorbitan monooleate
E 495	Sorbitan monopalmitate
E 511	Magnesium chloride
E 512	Stannous chloride
E 513	Sulphuric acid
E 514	Sodium sulphate, sodium hydrogen sulphate
E 515	Potassium sulphate, potassium hydrogen sulphate
E 517	Ammonium sulphate
E 520	Aluminium sulphate
E 521	Aluminium sodium sulphate
E 522	Aluminium potassium sulphate
E 523	Aluminium ammonium sulphate
E 524	Sodium hydroxide
E 525	Potassium hydroxide
E 526	Calcium hydroxide
E 527	Ammonium hydroxide
E 528	Magnesium hydroxide
E 536	Potassium ferrocyanide
E 538	Calcium ferrocyanide
E 553a	Magnesium silicate, Magnesium trisilicate
E 553b	Talc

E number	Name
E 556	Calcium aluminium silicate
E 558	Bentonite
E 559	Aluminium silicate, Kaolin
E 570	Fatty acids
E 574	Gluconic acid
E 576	Sodium gluconate
E 577	Potassium gluconate
E 578	Calcium gluconate
E 579	Ferrous gluconate
E 622	Monopotassium glutamate
E 623	Calcium diglutamate
E 624	Monoammonium glutamate
E 625	Magnesium diglutamate
E 626	Guanylic acid
E 628	Dipotassium guanylate
E 629	Calcium guanylate
E 630	Inosinic acid
E 632	Dipotassium inosinate
E 633	Calcium inosinate
E 634	Calcium 5' ribonucleotides
E 640	Glycine and its sodium salt
E 902	Candelilla wax
E 912	Montan acid esters
E 914	Oxidized polyethylene wax
E 927b	Carbamide
E 938	Argon
E 939	Helium
E 941	Nitrogen
E 942	Nitrous oxide
E 48	Oxygen
E 953	Isomalt
E 957	Thaumatin
E 959	Neohesperidine DC
E 965	Maltitol, maltiol syrup
E 966	Lactitol
E 967	Xylitol
E 999	Quillaia extract

E number	Name
E 1105	Lysozyme
E 1201	Polyvinylpyrrolidone
E 1202	Polyvinylpolypyrrolidone
E 1404	Oxidised starch
E 1410	Monostarch phosphate
E 1412	Distarch phosphate
E 1413	Phosphated distarch phosphate
E 1420	Acetylated starch
E 1440	Hydroxy propyl starch
E 1442	Hydroxy propyl distarch phosphate
E 1505	Triethyl citrate

Table 7.3
Overview of food additive usage in the Irish food supply as recorded in INFID

Food additive category	% of overall additive use	No. of additives used to perform function	Most commonly used additive to perform function* (No. of brand foods)**	No. of food groups in which additive category is present	Food groups in which additive category is most commonly found	No. of brands which contain additives within this category	%
Colour	18	38	E160a (351)	38	Sauces	182	26
					Sugar confectionery	143	82
Emulsifier	13	30	E471 628)	37	Biscuits	181	47
					Deserts	162	65
Acid	12	15	E330 (1063)	40	Sauces	304	43
					Preserves	261	69
Stabiliser	9	33	E412 (240)	35	Deserts	138	55
					Sauces	94	13
Preservative	9	23	E202 (351)	38	Other soft drinks (i.e. not diet)	135	68
					Yoghurts	86	50
Raising agent	8	10	E500 (500)	21	Biscuits	290	76
					Buns, cakes & pastries	92	44
Functional ingredient***	7	69	E418 (155)	37	Desserts	67	27
					Buns, cakes & pastries	77	37
Flavour enhancer	5	9	E621 (573)	23	Soups	172	64
					Sauces	118	17
Acidity regulator	4	19	E331 (291)	27	Preserves	203	54
					Sugar confectionery	43	25
Gelling agent	4	19	E440 (400)	15	Preserves	291	77
					Sugar confectionery	47	27
Sweetener	4	5	E951 (212)	15	Other soft drinks	117	59
					Yoghurts	45	26

* For full name of additive see Appendix 3, Table 3.1

** Number of brand foods in INFID = 5,684. Total number of brand foods containing additives = 3,821
Bulking agent, carrier, flavouring, packaging gas, propellant, foaming agent

*** In cases where an additive was labelled without its function, these additives were entered as functional ingredients

Food additive category	% of overall additive use	No. of additives used to perform function	Most commonly used additive to perform function* (No. of brand foods)**	No. of food groups in which additive category is present	Food groups in which additive category is most commonly found	No. of brands which contain additives within this category	%
Antioxidant	3	17	E301 (112)	27	Sauces	51	7
					Bacon & ham	48	79
Thickener	1	10	E412 (57)	15	Soups	44	16
					Miscellaneous foods	24	4
Emulsifying salt	1	8	E339 (44)	8	Cheese	61	45
					Burgers	2	4
Anticaking agent	<1	9	E504 (21)	6	Miscellaneous	23	4
					Sugar confectionery	22	13
Glazing agent	<1	7	E903 (19)	7	Sugar confectionery	24	4
					Chocolate confectionery	9	5
Flour treatment agent	<1	3	E300 (27)	8	Egg &/or cheese dishes	15	50
					Buns, cakes & pastries	7	3
Flour improver	<1	3	E300 (16)	5	White bread	9	16
					Other breads	4	9
Firming agent	<1	1	E509 (12)	2	Preserves	11	3
					Desserts	1	<1
Humectant	<1	2	E442 (8)	3	Sugar confectionery	4	2
					Breakfast & cereals	3	30
Modified starch	<1	2	E1422 (2)	2	Buns, cakes & pastries	2	1
					Sauces	2	<1
Sequestrant	<1	2	E575 (1)	2	Egg &/or cheese dishes	1	3
					Sauces	1	<1
Antifoaming agent	<1	1	E900 (1)	1	Diet soft drinks	1	3

* For full name of additive see Appendix 3,Table 3.1

** Number of brand foods in INFID = 5,684.Total number of brand foods containing additives = 3,821
Bulking agent, carrier, flavouring, packaging gas, propellant, foaming agent

*** In cases where an additive was labelled without its function, these additives were entered as functional ingredients

Table 7.4
Patterns of usage of colours

Additive		No. of brand foods in INFID	% contribution to total colours
E 160a	Carotenes, Mixed carotenes, Beta-carotene	353	15
E 150a	Plain caramel	282	12
E 160b	Annatto, Bixin, Norbixin	227	10
E 100	Curcumin	134	6
E 163	Anthocyanins	117	5
E 124	Ponceau 4R, Cochineal Red A	104	5
E 110	Sunset yellow FCF, Orange Yellow S	98	4
E 104	Quinoline yellow	97	4
E 162	Beetroot red (betanin)	85	4
E 120	Cochineal, Carminic acid, Carmines	73	3
E 122	Azorubine, Carmoisine	68	3
E 132	Indigotine, Indigo carmine	59	3
E 160e	Beta-apo-8'–carotenal (C30)	55	2
E 160c	Paprika extract, Capsanthin, Capsorubin	53	2
E 128	Red 2G	45	2
E 127	Erythrosine	40	2
E 171	Titanium dioxide	39	2
E 101	Riboflavin	39	2
E 142	Green S	39	2
E 102	Tartrazine	37	2
E 150c	Ammonia caramel	37	2
E 133	Indigotine, Indigo Carmine	36	2
E 161b	Lutein	32	1
E 150d	Sulphite ammonia caramel	30	1
E 129	Allura red	29	1
E 140	Chlorophylls and chlorophyllins	18	1
E 131	Patent blue V	16	1
E 141	Copper complexes of chlorophyll/chlorophyllins	15	1
E 155	Brown HT	14	1
E 153	Vegetable carbon	13	1
E 151	Brilliant black BN, Black PN	8	<1
E 161g	Canthaxanthin	2	<1
E 173	Aluminium	2	<1
E 172	Iron oxides and hydroxides	2	<1

Additive		No. of brand foods in INFID	% contribution to total colours
E 123	Amaranth	2	<1
E 214	Ethyl-p-hydroxybenzoate	1	<1
E 150b	Caustic sulphite caramel	1	<1
E 160f	Ethyl ester of beta-apo-8-carotenoic acid	1	<1

Table 7.5
Patterns of usage of emulsifiers

Additive		No. of brand foods in INFID	% contribution to total emulsifiers
E 471	Mono- and diglycerides of fatty acids	634	39
E 322	Lecithin	473	29
E 472e	Mono-& diacetyl tartaric acid esters of mono-& diglycerides of fatty acids	106	7
E 442	Ammonium phosphatides	63	4
E 472b	Lactic acid esters of mono-diglycerides of fatty acids	44	3
E 475	Polyglycerol esters of fatty acids	36	2
E 476	Polyglycerol polyricinoleate	35	2
E 481	Sodium stearoyl-2-lactylate	31	2
E 477	Propane-1, 2-diol esters of fatty acids	30	2
E 450	Magnesium oxide	28	2
E 339	Sodium phosphates	22	1
E 472a	Acetic acid esters of mono-& diglycerides of fatty acids	18	1
E 452	Sodium, potassium and calcium polyphosphates	15	1
E 435	Polyoxyethylene sorbitan monostearate	10	1
E 451	Sodium and potassium triphosphates	9	1
E 407	Carrageenan	8	<1
E 473	Sucrose esters of fatty acids	8	<1
E 410	Locust bean gum	6	<1
E 472c	Citric acid esters of mono- diglycerides of fatty acids	5	<1
E 415	Xanthan gun	5	<1
E 412	Guar gum	5	<1
E 405	Propane-1, 2-diol alginate	5	<1
E 434	Polyoxyethylene sorbitan monopalmitate	4	<1

Additive		No. of brand foods in INFID	% contribution to total emulsifiers
E 440	Pectins	4	<1
E 340	Potassium phosphates	3	<1
E 482	Calcium stearoyl-2-lactylate	3	<1
E 320	Butylated hydroxyanisole	2	<1
E 401	Sodium alginate	2	<1
E 492	Sorbitan tristearate	1	<1
E 406	Agar	1	<1

Table 7.6
Patterns of usage of acids

Additive		No. of brand foods in INFID	% contribution to total acids
E 471	Citric acid	1,070	70
E 260	Acetic acid	177	12
E 270	Lactic acid	116	8
E 2926	Malic acid	61	4
E 300	L-Ascorbic acid	49	3
E 334	L-Tartaric acid	19	1
E 338	Phosphoric acid	12	1
E 355	Adipic acid	9	1
E 200	Sorbic acid	7	<1
E 297	Fumaric acid	7	<1
E 575	Glucono-delta-lactone	3	<1
E 507	Hydrochloric acid	1	<1
E 331	Sodium citrates	1	<1
E 301	L-Sodium ascorbate	1	<1
E 210	Benzoic acid	1	<1

Table 7.7
Patterns of usage of stabilisers

Additive		No. of brand foods in INFID	% contribution to total stabilisers
E 412	Guar gum	240	20
E 415	Xanthan gum	215	18
E 410	Locust bean gum	143	12

Additive		No. of brand foods in INFID	% contribution to total stabilisers
E 407	Carrageenan	98	8
E 450	Sodium, potassium and calcium diphosphates	68	6
E 452	Sodium, potassium and calcium polyphosphates	66	6
E 440	Pectins	60	5
E 466	Carboxy/Sodium methyl cellulose	51	4
E 401	Sodium alginate	49	4
E 340	Potassium phosphates	42	4
E 451	Sodium and potassium triphosphates	32	3
E 339	Sodium phosphates	26	2
E 418	Gellan gum	20	2
E 464	Hydroxypropyl methly cellulose	14	1
E 414	Acacia (gum arabic)	14	1
E 413	Tragacanth	9	1
E 405	Propane-1, 2-diol alginate	8	1
E 422	Glycerol	6	1
E 461	Methyl cellulose	6	1
E 420	Sorbitol, sorbitol syrup	4	<1
E 330	Citric acid	3	<1
E 471	Mono- and diglycerides of fatty acids	3	<1
E 460	Cellulose	3	>1
E 406	Agar	2	<1
E 331	Sodium citrates	2	<1
E 551	Silicon dioxide	1	<1
E 555	Potassium aluminium silicate	1	<1
E 331c	Trisodium citrates	1	<1
E 472e	Mono- & diacetyl tartaric acid esters of mono-& diglycerides of fatty acids	1	<1
E 500	Sodium carbonate, sodium hydrogen carbonate, sodium sesquicarbonate	1	<1
E 336	Potassium-L-tartrates	1	<1
E 501	Potassium carbonate, potassium hydrogen carbonate	1	<1
E 327	Calcium lactate	1	<1

Table 7.8
Patterns of usage of preservatives

Additive		No. of brand foods in INFID	% contribution to total preservatives
E 202	Potassium sorbate	352	32
E 211	Sodium benzoate	183	17
E 250	Sodium nitrite	130	12
E 223	Sodium metabisulphite	120	11
E 220	Sulphur dioxide	108	10
E 251	Sodium nitrate	57	8
E 200	Sorbic acid	29	3
E 221	Sodium sulphite	27	2
E 282	Calcium propionate	26	2
E 252	Potassium nitrate	25	2
E 234	Nisin	16	1
E 296	Malic acid	7	1
E 224	Potassium metabisulphite	6	1
E 452	Sodium, potassium and calcium polyphosphates	4	<1
E 330	Butylated hydroxyanisole	3	<1
E 509	Calcium chloride	3	<1
E 249	Potassium nitrite	3	<1
E 450	Sodium, potassium and calcium diphosphates	2	<1
E 270	Lactic acid	1	<1
E 325	Sodium lactate	1	<1
E 331	Sodium citrates	1	<1
E 218	Methyl-4-hydroxybenzoate	1	<1
E 210	Benzoic acid	1	<1

Table 7.9
Patterns of usage of raising agents

Additive		No. of brand foods in INFID	% contribution to total raising agents
E 500	Sodium carbonate, sodium hydrogen carbonate, sodium sesquicarbonate	509	48
E 503	Ammonium carbonate, ammonium hydrogen carbonate	251	24
E 450	Sodium, potassium and calcium diphosphates	200	19

Additive		No. of brand foods in INFID	% contribution to total raising agents
E 341	Calcium phosphates	40	4
E 575	Glucono-delta-lactone	19	2
E 334	L-Tartaric acid	15	1
E 541	Sodium aluminium phosphate acidic	12	1
E 339	Sodium phosphates	3	<1
E 529	Calcium oxide	2	<1
E 330	Citric acid	1	<1

Table 7.10
Patterns of usage of functional ingredients*

Additive		No. of brand foods in INFID	% contribution to total functional ingredients
E 418	Gellan gum	156	17
E 170	Calcium carbonate	111	12
E 422	Glycerol	97	11
E 440	Pectins	57	6
E 450	Sodium, potassium and calcium diphosphates	43	5
E 322	Lecithin	40	4
E 420	Sorbitol, sorbitol syrup	35	4
E 452	Sodium, potassium and calcium polyphosphates	29	3
E 500	Sodium carbonate, sodium hydrogen carbonate, sodium sesquicarbonate	28	3
E 415	Xanthan gum	25	3
E 470b	Magnesium salts of fatty acids	25	3
E 262	Sodium acetates	24	3
E 341	Calcium phosphates	22	2
E 202	Potassium sorbate	20	2
E 339	Sodium phosphates	18	2
E 325	Sodium lactate	12	1
E 621	Monosodium glutamate	11	1
E 250	Sodium nitrite	8	1
E 412	Guar gum	8	1
E 509	Calcium chloride	8	1
E 471	Mono- and diglycerides of fatty acids	7	1
E 414	Acacia (gum arabic)	7	1

Additive		No. of brand foods in INFID	% contribution to total functional ingredients
E 251	Sodium nitrate	6	1
E 516	Calcium sulphate	6	1
E 401	Sodium alginate	6	1
E 160a	Carotenes, mixed carotenes, beta-carotene	6	1
E 150a	Plain caramel	6	1
E 451	Sodium and potassium triphosphates	5	1
E 472e	Mono- & diacetyl tartaric acid esters of mono-& diglycerides of fatty acids	5	1
E 301	L-Sodium ascorbate	5	1
E 508	Potassium chloride	5	1
E 954	Saccharin and its Na, K and Ca salts	5	1
E 466	Carboxy/sodium methyl cellulose	4	<1
E 160c	Paprika extract, capsanthin, capsorubin	4	<1
E 331	Sodium citrates	4	<1
E 320	Butylated hydroxyanisole	3	<1
E 263	Calcium acetate	3	<1
E 501	Potassium carbonate, potassium hydrogen carbonate	3	<1
E 211	Sodium benzoate	3	<1
E 460	Cellulose	3	<1
E 221	Sodium sulphite	3	<1
E 1200	Polydextrose	3	<1
E 297	Fumaric acid	2	<1
E 300	L-Ascorbic acid	2	<1
E 223	Sodium metabisulphite	2	<1
E 340	Potassium phosphates	2	<1
E 321	Butylated hydroxytoluene	2	<1
E 575	Glucono-delta-lactone	2	<1
E 530	Magnesium oxide	2	<1
E 407	Agar	2	<1
E 504	Magnesium carbonate, magnesium hydrogen carbonate	2	<1
E 330	Citric acid	2	<1
E 464	Hydroxypropyl methyl cellulose	1	<1
E 434	Polyoxyethylene sorbitan monopalmitate	1	<1

Additive		No. of brand foods in INFID	% contribution to total functional ingredients
E 160b	Annatto, bixin, norbixin	1	<1
E 410	Locust bean gum	1	<1
E 433	Polyoxyethylene sorbitan monoleate	1	<1
E 903	Carnauba wax	1	<1
E 954	Saccharin and its Na, K and Ca salts	1	<1
E 385	Calcium disodium EDTA	1	<1
E 332	Potassium citrates	1	<1
E 481	Sodium stearoyl-2-lactylate	1	<1
E 552	Calcium silicate	1	<1
E 110	Sunset yellow FCF, orange yellow S	1	<1
E 421	Mannitol	1	<1
E 290	Carbon dioxide	1	<1
E 404	Calcium alginate	1	<1
E 203	Calcium sorbate	1	<1

* In cases where an additive was labelled without its function, these additives were entered as functional ingredients.

Table 7.11
Patterns of usage of flavour enhancers

Additive		No. of brand foods in INFID	% contribution to total flavour enhancers
E 621	Monosodium glutamate	578	83
E 635	Sodium 5' ribonucleotides	98	14
E 631	Disodium inosinate	7	1
E 627	Disodium guanylate	4	1
E 920	L-Cysteine hydrochloride	3	<1
E 620	Glutamic acid	3	<1
E 160b	Annatto, bixin, norbixin.	3	<1
E 339	Sodium phosphates	1	<1
E 331	Sodium citrates	1	<1

Table 7.12
Patterns of usage of acidity regulators

Additive		No. of brand foods in INFID	% contribution to total acidity regulators
E 331	Sodium citrates	297	56

Additive		No. of brand foods in INFID	% contribution to total acidity regulators
E 330	Citric acid	80	15
E 340	Potassium phosphates	47	9
E 331c	Trisodium citrates	22	4
E 334	L-Tartaric acid	22	4
E 262	Sodium acetates	18	3
E 270	Lactic acid	10	2
E 296	Malic acid	6	1
E 332	Potassium citrates	6	1
E 575	Glucono-delta-lactone	5	1
E 333	Calcium citrates	5	1
E 325	Sodium lactate	4	1
E 260	Acetic acid	3	1
E 500	Sodium carbonate, sodium hydrogen carbonate, sodium sesquicarbonate	2	<1
E 338	Phosphoric acid	2	<1
E 472a	Acetic acid esters of mono- & diglycerides of fatty acids	1	<1
E 339	Sodium phosphates	1	<1
E 301	L-Sodium ascorbate	1	<1
E 341	Calcium phosphates	1	<1
E 450	Sodium, potassium and calcium diphosphates	1	<!

Table 7.13
Patterns of usage of gelling agents

Additive		No. of brand foods in INFID	% contribution to total gelling agents
E 440	Pectins	405	77
E 418	Gellan gum	51	10
E 407	Carrageenan	15	3
E 450	Sodium, potassium and calcium diphosphates	11	2
E 406	Agar	10	2
E 339	Sodium phosphates	8	2
E 340	Potassium phosphates	5	1
E 401	Sodium alginate	4	1
E 508	Potassium chloride	4	1
E 415	Xanthan gum	3	1

Additive		No. of brand foods in INFID	% contribution to total gelling agents
E 341	Calcium phosphates	2	<1
E 414	Acacia (gum arabic)	2	<1
E 330	Citric acid	2	<1
E 410	Locust bean gum	1	<1
E 263	Calcium acetate	1	<1
E 412	Guar gum	1	<1
E 585	Ferrous lactate	1	<1
E 333	Calcium citrates	1	<1
E 331	Sodium citrates	1	<1

Table 7.14
Patterns of usage of sweeteners

Additive		No. of brand foods in INFID	% contribution to total sweeteners
E 951	Aspartame	212	47
E 954	Saccharin and its Na. K and Ca salts	163	36
E 950	Acesulfame potassium, Acesulfame K	77	17
E 952	Cyclamic acid and its Na and Ca salts	1	<1
E 420	Sorbitol, sorbitol syrup	1	<1

Table 7.15
Patterns of usage of antioxidants

Additive		No. of brand foods in INFID	% contribution to total antioxidants
E 320	Butylated hydroxyanisole	113	28
E 301	L-Sodium ascorbate	111	27
E 300	L-Ascorbic acid	82	20
E 321	Butylated hydroxytoluene	36	9
E 306	Tocopherol-rich extracts	13	3
E 331	Sodium citrates	9	2
E 310	Propyl gallate	8	2
E 304	Fatty acid esters of ascorbic acid	8	2
E 316	Sodium erythorbate	7	2
E 307	Alpha-Tocopherol (synthetic)	7	2
E 224	Potassium metabisulphite	3	1

Additive		No. of brand foods in INFID	% contribution to total antioxidants
E 223	Sodium metabisulphite	3	1
E 330	Citric acid	2	<1
E 340	Potassium phosphates	1	<1
E 220	Sulphur dioxide	1	<1
E 302	L-Calcium ascorbate	1	<1
E 341	Calcium phosphates	1	<1
E 900	Dimethyl polysiloxane	1	<1

Table 7.16
Patterns of usage of thickeners

Additive		No. of brand foods in INFID	% contribution to total thickeners
E 412	Guar gum	58	44
E 415	Xanthan gum	26	20
E 407	Carrageenan	16	12
E 466	Carboxy / Sodium methly cellulose	12	9
E 410	Locust bean gum	9	7
E 440	Pectins	7	5
E 418	Gellan gum	2	2
E 460	Cellulose	1	1
E 413	Tragacanth	1	1
E 401	Sodium alginate	1	1

Table 7.17
Patterns of usage of emulsifying salts

Additive		No. of brand foods in INFID	% contribution to total emulsifyfing salts
E 339	Sodium phosphates	45	37
E 450	Sodium, potassium and calcium diphosphates	32	26
E 452	Sodium, potassium and calcium polyphosphates	19	15
E 331	Sodium citrates	14	11
E 341	Calcium phosphates	7	6
E 331c	Trisodium citrates	4	3
E 621	Monosodium glutamate	1	1
E 251	Sodium nitrate	1	1

Table 7.18
Patterns of usage of anti-caking agents

Additive		No. of brand foods in INFID	% contribution to total anti-caking agents
E 504	Magnesium carbonate, magnesium hydroxide carbonate	21	31
E 554	Sodium aluminium silicate	16	24
E 551	Silicon dioxide	10	15
E 535	Sodium ferrocyanide	9	13
E 552	Calcium silicate	3	4
E 341	Calciumphosphates	3	4
E 470b	Magnesium salts of fatty acids	3	4
E 339	Sodium phosphates	2	3
E 170	Calcium carbonate	1	1

Table 7.19
Patterns of usage of glazing agents

Additive		No. of brand foods in INFID	% contribution to total glazing agents
E 903	Canada wax	19	41
E 904	Shellac	12	26
E 414	Acacia (gum arabic)	7	15
E 901	Bees wax, white and yellow	5	11
E 418	Gellan gum	1	2
E 500	Sodium carbonate, sodium hydrogen carbonate, Sodium sesquicarbonate	1	2
E 422	Glycerol	1	2

Table 7.20
Patterns of usage of flour treatment agents

Additive		No. of brand foods in INFID	% contribution to total flour treatment agents
E 300	L-Ascorbic acid	27	66
E 920	L-Cysteine hydrochloride	13	32
E 223	Sodium metabisulphite	1	2

Table 7.21
Patterns of usage of flour improvers

Additive		No. of brand foods in INFID	% contribution to total flour improvers
E 300	L-Ascorbic acid	16	64
E 920	L-Cysteine hydrochloride	7	28
E 290	Carbon dioxide	2	8

Table 7.22
Patterns of usage of firming agents

Additive		No. of brand foods in INFID	% contribution to total firming agents
E 509	Calcium chloride	12	100

Table 7.23
Patterns of usage of humectants

Additive		No. of brand foods in INFID	% contribution to total humectants
E 422	Glycerol	8	80
E 420	Sorbitol, sorbitol syrup	2	20

Table 7.24
Patterns of usage of modified starches

Additive		No. of brand foods in INFID	% contribution to total modified starches
E 422	Glycerol	2	50
E 414	Acacia (gum arabic)	2	50

Table 7.25
Patterns of usage of sequestrants

Additive		No. of brand foods in INFID	% contribution to total sequestrants
E 575	Glucono-delta-lactone	1	50
E 385	Calcium disodium EDTA	1	50

Table 7.26
Patterns of usage of antifoaming agents

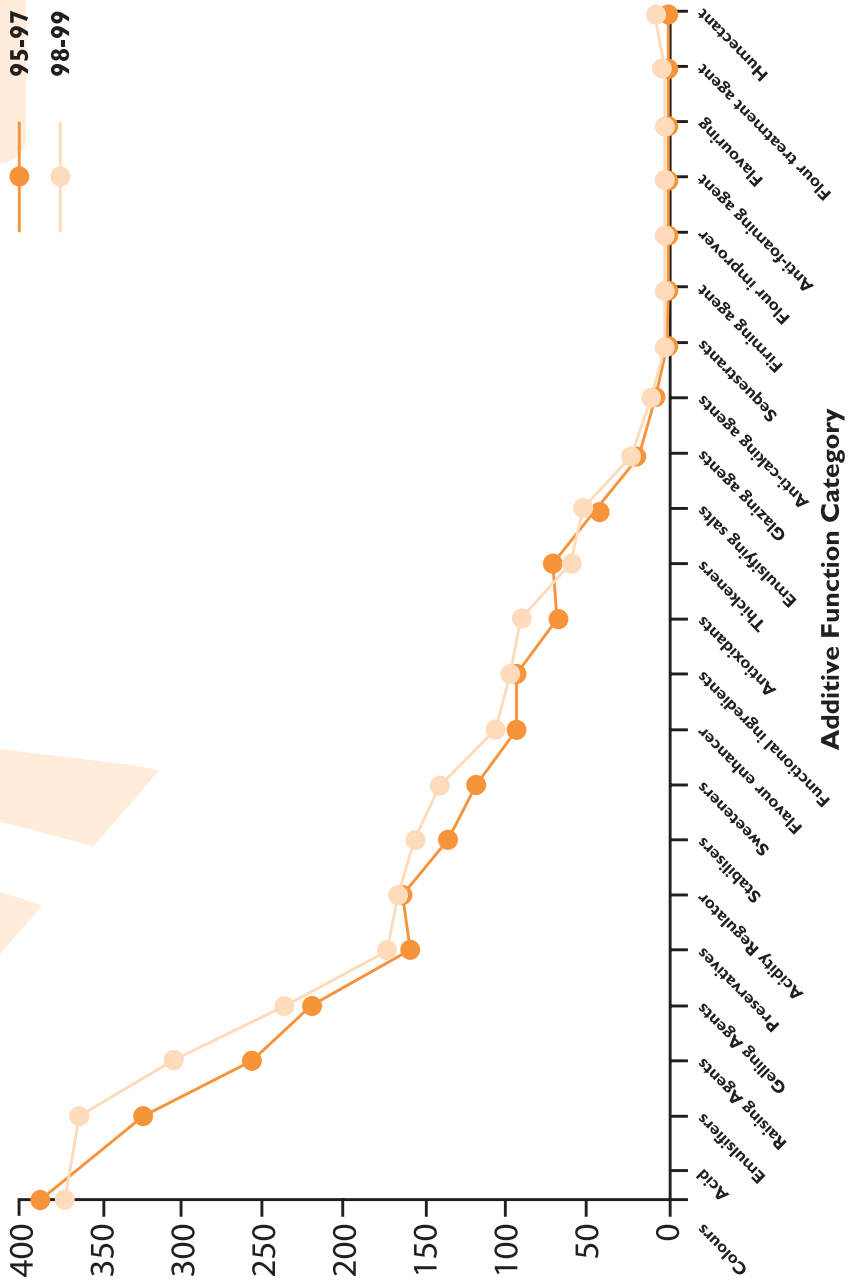
Aditive		No. of brand foods in INFID	% contribution to total thickeners
E 900	Dimethyl polysiloxane	1	1

Table 7.27
% brands within Irish food groups which contain additives

Food group	% brands containing additives	No. of brand foods in food group
Diet soft drinks	100	37
Low-fat spreads	100	24
Liver, liver pâté	100	10
Sausages	98	53
Bacon and Ham	98	61
Chocolate confectionery	96	181
Other soft drinks	93	198
Desserts	92	252
Sugar confectionery	91	174
Margarines	89	27
Meat pies and pastries	88	43
Preserves	85	382
Biscuits	84	396
Yoghurt	83	171
Egg &/or cheese dishes	83	30
Soups	80	269
Cheese	79	136
Buns, cakes and pastries	78	209
Other meat products	80	50
Savoury snacks	75	168
Sauces	73	718
Butter etc.	69	27
Burgers	67	56
Beef, veal and dishes	62	61
Other vegetables and dishes	57	122
Potatoes other than chips	56	41
White bread	55	56
Chicken and turkey	54	134
Lamb and dishes	50	16
Peas	47	17
Miscellaneous	37	608
Low-fat and other milks	46	39
Baked beans	46	13
Other breads	45	47
Cream	45	11

Food group	% brands containing additives	No. of brand foods in food group
Breakfast cereals	44	100
Pork and dishes	44	18
Other cereals	42	229
Canned fruit and other fruit	42	100
Wholemeal bread	40	36
Seafood	27	148
Tomatoes	32	16
Leafy green vegetables	21	14
Chips and other fried/roast	19	16
Other pulses	15	47
Coffee	11	28
Nuts	10	51
Fruit juice	8	26
Tea	<1	33
Whole milk	<1	9
Carrots	<1	8
Table sugar	<1	7
Cabbage	<1	2

Figure 7.1
Changes in patterns of additive usage in Ireland during the period 1995–1997 to 1998–1999



- **Monitoring of intake**

It has generally been agreed by expert task forces that the process of evaluating food additive intake should always start with crude, conservative, easy-to-apply approaches and only proceed to more detailed approaches if the evaluation of the intake, relative to the ADI, indicates that it is necessary to do so. [8]

The initial, EU conducted screening for additives using the budget method high lighted 36 additives or groups of additives which required further screening by Member States. A variety of approaches, including portion back calculations, crude food intake data and nutrient-back calculations, were employed by the Irish Universities Nutrition Alliance (IUNA) research group as a second stage screening to identify additives which require detailed intake estimates.

Before any of the methods were employed, INFID was used to establish the presence or absence of the additives in the relevant food groups. If an additive was found to be absent from a food group which was well-represented in INFID, then the food group was omitted from the intake calculations. If an additive was permitted in a food group which was considered to be rarely consumed (e.g. powders for the home preparation of drinks), intake estimates of that food group were not deemed necessary. If an additive was permitted in a commonly consumed food group, which was not considered to be fully represented in INFID (e.g. chewing gum), then potential intake estimates of the additive from that food group were calculated. In all estimates of additive intake the additive in question was assumed to be always present in the food in which it is permitted for use and always present at its maximum permitted level.

- Portion back calculations considered the number of portions of a food necessary to reach the ADI, assuming that the additive was present at the maximum permitted level of use (MPL). These calculations are only appropriate for additives permitted in one food or a very limited number of foods.
- Nutrient back calculations, extrapolated from foods to nutrients for comparison with current nutrient intakes was carried out for certain additives.
- Crude food intakes, based on consumer only intakes of broadly defined food groups from the database of the Irish National Nutrition Survey (INNS)[9] were multiplied by Maximum Permitted Levels (MPLs) to give conservative estimates of additive intake.
- In cases where existing food groups did not cover the intake of specific foods, average portion sizes,[10] consumed on a daily basis, were considered to represent a conservative intake. The intake estimated were then compared with the ADI. See examples 1-3 of methods employed to screen for additives for inclusion on a final list for more detailed analysis:

Example 1: Portion back-calculation

Ferrocyanides (E 535, E 536)

ADI = 0.025mg/kg bw/day (1.5mg/day)

Permitted in "salt and its substitutes" @ 20mg/kg

INFID – confirms presence (9 brands)

If 1kg (1,000g) salt contains 20mg, then 75g salt will contain 1.5mg (ADI)

75g salt = 15 level teaspoons/day

Conclusion: If intake of 15 level teaspoons of salt/day is necessary to exceed the ADI, this additive is most unlikely to pose a problem and can be eliminated from the priority list.

Example 2: Nutrient back-calculation

Gallates (E 310 – E 312)

ADI – 0.5mg/kg bw/day (30mg/day)

Permitted in 15 food categories, of which 12 are expressed on fat @ 200mg/kg. Also permitted in chewing gum, dietary supplements, dehydrated granulated potatoes.

97.5 percentile fat intake (Irish National Nutrition Survey (INNS) 1990 = 194g/day

If we assume that all fat in the diet contains gallates, then consumers at 97.5th percentile fat have gallate intake of 194 x 0.2 = 38.8mg/day = 129% ADI

Example 3: Food intakes x Maximum Permitted Level (MPL)

Green S (E 142)

ADI = 5mg/kg bw/day (300mg/day)

Permitted in 37 food categories, of which 10 categories contained Green S (INFID), 5 did not contain Green S (INFID), 10 potentially contained Green S and could make a significant contribution to intakes but were not well represented in INFID and 11 potentially contained Green S but were unlikely to make a significant contribution to intakes (e.g. candied vegetables, surimi).

Table 7.28
Intake Calculations for Green S

Food Category	MPL (mg/g)**	Intake (g/day)	Green S (mg/day)	% ADI*
Desserts	0.15	114 (INNS)***	17	6
Sauces, seasonings	0.5	60 (INNS)	30	10
Confectionery	0.3	90 (INNS)	27	9
Edible ices	0.15	77 (MAFF)****	12	4
Processed mushy peas	0.01	80 (MAFF)	0.8	0.3

* ADI Green S = 5mg/kgbw/day
** MPL = Maximum permitted level
*** INNS = Irish National Nutrition Survey, 1990
**** MAFF = Ministry for Agriculture, Fisheries and Food (UK)

The IUNA screening eliminated 22 additives from the list of 36, and identified 14 additives for detailed analysis:

Table 7.29
List of additives identified for and eliminated from further analysis

14 additives identified for detailed analysis		
Annatto	Gallates	Stearoyl lactylates
Benzoates	Nitrites	Sucrose esters / sucroglycerides
BHA	Polyglycerol esters of fatty acids	Sulphites
BHT	Polyglycerol polyricinoleate	Sunset yellow
Carmines	Polysorbates	
22 additives eliminated from further analysis		
Acesulfame K	Cyclamic acid & its salts	Ponceau 4R
Adipic acids & salts	Erythorbates	Red 2G
Aluminium	Erythrosine	Sorbitan esters I
Ammonium phosphatides	Ferrocyanides	Sorbitan esters II
Black PN	Fumaric acid & salts	Stearyl tartrate
Brown HT	Green S	Thermally oxidised soyabean oil with mono/diglycerides of fatty acids
Canthaxanthin	Indigotine	
Carmoisine / Azorubine	Karaya gum	

For these 14 additives a more refined intake assessment was carried out using the North South Food Consumption Survey (NSFCS)[11].

The North South Food Consumption Survey was initiated to replace the Irish National Nutrition Survey (INNS) (Republic of Ireland only) which was carried out by the Irish Nutrition & Dietetic Institute and published in 1990. The survey is based on approximately 1,000 subjects in the Republic of Ireland and 400 subjects in Northern Ireland along a common protocol involving a 7-day food intake diary. The level of food aggregation in the full electronic database is minimal which will allow the NSFCS database to address aspects of food additive intake which are not possible with the 1990 INNS database. For the purposes of this report, only data from the Republic of Ireland were used.

The further more refined intake assessment involved identifying food categories in which each additive is legally permitted, and re-grouping foods in the consumption database where appropriate to correspond to the relevant EU food categories (see Appendix 4).

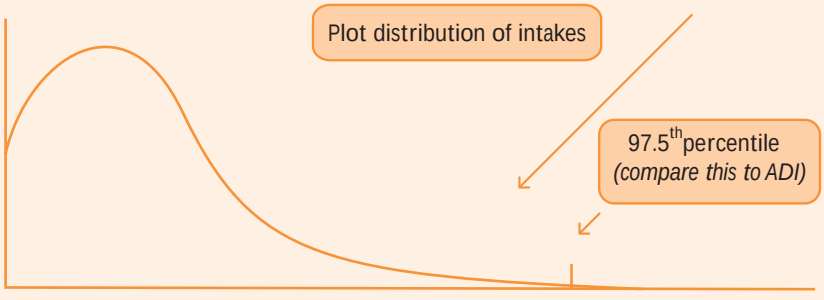
For each additive, the appropriate MPL was allocated to each food group. Food additive intake estimates were generated by multiplying the food intake by the MPL and then summing the intake of the additive from each food group for each individual's consumption of the food groups (see Table 7.28).

Example 4: Additive X; permitted in foods

A @ 0.2mg/g
B @ 0.1mg/g
C @ 0.5mg/g

Table 7.30
Example of the method employed to estimate additive intakes using the NSFCS

Subject	Food A g/day	x from A mg/day	Food B g/day	x from B mg/day	Food C g/day	x from C mg/day	Body weight kg	Total intake of x from all foods mg/kg bw/day
1	50	10	40	4	55	28	60	0.7
2	60	12	0	0	35	18	70	0.4
3	90	18	0	0	50	25	75	0.6
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
958	40	8	10	1	0	0	55	0.2



This method more closely approximates the true distribution of the additive because it is generated at the level of the individual rather than at food group level (the approach used in the IUNA second screening).

In cases where an additive was expressed on the fat content of a particular food (i.e. BHA, BHT, gallates), a nutrient-back calculation was employed (see example 2).

Where appropriate, INFID was used to refine broad food categories for more detailed intake estimates. E.g. if an additive was permitted for use in fine bakery wares (which includes biscuits, buns, cakes & pastries) and INFID confirmed its presence in only biscuits, then the intake of the additive from buns, cakes and pastries was excluded from the analysis.

As with the second stage crude screening, if INFID confirmed the absence of an additive from a particular food group, that food group was excluded from the exposure assessment.

In the case of alcoholic beverages where ingredient information is not required by law, confirmation of the presence or absence of the additive in question, in a particular alcoholic beverage, was sought with the assistance of the Irish Business and Employers Confederation (IBEC).

In the case of unpackaged foods (e.g. some bread, cakes), it was assumed that the food additive content was comparable to the packaged counterpart.

Intake estimates were expressed for consumers only at the 97.5th percentile of intake in mg/kg bw/day, which is directly comparable to the ADI.

Intake estimates exceeding the ADI were deemed necessary for further assessment. Although this method of assessment represents a refined approach, it is important to bear in mind that it still offers some degree of conservatism. For example if INFID confirms the presence of an additive in only a few foods within a food group, it is assumed that all foods within that food group contain the additive in question. Furthermore all intake estimates assume that an additive is always present at its MPL, which, may not always be the case. Thus if the results of this analysis present an intake estimate for an additive which is close to the ADI i.e. stearoyl lactylates 90% ADI, this does not necessarily warrant concern.

Results

The results of the detailed intake estimate approach excluded a further 12 additives from the prioritised list and prioritised 2 additives (sulphites & nitrites) for a more detailed assessment or for a revision of the conditions of use.

Table 7.31
Detailed intake estimates* of the 14 prioritised food additives using the NSFCS

Additive	E number	Result from detailed analysis mg/kg bw/day	% ADI	Conclusion
Sunset Yellow	E 110	0.556	22	Unlikely to exceed ADI
Annatto	E 160b	0.055	85	Unlikely to exceed ADI
Sulphites	E 220 - E 224 E 226 - E 228	0.821	117	Possibility of exceeding the ADI
Butylated Hydroxyanisole (BHA)	E 320	0.373	75	Unlikely to exceed ADI
Carmines	E 120	1.570	31	Unlikely to exceed ADI
Benzoic Acid & Salts	E 210 - E 213	2.878	57	Unlikely to exceed ADI
Polyglycerol Polyricinoleate	E 476	4.327	70	Unlikely to exceed ADI
Polyglycerol Esters of fatty Acids	E 475	23.910	96	Unlikely to exceed ADI
Polysorbates	E 432 - E 436	8.233	80	Unlikely to exceed ADI
Nitrites	E 249, E 250	0.205	205	Possibility of exceeding the ADI
Gallates	E 310 - E 312	0.384	77	Unlikely to exceed ADI
Stearoyl Lactylates	E 481 - E 482	18.611	20	Unlikely to exceed ADI
Sucrose Esters/ Sucroglycerides	E 473 - E 474	8.926	45	Unlikely to exceed ADI
Butylated Hydroxytuluene (BHT)	E 321	0.043	85	Unlikely to exceed ADI

*Note: Results from the NSFCS demonstrate that some 25% of people consume some form of food supplements. INFID contains a rather limited range of food supplements. Thus, the potential intake of carmines, benzoates, BHA, BHT, gallates & sunset yellow, from food supplements has not been included in their respective exposure assessments. Until such time as a comprehensive database of the additives used in food supplements is obtained, the potential exposure of these additives from food supplements remains to be investigated.

CHAPTER 8: INTOLERANCE TO FOOD ADDITIVES

Adverse reactions to food additives occur in a small proportion of the population, and occur less often than supposed by patients.[12] Adverse reactions to food additives are however difficult to demonstrate and are almost certainly much less common than reactions to substances present naturally in food.[13] A UK Ministry of Agriculture, Fisheries and Food survey estimated that the occurrence of intolerance reactions to food additives in the general population is in the range of 0.01-0.23% (1-23 per 10,000 people)[13] in contrast to a perceived prevalence of 7.4%.[14]

In children, food additive intolerance is primarily found in atopic children with cutaneous symptoms where the additive is aggravating an existing disease. The prevalence in children with atopic symptoms age 5-16 was found to be 1-2%.[15] When children have behavioural problems, an association between ingestion of certain foods or food additives and abnormal behaviour is often suspected by parents. A large number of studies using proper study dosing, including double-blind, placebo-controlled challenge, have been unable to show a significant effect of colouring and preservative free diet on behaviour in children with true hyperkinetic syndrome. There is some evidence that an additive-free diet may have a small effect in a small subset of pre-school aged children. However, the association is much weaker than originally postulated.[12]

APPENDIX 1: EU ACTION PLAN ON FOOD SAFETY CONCERNING FOOD ADDITIVES

(As published by the COMMISSION OF THE EUROPEAN COMMUNITIES, Brussels, 12 January 2000 COM (1999) 719 final In the WHITE PAPER ON FOOD SAFETY)

Proposal for amending Directive 89/107/EEC on food additives

To confer implementing powers for maintaining the lists of permitted food additives and to lay down specific provisions in respect of enzymes

Adoption by Commission December 2000

Adoption by Council/Parliament December 2001

Proposal for amending Directive 95/2/EC on food additives other than colours and sweeteners

To update and revise the list of food additives other than colours and sweeteners

Adoption by Commission December 2000

Adoption by Council/Parliament December 2001

Proposal for amending Directive 79/112/EEC on the labelling, presentation and advertising of foodstuffs

To remove the possibility not to indicate the components of compound ingredients forming less than 25% of the final product and lay down a list of allergenic substances

Adoption by Commission December 2000

Adoption by Council/Parliament December 2001

Report on the intake of food additives

To provide an overview of the intake of food additives in the European Union

Adoption by Commission June 2000

Proposal for amending Directive 94/35/EC on sweeteners

To update and revise the list of sweeteners for use in foodstuffs

Adoption by Commission December 2000

Adoption by Council/Parliament December 2001

Amendment to Directives 95/31/EC, 95/45/EC and 96/77/EC on purity criteria for food additives (including sweeteners and colours)

To update and complete existing provisions. To introduce a general requirement for a new safety evaluation for permitted additives made from new sources or with new methods.

Adoption by Commission September 2000

Amendment to Directive 81/712/EEC laying down Community methods of analysis for the respect of purity criteria

To replace existing provisions with a set of general principles and a reference to other similar provisions

Adoption by Commission June 2001

Proposal for a Regulation on additives used in flavourings

To lay down a list of additives authorised for use in flavourings

Adoption by Commission June 2001

Adoption by Council/Parliament December 2002

APPENDIX 2: LEGISLATION RELATING TO THE LABELLING OF FOOD ADDITIVES IN FOODSTUFFS

- Council Directive 2000/13/EC on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs
- Commission Regulation (EC) No 50/2000 of 10 January 2000 on the labelling of foodstuffs and food ingredients containing additives and flavourings that have been genetically modified or have been produced from genetically modified organisms
- European Parliament and Council Directive 94/35/EC of 30 June 1994 on sweeteners for use in foodstuffs (specific requirements for the labelling of sweeteners)
- Commission Directive 94/54/EC of 18 November 1994 concerning the compulsory indication on the labelling of certain foodstuffs of particulars other than those provided for in Council Directive 79/112/EEC
- Council Directive 96/21/EC of 29 March 1996 amending Commission Directive 94/54/EC concering the compulsory indication on the labelling of certain foodstuffs of particulars other than those provided for in Directive 79/112/EEC.

APPENDIX 3: LIST OF E NUMBERS

The lists below give the reference number (the "E number") and the English name of all those additives listed in the three Specific Directives in numerical and alphabetical order. It should be noted that some additives are restricted to a very limited number of foods whereas others may be permitted at the level necessary to achieve the desired technical effect ("quantum satis") with no numerical limit stated. The Directives or the implementing legislation in the Member States should be consulted for actual details. The numbering system is being adapted for international use by the Codex Alimentarius Commission who are developing an International Numbering System (INS). This will largely use the same numbers (but without the E).

This list is correct as of Oct 2001, but may be amended subsequently.

3.1 E numbers in numerical order

E 100	Curcumin
E 101	Riboflavin (ii) Riboflavin-5'-phosphate
E 102	Tartrazine
E 104	Quinoline Yellow
E 110	Sunset Yellow FCF, Orange Yellow S
E 120	Cochineal, Carminic acid, Carmines
E 122	Azorubine, Carmoisine
E 123	Amaranth
E 124	Ponceau 4R, Cochineal Red A
E 127	Erythrosine
E 128	Red 2G
E 129	Allura Red AC
E 131	Patent Blue V
E 132	Indigotine, Indigo carmine
E 133	Brilliant Blue FCF
E 140	Chlorophylis and Chlorophyllins: (i) Chlorophylls (ii) Chlorophyllins
E 141	Copper complexes of chlorophylls and chlorophyllins (i) Copper complexes of chlorophylls (ii) Copper complexes of chlorophyllins
E 142	Greens S
E 150a	Plain caramel
E 150b	Caustic sulphite caramel
E 150c	Ammonia caramel
E 150d	Sulphite ammonia caramel
E 151	Brilliant Black BN, Black PN
E 153	Vegetable carbon

E 154	Brown FK
E 155	Brown HT
E 160a	Carotenes: (i) Mixed carotenes (ii) Beta-carotene
E 160b	Annatto, bixin, norbixin
E 160c	Paprika extract, capsanthin, capsorubin
E 160d	Lycopene
E 160e	Beta-apo-8'-carotenal (C 30)
E 160f	Ethyl ester of beta-apo-8'-carotenic acid (C 30)
E 161b	Lutein
E 161g	Canthaxanthin
E 162	Beetroot Red, betanin
E 163	Anthocyanins
E 170	Calcium carbonates
E 171	Titanium dioxide
E 172	Iron oxides and hydroxides
E 173	Aluminium
E 174	Silver
E 175	Gold
E 180	Litholrubine BK
E 200	Sorbic acid
E 202	Potassium sorbate
E 203	Calcium sorbate
E 210	Benzoic acid
E 211	Sodium benzoate
E 212	Potassium benzoate
E 213	Calcium benzoate
E 214	Ethyl p-hydroxybenzoate
E 215	Sodium ethyl p-hydroxybenzoate
E 216	Propyl p-hydroxybenzoate
E 217	Sodium propyl p-hydroxybenzoate
E 218	Methyl p-hydroxybenzoate
E 219	Sodium methyl p-hydroxybenzoate
E 220	Sulphur dioxide
E 221	Sodium sulphite
E 222	Sodium hydrogen sulphite
E 223	Sodium metabisulphite
E 224	Potassium metabisulphite
E 226	Calcium sulphite

E 227	Calcium hydrogen sulphite
E 228	Potassium hydrogen sulphite
E 230	Biphenyl, diphenyl
E 231	Orthophenyl phenol
E 232	Sodium orthophenyl phenol
E 233	Thiabendazole
E 234	Nisin
E 235	Natamycin
E 239	Hexamethylene tetramine
E 242	Dimethyl dicarbonate
E 249	Potassium nitrite
E 250	Sodium nitrite
E 251	Sodium nitrate
E 252	Potassium nitrate
E 260	Acetic acid
E 261	Potassium acetate
E 262	Sodium acetates (i) Sodium acetate (ii) Sodium hydrogen acetate (sodium diacetate)
E 263	Calcium acetate
E 270	Lactic acid
E 280	Propionic acid
E 281	Sodium propionate
E 282	Calcium propionate
E 283	Potassium propionate
E 284	Boric acid
E 285	Sodium tetraborate (borax)
E 290	Carbon dioxide
E 296	Malic acid
E 297	Fumaric acid
E 300	Ascorbic acid
E 301	Sodium ascorbate
E 302	Calcium ascorbate
E 304	Fatty acid esters of ascorbic acid (i) Ascorbyl palmitate (ii) Ascorbyl stearate
E 306	Tocopherol-rich extract
E 307	Alpha-tocopherol
E 308	Gamma-tocopherol
E 309	Delta-tocopherol
E 310	Propyl gallate

E 311	Octyl gallate
E 312	Dodecyl gallate
E 315	Erythorbic acid
E 316	Sodium erythorbate
E 320	Butylated hydroxyanisole (BHA)
E 321	Butylated hydroxytoluene (BHT)
E 322	Lecithins
E 325	Sodium lactate
E 326	Potassium lactate
E 327	Calcium lactate
E 330	Citric acid
E 331	Sodium citrates (i) Monosodium citrate (ii) Disodium citrate (iii) Trisodium citrate
E 332	Potassium citrates (i) Monopotassium citrate (ii) Tripotassium citrate
E 333	Calcium citrates (i) Monocalcium citrate (ii) Dicalcium citrate (iii) Tricalcium citrate
E 334	Tartaric acid (L(+)-)
E 335	Sodium tartrates (i) Monosodium tartrate (ii) Disodium tartrate
E 336	Potassium tartrates (i) Monopotassium tartrate (ii) Dipotassium tartrate
E 337	Sodium potassium tartrate
E 338	Phosphoric acid
E 339	Sodium phosphates (i) Monosodium phosphate (ii) Disodium phosphate (iii) Trisodium phosphate
E 340	Potassium phosphates (i) Monopotassium phosphate (ii) Dipotassium phosphate (iii) Tripotassium phosphate
E 341	Calcium phosphates (i) Monocalcium phosphate (ii) Dicalcium phosphate (iii) Tricalcium phosphate
E 343	Magnesium phosphates (i) monomagnesium phosphate (ii) Dimagnesium phosphate
E 350	Sodium malates (i) Sodium malate (ii) Sodium hydrogen malate
E 351	Potassium malate
E 352	Calcium malates (i) Calcium malate (ii) Calcium hydrogen malate
E 353	Metatartaric acid
E 354	Calcium tartrate
E 355	Adipic acid
E 356	Sodium adipate
E 357	Potassium adipate
E 363	Succinic acid

E 380	Triammonium citrate
E 385	Calcium disodium ethylene diamine tetra-acetate (Calcium disodium EDTA)
E 400	Alginic acid
E 401	Sodium alginate
E 402	Potassium alginate
E 403	Ammonium alginate
E 404	Calcium alginate
E 405	Propan-1,2-diol alginate
E 406	Agar
E 407	Carrageenan
E 407a	Processed eucheuma seaweed
E 410	Locust bean gum
E 412	Guar gum
E 413	Tragacanth
E 414	Acacia gum (gum arabic)
E 415	Xanthan gum
E 416	Karaya gum
E 417	Tara gum
E 418	Gellan gum
E 420	Sorbitol (i) Sorbitol (ii) Sorbitol syrup
E 421	Mannitol
E 422	Glycerol
E 425	Konjac (i) Konjac gum (ii) Konjac glucomannane
E 431	Polyoxyethylene (40) stearate
E 432	Polyoxyethylene sorbitan monolaurate (polysorbate 20)
E 433	Polyoxyethylene sorbitan monooleate (polysorbate 80)
E 434	Polyoxyethylene sorbitan monopalmitate (polysorbate 40)
E 435	Polyoxyethylene sorbitan monostearate (polysorbate 60)
E 436	Polyoxyethylene sorbitan tristearate (polysorbate 65)
E 440	Pectins (i) pectin (ii) amidated pectin
E 442	Ammonium phosphatides
E 444	Sucrose acetate isobutyrate
E 445	Glycerol esters of wood rosins
E 450	Diphosphates (i) Disodium diphosphate (ii) Trisodium diphosphate (iii) Tetrasodium diphosphate (iv) Dipotassium diphosphate (v) Tetrapotassium diphosphate (vi) Dicalcium diphosphate (vii) Calcium dihydrogen diphosphate
E 451	Triphosphates (i) Pentasodium triphosphate (ii) Pentapotassium triphosphate

E 452	Polyphosphates (i) Sodium polyphosphates (ii) Potassium polyphosphates (iii) Sodium calcium polyphosphate (iv) Calcium polyphophates
E 459	Beta-cyclodextrine
E 460	Cellulose (i) Microcrystalline cellulose (ii) Powdered cellulose
E 461	Methyl cellulose
E 463	Hydroxypropyl cellulose
E 464	Hydroxypropyl methyl cellulose
E 465	Ethyl methyl cellulose
E 466	Carboxy methyl cellulose, Sodium carboxy methyl cellulose
E 468	Crosslinked sodium carboxymethyl cellulose
E 469	Enzymically hydrolysed carboxy methyl cellulose
E 470a	Sodium, potassium and calcium salts of fatty acids
E 470b	Magnesium salts of fatty acids
E 471	Mono- and diglycerides of fatty acids
E 472a	Acetic acid esters of mono- and diglycerides of fatty acids
E 472b	Lactic acid esters of mono- and diglycerides of fatty acids
E 472c	Citric acid esters of mono- and diglycerides of fatty acids
E 472d	Tartaric acid esters of mono- and diglycerides of fatty acids
E 472e	Mono- and diacetyl tartaric acid esters of mono- and diglycerides of fatty acids
E 472f	Mixed acetic and tartaric acid esters of mono- and diglycerides of fatty acids
E 473	Sucrose esters of fatty acids
E 474	Sucroglycerides
E 475	Polyglycerol esters of fatty acids
E 476	Polyglycerol polyricinoleate
E 477	Propane-1,2-diol esters of fatty acids
E 479b	Thermally oxidized soya bean oil interacted with mono- and diglycerides of fatty acids
E 481	Sodium stearoyl-2-lactylate
E 482	Calcium stearoyl-2-lactylate
E 483	Stearyl tartrate
E 491	Sorbitan monostearate
E 492	Sorbitan tristearate
E 493	Sorbitan monolaurate
E 494	Sorbitan monooleate
E 495	Sorbitan monopalmitate
E 500	Sodium carbonates (i) Sodium carbonate (ii) Sodium hydrogen carbonate (iii) Sodium sesquicarbonate

E 501	Potassium carbonates (i) Potassium carbonate (ii) Potassium hydrogen carbonate
E 503	Ammonium carbonates (i) Ammonium carbonate (ii) Ammonium hydrogen carbonate
E 504	Magnesium carbonates (i) Magnesium carbonate (ii) Magnesium hydroxide carbonate (syn. Magnesium hydrogen carbonate)
E 507	Hydrochloric acid
E 508	Potassium chloride
E 509	Calcium chloride
E 511	Magnesium chloride
E 512	Stannous chloride
E 513	Sulphuric acid
E 514	Sodium sulphates (i) Sodium sulphate (ii) Sodium hydrogen sulphate
E 515	Potassium sulphates (i) Potassium sulphate (ii) Potassium hydrogen sulphate
E 516	Calcium sulphate
E 517	Ammonium sulphate
E 520	Aluminium sulphate
E 521	Aluminium sodium sulphate
E 522	Aluminium potassium sulphate
E 523	Aluminium ammonium sulphate
E 524	Sodium hydroxide
E 525	Potassium hydroxide
E 526	Calcium hydroxide
E 527	Ammonium hydroxide
E 528	Magnesium hydroxide
E 529	Calcium oxide
E 530	Magnesium oxide
E 535	Sodium ferrocyanide
E 536	Potassium ferrocyanide
E 538	Calcium ferrocyanide
E 541	Sodium aluminium phosphate, acidic
E 551	Silicon dioxide
E 552	Calcium silicate
E 553a	(i) Magnesium silicate (ii) Magnesium trisilicate
E 553b	Talc
E 554	Sodium aluminium silicate
E 555	Potassium aluminium silicate
E 556	Calcium aluminium silicate

E 558	Bentonite
E 559	Aluminium silicate (Kaolin)
E 570	Fatty acids
E 574	Gluconic acid
E 575	Glucono-delta-lactone
E 576	Sodium gluconate
E 577	Potassium gluconate
E 578	Calcium gluconate
E 579	Ferrous gluconate
E 585	Ferrous lactate
E 620	Glutamic acid
E 621	Monosodium glutamate
E 622	Monopotassium glutamate
E 623	Calcium diglutamate
E 624	Monoammonium glutamate
E 625	Magnesium diglutamate
E 626	Guanylic acid
E 627	Disodium guanylate
E 628	Dipotassium guanylate
E 629	Calcium guanylate
E 630	Inosinic acid
E 631	Disodium inosinate
E 632	Dipotassium inosinate
E 633	Calcium inosinate
E 634	Calcium 5'-ribonucleotides
E 635	Disodium 5'-ribonucleotides
E 640	Glycine and its sodium salt
E 900	Dimethyl polysiloxane
E 901	Beeswax, white and yellow
E 902	Candelilla wax
E 903	Carnauba wax
E 904	Shellac
E 905	Microcrystalline wax
E 912	Montanic acid esters
E 914	Oxidized polyethylene wax
E 920	L-Cysteine
E 927b	Carbamide
E 938	Argon

E 939	Helium
E 941	Nitrogen
E 942	Nitrous oxide
E 943a	Butane
E 943b	Isobutane
E 944	Propane
E 948	Oxygen
E 949	Hydrogen
E 950	Acesulfame K
E 951	Aspartame
E 952	Cyclamic acid and its Na and Ca salts
E 953	Isomalt
E 954	Saccharin and its Na, K and Ca salts
E 957	Thaumatin
E 959	Neohesperidine DC
E 965	Maltitol (i) Maltitol (ii) Maltitol syrup
E 966	Lactitol
E 967	Xylitol
E 999	Quillaia extract
E 1103	Invertase
E 1105	Lysozyme
E 1200	Polydextrose
E 1201	Polyvinylpyrrolidone
E 1202	Polyvinylpolypyrrolidone
E 1404	Oxidized starch
E 1410	Monostarch phosphate
E 1412	Distarch phosphate
E 1413	Phosphated distarch phosphate
E 1414	Acetylated distarch phosphate
E 1420	Acetylated starch
E 1422	Acetylated distarch adipate
E 1440	Hydroxy propyl starch
E 1442	Hydroxy propyl distarch phosphate
E 1451	Acetylated oxidised starch
E 1450	Starch sodium octenyl succinate
E 1505	Triethyl citrate
E 1518	Glyceryl triacetate (triacetin)
E 1520	Propan-1,2-diol (propylene glycerol)

3.2 E numbers in alphabetical order

E 414	Acacia gum (gum arabic)
E 950	Acesulfame K
E 260	Acetic acid
E 472a	Acetic acid esters of mono- and diglycerides of fatty acids
E 1422	Acetylated distarch adipate
E 1414	Acetylated distarch phosphate
E 1451	Acetylated oxidised starch
E 1420	Acetylated starch
E 355	Adipic acid
E 406	Agar
E 400	Alginic acid
E 129	Allura Red AC
E 307	Alpha-tocopherol
E 173	Aluminium
E 523	Aluminium ammonium sulphate
E 522	Aluminium potassium sulphate
E 559	Aluminium silicate (Kaolin)
E 521	Aluminium sodium sulphate
E 520	Aluminium sulphate
E 123	Amaranth
E 150c	Ammonia caramel
E 403	Ammonium alginate
E 503	Ammonium carbonates (i) Ammonium carbonate (ii) Ammonium hydrogen carbonate
E 527	Ammonium hydroxide
E 442	Ammonium phosphatides
E 517	Ammonium sulphate
E 160b	Annatto, bixin, norbixin
E 163	Anthocyanins
E 938	Argon
E 300	Ascorbic acid
E 951	Aspartame
E 122	Azorubine, Carmoisine
E 901	Beeswax, white and yellow
E 162	Beetroot Red, betanin
E 558	Bentonite

E 210	Benzoic acid
E 160e	Beta-apo-8'-carotenal (C 30)
E 459	Beta-cyclodextrine
E 230	Biphenyl, diphenyl
E 284	Boric acid
E 151	Brilliant Black BN, Black PN
E 133	Brilliant Blue FCF
E 154	Brown FK
E 155	Brown HT
E 943a	Butane
E 320	Butylated hydroxyanisole (BHA)
E 321	Butylated hydroxytoluene (BHT)
E 634	Calcium 5'-ribonucleotides
E 263	Calcium acetate
E 404	Calcium alginate
E 556	Calcium aluminium silicate
E 302	Calcium ascorbate
E 213	Calcium benzoate
E 170	Calcium carbonates
E 509	Calcium chloride
E 333	Calcium citrates (i) Monocalcium citrate (ii) Dicalcium citrate (iii) Tricalcium citrate
E 623	Calcium diglutamate
E 385	Calcium disodium ethylene diamine tetra-acetate (Calcium disodium EDTA)
E 538	Calcium ferrocyanide
E 578	Calcium gluconate
E 629	Calcium guanylate
E 227	Calcium hydrogen sulphite
E 526	Calcium hydroxide
E 633	Calcium inosinate
E 327	Calcium lactate
E 352	Calcium malates (i) Calcium malate (ii) Calcium hydrogen malate
E 529	Calcium oxide
E 341	Calcium phosphates (i) Monocalcium phosphate (ii) Dicalcium phosphate (iii) Tricalcium phosphate
E 282	Calcium propionate
E 552	Calcium silicate
E 203	Calcium sorbate

E 482	Calcium stearoyl-2-lactylate
E 516	Calcium sulphate
E 226	Calcium sulphite
E 354	Calcium tartrate
E 902	Candelilla wax
E 161g	Canthaxanthin
E 927b	Carbamide
E 290	Carbon dioxide
E 466	Carboxy methyl cellulose, Sodium carboxy methyl cellulose
E 903	Carnauba wax
E 160a	Carotenes: (i) Mixed carotenes (ii) Beta-carotene
E 407	Carrageenan
E 150b	Caustic sulphite caramel
E 460	Cellulose (i) Microcrystalline cellulose (ii) Powdered cellulose
E 140	Chlorophylis and Chlorophyllins: (i) Chlorophylls (ii) Chlorophyllins
E 330	Citric acid
E 472c	Citric acid esters of mono- and diglycerides of fatty acids
E 120	Cochineal, Carminic acid, Carmines
E 141	Copper complexes of chlorophylls and chlorophyllins (i) Copper complexes of chlorophylls (ii) Copper complexes of chlorophyllins
E 468	Crosslinked sodium carboxymethyl cellulose
E 100	Curcumin
E 952	Cyclamic acid and its Na and Ca salts
E 309	Delta-tocopherol
E 242	Dimethyl dicarbonate
E 900	Dimethyl polysiloxane
E 450	Diphosphates (i) Disodium diphosphate (ii) Trisodium diphosphate (iii) Tetrasodium diphosphate (iv) Dipotassium diphosphate (v) Tetrapotassium diphosphate (vi) Dicalcium diphosphate (vii) Calcium dihydrogen diphosphate
E 628	Dipotassium guanylate
E 632	Dipotassium inosinate
E 635	Disodium 5'-ribonucleotides
E 627	Disodium guanylate
E 631	Disodium inosinate
E 1412	Distarch phosphate
E 312	Dodecyl gallate
E 469	Enzymically hydrolysed carboxy methyl cellulose

E 315	Erythorbic acid
E 127	Erythrosine
E 160f	Ethyl ester of beta-apo-8'-carotenic acid (C 30)
E 465	Ethyl methyl cellulose
E 214	Ethyl p-hydroxybenzoate
E 304	Fatty acid esters of ascorbic acid (i) Ascorbyl palmitate (ii) Ascorbyl stearate
E 570	Fatty acids
E 579	Ferrous gluconate
E 585	Ferrous lactate
E 297	Fumaric acid
E 308	Gamma-tocopherol
E 418	Gellan gum
E 574	Gluconic acid
E 575	Glucono-delta-lactone
E 620	Glutamic acid
E 422	Glycerol
E 445	Glycerol esters of wood rosins
E 1518	Glyceryl triacetate (triacetin)
E 640	Glycine and its sodium salt
E 175	Gold
E 142	Greens S
E 626	Guanylic acid
E 412	Guar gum
E 939	Helium
E 239	Hexamethylene tetramine
E 507	Hydrochloric acid
E 949	Hydrogen
E 1442	Hydroxy propyl distarch phosphate
E 1440	Hydroxy propyl starch
E 463	Hydroxypropyl cellulose
E 464	Hydroxypropyl methyl cellulose
E 132	Indigotine, Indigo carmine
E 630	Inosinic acid
E 1103	Invertase
E 172	Iron oxides and hydroxides
E 943b	Isobutane
E 953	Isomalt
E 416	Karaya gum

E 425	Konjac (i) Konjac gum (ii) Konjac glucomannane
E 270	Lactic acid
E 472b	Lactic acid esters of mono- and diglycerides of fatty acids
E 966	Lactitol
E 180	LatoIrubine BK
E 920	L-Cysteine
E 322	Lecithins
E 410	Locust bean gum
E 161b	Lutein
E 160d	Lycopene
E 1105	Lysozyme
E 504	Magnesium carbonates (i) Magnesium carbonate (ii) Magnesium hydroxide carbonate (syn. Magnesium hydrogen carbonate)
E 511	Magnesium chloride
E 625	Magnesium diglutamate
E 528	Magnesium hydroxide
E 530	Magnesium oxide
E 343	Magnesium phosphates (i) monomagnesium phosphate (ii) Dimagnesium phosphate
E 470b	Magnesium salts of fatty acids
E 553a	(i) Magnesium silicate (ii) Magnesium trisilicate
E 296	Malic acid
E 965	Maltitol (i) Maltitol (ii) Maltitol syrup
E 421	Mannitol
E 353	Metatartaric acid
E 461	Methyl cellulose
E 218	Methyl p-hydroxybenzoate
E 905	Microcrystalline wax
E 472f	Mixed acetic and tartaric acid esters of mono- and diglycerides of fatty acids
E 472e	Mono- and diacetyl tartaric acid esters of mono- and diglycerides of fatty acids
E 471	Mono- and diglycerides of fatty acids
E 624	Monoammonium glutamate
E 622	Monopotassium glutamate
E 621	Monosodium glutamate
E 1410	Monostarch phosphate
E 912	Montan acid esters
E 235	Natamycin

E 959	Neohesperidine DC
E 234	Nisin
E 941	Nitrogen
E 942	Nitrous oxide
E 311	Octyl gallate
E 231	Orthophenyl phenol
E 914	Oxidized polyethylene wax
E 1404	Oxidized starch
E 948	Oxygen
E 160c	Paprika extract, capsanthin, capsorubin
E 131	Patent Blue V
E 440	Pectins (i) pectin (ii) amidated pectin
E 1413	Phosphated distarch phosphate
E 338	Phosphoric acid
E 150a	Plain caramel
E 1200	Polydextrose
E 475	Polyglycerol esters of fatty acids
E 476	Polyglycerol polyricinoleate
E 431	Polyoxyethylene (40) stearate
E 432	Polyoxyethylene sorbitan monolaurate (polysorbate 20)
E 433	Polyoxyethylene sorbitan monooleate (polysorbate 80)
E 434	Polyoxyethylene sorbitan monopalmitate (polysorbate 40)
E 435	Polyoxyethylene sorbitan monostearate (polysorbate 60)
E 436	Polyoxyethylene sorbitan tristearate (polysorbate 65)
E 452	Polyphosphates (i) Sodium polyphosphates (ii) Potassium polyphosphates (iii) Sodium calcium polyphosphate (iv) Calcium polyphophates
E 1202	Polyvinylpolypyrrolidone
E 1201	Polyvinylpyrrolidone
E 124	Ponceau 4R, Cochineal Red A
E 261	Potassium acetate
E 357	Potassium adipate
E 402	Potassium alginate
E 555	Potassium aluminium silicate
E 212	Potassium benzoate
E 501	Potassium carbonates (i) Potassium carbonate (ii) Potassium hydrogen carbonate
E 508	Potassium chloride
E 332	Potassium citrates (i) Monopotassium citrate (ii) Tripotassium citrate

E 536	Potassium ferrocyanide
E 577	Potassium gluconate
E 228	Potassium hydrogen sulphite
E 525	Potassium hydroxide
E 326	Potassium lactate
E 351	Potassium malate
E 224	Potassium metabisulphite
E 252	Potassium nitrate
E 249	Potassium nitrite
E 340	Potassium phosphates (i) Monopotassium phosphate (ii) Dipotassium phosphate (iii) Tripotassium phosphate
E 283	Potassium propionate
E 202	Potassium sorbate
E 515	Potassium sulphates (i) Potassium sulphate (ii) Potassium hydrogen sulphate
E 336	Potassium tartrates (i) Monopotassium tartrate (ii) Dipotassium tartrate
E 407a	Processed eucheuma seaweed
E 1520	Propan-1,2-diol (propylene glycerol)
E 405	Propan-1,2-diol alginate
E 944	Propane
E 477	Propane-1,2-diol esters of fatty acids
E 280	Propionic acid
E 310	Propyl gallate
E 216	Propyl p-hydroxybenzoate
E 999	Quillaia extract
E 104	Quinoline Yellow
E 128	Red 2G
E 101	(i) Riboflavin (ii) Riboflavin-5'-phosphate
E 954	Saccharin and its Na, K and Ca salts
E 904	Shellac
E 551	Silicon dioxide
E 174	Silver
E 262	Sodium acetates (i) Sodium acetate (ii) Sodium hydrogen acetate (sodium diacetate)
E 356	Sodium adipate
E 401	Sodium alginate
E 541	Sodium aluminium phosphate, acidic
E 554	Sodium aluminium silicate
E 301	Sodium ascorbate

E 211	Sodium benzoate
E 500	Sodium carbonates (i) Sodium carbonate (ii) Sodium hydrogen carbonate (iii) Sodium sesquicarbonate
E 331	Sodium citrates (i) Monosodium citrate (ii) Disodium citrate (iii) Trisodium citrate
E 316	Sodium erythorbate
E 215	Sodium ethyl p-hydroxybenzoate
E 535	Sodium ferrocyanide
E 576	Sodium gluconate
E 222	Sodium hydrogen sulphite
E 524	Sodium hydroxide
E 325	Sodium lactate
E 350	Sodium malates (i) Sodium malate (ii) Sodium hydrogen malate
E 223	Sodium metabisulphite
E 219	Sodium methyl p-hydroxybenzoate
E 251	Sodium nitrate
E 250	Sodium nitrite
E 232	Sodium orthophenyl phenol
E 339	Sodium phosphates (i) Monosodium phosphate (ii) Disodium phosphate (iii) Trisodium phosphate
E 337	Sodium potassium tartrate
E 281	Sodium propionate
E 217	Sodium propyl p-hydroxybenzoate
E 481	Sodium stearoyl-2-lactylate
E 514	Sodium sulphates (i) Sodium sulphate (ii) Sodium hydrogen sulphate
E 221	Sodium sulphite
E 335	Sodium tartrates (i) Monosodium tartrate (ii) Disodium tartrate
E 285	Sodium tetraborate (borax)
E 470a	Sodium, potassium and calcium salts of fatty acids
E 200	Sorbic acid
E 493	Sorbitan monolaurate
E 494	Sorbitan monooleate
E 495	Sorbitan monopalmitate
E 491	Sorbitan monostearate
E 492	Sorbitan tristearate
E 420	Sorbitol (i) Sorbitol (ii) Sorbitol syrup
E 512	Stannous chloride
E 1450	Starch sodium octenyl succinate

E 483	Stearyl tartrate
E 363	Succinic acid
E 474	Sucroglycerides
E 444	Sucrose acetate isobutyrate
E 473	Sucrose esters of fatty acids
E 150d	Sulphite ammonia caramel
E 220	Sulphur dioxide
E 513	Sulphuric acid
E 110	Sunset Yellow FCF, Orange Yellow S
E 553b	Talc
E 417	Tara gum
E 334	Tartaric acid (L(+)-)
E 472d	Tartaric acid esters of mono- and diglycerides of fatty acids
E 102	Tartrazine
E 957	Thaumatin
E 479b	Thermally oxidized soya bean oil interacted with mono- and diglycerides of fatty acids
E 233	Thiabendazole
E 171	Titanium dioxide
E 306	Tocopherol-rich extract
E 413	Tragacanth
E 380	Triammonium citrate
E 1505	Triethyl citrate
E 451	Triphosphates (i) Pentasodium triphosphate (ii) Pentapotassium triphosphate
E 153	Vegetable carbon
E 415	Xanthan gum
E 967	Xylitol

APPENDIX 4: EU FOOD CATEGORIES*

Table 4.1. EU food categories*

EU food category	Analysis included
Beer (including low alcohol and alcohol free beer)	All beers
Beer with a second fermentation in the cask	All beers
Bread (except that made solely from wheat flour, water, yeast or leaven & salt)	All breads
Breakfast sausages with a minimum cereal content of 6%	All sausages
Burger meat with a minimum vegetable &/or cereal content of 4%	All burgers (includes chicken & beef)
Candied fruits	Candied fruit in fine bakery wares
Candied, crystallised and glaze fruit	Candied, crystallised and glaze fruit in fine bakery wares
Canned meat products	Canned meat products
Cereal based snacks	All savoury snack products
Cereal & potato based snacks	All savoury snack products
Chewing gum	Chewing gum
Cider & perry	All cider
Cider (except cider bouche) and perry	All cider
Cider, perry (including alcohol free products)	All cider
Cocoa based confectionery including chocolate	All chocolate confectionery
Confectionery	All chocolate & sugar confectionery
Cured bacon	All bacon
Dairy based drinks	Dairy based drinks i.e. milkshakes (assumed not to mean yoghurts)
Desserts	All desserts
Desserts including flavoured milk products	All desserts & flavoured milk products such as processed milks, milk based drinks (not yoghurts)
Edible ices	Water based ices
Egg products	Eggs, savoury egg dishes (e.g. omelettes) and sweet egg dishes (e.g. meringue)
Emulsified liqueur	All liqueurs
Emulsified sauces	All sauces
Extruded or expanded savoury snack	Extruded or expanded savoury snack products (dry, savoury potato, cereal or starch based products) i.e. monster munch, chipsticks etc.

* As listed in Directives 95/2/EC, 94/35/EC, 94/36/EC

Extruded, puffed and/or fruit flavoured breakfast cereals	All breakfast cereals except weetabix, porridge, ready brek and muesli
Fat emulsions	All fat emulsions i.e. all butters, margarines and low fat spreads
Fat emulsions for baking purposes	Fats used in the professional manufacture of fine bakery wares, bread, and the pastry on "meat pies & pastries"
Fats & oils for the professional manufacture of heat treated foodstuffs	All fat derived from savoury snacks, bread, cakes, pastry
Fine bakery wares	Biscuits, buns, cakes, pastry
Fish roe	Fish roe
Flavoured processed cheese	All processed cheese
Fois gras, fois gras entier, blocs de fois gras	All liver pate
Jams, jellies & marmalades as mentioned in Directive 79/693/EEC (except extra jam and extra jelly) and other similar low fat spreads including low calorie products	All jams & preserves
Liqueurs, including fortified beverages with less than 15% alcohol by volume	All liqueurs
Liquid egg (white, yolk or whole egg)	All egg derived from fine bakery wares & egg dishes
Low sugar jams, jellies, marmalade & similar low calorie or sugar free products or other fruit based spreads, marmalades	All sugars, syrups & preserves
Low and very low fat spreads and dressings	Low and very low fat spreads and dressings
Margarine, minarine, other fat emulsions and fats essentially free from water	All fat emulsions i.e. butters, margarine and low-fat spreads
Meat & fish analogues based on vegetable	Textured vegetable protein products, i.e. proteins quorn burgers etc.
Minced & diced canned meat products	Minced & diced canned meat products
Mustard	Mustard
Non alcoholic flavoured drinks	Non alchoholic flavoured drinks includes carbonated and non-carbonated, squash, cordials and juices
Non emulsified sauces	All sauces
Other cured meat products	Cured meat products (excluding bacon)

Other savoury snack products (dry, savoury potato, cereal or starch based products) & savoury coated nuts	Other savoury snack products (dry, savoury potato, cereal or starch based products) i.e. potato crisps, tortilla chips & savoury coated nuts
Powders for the preparation of hot beverages	Powders for the preparation of hot beverages
Pre-cooked crustaceans	Pre-cooked crustaceans (analysis did not include pre-cooked crustaceans in cooked dishes)
Prepared salads	Salads & salad dishes
Preserves of red fruits	Preserves of red fruits
Quick cook rice	Quick cook rice
Red Leicester cheese	Red Leicester cheese
Ripened orange, yellow and broken white cheese	All cheese except processed cheese
Sauces, seasonings (e.g. curry powder, tandoori, pickles, relishes, chutney and piccalilli)	All sauces, pickles & chutney
Sausages, pate & terrines	All sausages & pate
Semi-preserved fish products including fish roe products	Assumed to mean fish canned/bottled/tinned fish in brine/vinegar/tomato sauce/oil
Smoked fish	Smoked fish (does not include smoked fish in cooked dishes)
Unflavoured processed cheese	All processed cheese
Vegetables in vinegar, brine or oil (excluding olives)	Vegetables in vinegar, brine or oil (excluding olives)

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GLOSSARY

Antioxidant
Any of various substances (as beta-carotene, vitamin C, and alpha-tocopherol) that inhibit oxidation or reactions promoted by oxygen and peroxides and that include many held to protect the living body from the deleterious effects of free radicals

Atopy
A probably hereditary allergy characterised by symptoms (asthma, hay fever or hives) produced upon exposure to the exciting antigen

Cumulative
Increasing by successive additions

Organoleptic
Being, affecting, or relating to qualities (as taste, colour, odour, and feel) of a substance (as a food or drug) that stimulate the sense organs

Potentiating
To make effective or active or more effective or more active; also: to augment the activity of (as a drug) synergistically

Prevalence
The degree to which something is prevalent; especially: the percentage of a population that is affected with a particular disease at a given time

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