FP6-CT-2005-513944

EuroFIR

European Food Information Resource Network of Excellence

Network of Excellence

Sixth Framework Programme Priority 5 – Food Quality and Safety

Deliverable D1.6.6a
Review of Food Classification and Description Systems for Use in Food Composition Databases

Due date of milestone or deliverable: February 2006

Actual submission date: 02 February 2006

Start Date: January 01, 2005   Duration: 5 years

Organisation name of lead contractor for this deliverable or milestone: AFSSA

EuroFIR IA 1.6
Review of Food Classification and Description Systems for Use in Food Composition Databases

Report prepared by
Jayne Ireland (French Food Safety Agency, AFSSA),
Anders Møller (Danish Institute for Food and Veterinary Research, DFVF)

in collaboration with
Simone Bell (Federal Research Centre for Nutrition and Food, BFE),
Tue Christensen (Danish Institute for Food and Veterinary Research, DFVF)
Andreu Farran-Codina (Center for Superior Studies on Nutrition and Diatetics, CESNID-UB)
Elin Bjorge Loken (University of Oslo, UiO)
Ada Naska (National and Kapodistrian University of Athens, NKUA)
Ólafur Reykdal (Technological Institute of Iceland, ICETEC)
Mark Roe (Institute of Food Research, IFR)
Susanne Westinbrink (Wageningen University / TNO)

ABSTRACT

The preparation of reliable data on food requires precise nomenclature and detailed description of foods. Even data of good quality can be a source of error if they are derived from foods that are not clearly defined. Moreover, it is difficult to exchange data on foods, or to understand and compare nutritional status for different countries or individuals, without a coherent description of foods in databases.

The present paper reviews existing international methods of identifying foods in computerised databases: Codex Alimentarius, CIAA Food Categorization system, DAFNE classification, Eurocode, EFG, LanguaL thesaurus, INFOODS food description, International Interface Standard, COST Action 99 Recommendations.

Food classification and food description may have very different goals, and this leads to very different appearances of the systems. A classification system tends to group or aggregate foods with similar characteristics; it is a tool of the "end-user" of data and specific to its use. A description system, on the other hand, is a tool of the data originator, who wants to give a description of the food, as precise as possible, without the necessity of aggregating them. The report describes and contrasts the various systems, to point out where the systems are complementary, where they are in conflict, and whether they can be linked.

Key Words: Food classification; Food description; Codex Alimentarius; Eurocode; EFG, INFOODS; LanguaL, EuroFIR

TABLE OF CONTENTS:

1   THE IMPORTANCE OF FOOD NOMENCLATURE AND DESCRIPTION

This report was completed on behalf of the **European Food Information Resource** (**EuroFIR**) Consortium, funded under the EU 6th Framework Food Quality and Safety Programme, project number FP6-513944. EuroFIR, the world-leading European Network of Excellence on Food Composition Databank systems[1] is a partnership between 40 universities, research institutes and small-to-medium sized enterprises (SMEs) from 21 countries. EuroFIR aims to develop and integrate a comprehensive, coherent and validated databank providing a single, authoritative source of food composition data for Europe.

The goal of EuroFIR Work Package on Food Identification and Description (IA1.6) is to establish a common standard for the identification and description of foods in European food composition databases that allows for application of state-of-the-art concepts in database linking and management and their comparability as well as the comparison and interchange of food composition data. In order to be effective and not duplicate work, EuroFIR must evaluate and build on results of previous projects. This is the reason for this review of existing methods of food classification and description, which enlarges upon a paper presented at the Third International Food Data Conference (Rome, Italy, 1999)[2] and a discussion paper presented at the first EuroFIR IA1.6 workshop[3].

The preparation of reliable data on food requires precise identification of foods. Even data of good quality can be a source of error if they are derived from foods that are not clearly defined.[4] It is difficult to exchange data on foods, or to understand and compare nutritional status for different countries or individuals, without a coherent description of foods in databases. The present paper reviews different methods of identifying foods and gives basic recommendations for food classification and description in computerised databases. The recommendations are founded on previous work done internationally by INFOODS and by national agencies and institutes as well as European projects such as EU FLAIR Eurofoods-Enfant, COST Action 99 Eurofoods and EFCOSUM. The paper describes and contrasts the various food classification and description systems, to point out where the systems are complementary, where they are in conflict, and whether they can be linked. A set of minimum criteria is proposed for international use.

The need for an international food language became patent when databases on foods were created in different countries and when data interchange was attempted. Data collection and processing by single, small institutions are costly, troublesome and time-wasting activities. Really successful work requires collaboration and can rarely be undertaken by individual institutions. This recognition demands sharing of work by international co-operation, and especially the utilisation of collected and generated data for wider use. Even today, it is difficult to understand and compare nutritional status for different countries or individuals, due to the lack of scientific methodology for describing foods. Food composition data cannot be usefully

---

[1] URL: http://www.eurofir.net

[2] Ireland J.D. & Møller A. (2000). Review of international food classification and description. *J. food compos. anal.* Aug 2000. v. 13 (4), p. 529-538.

[3] Ireland J., Møller A., Becker W. (2005). Food Identification and Description in European Food Composition Databases. *EuroFIR IA 1.6 Discussion paper*, Lisbon, 3 March 2005

[4] Polacchi W. (1987). Standardized food terminology: an Essential Element for Preparing and Using Food Consumption Data on an International Basis. *Food and Nutrition Bulletin*, Vol.8, No.2, p.66-68.

exchanged between countries until we can standardise the nomenclature and description of foods.[5]

1.1 SHORTCOMINGS OF NATURAL LANGUAGE

If a BLACKBERRY is black and a BLUEBERRY blue, what is a STRAWBERRY or a GOOSEBERRY supposed to look like? There is no egg in EGGPLANT, no grape in GRAPEFRUIT, neither peas nor nuts in PEANUTS, no cheese in HEADCHEESE, no ham in a HAMBURGER, and no meat in a MINCEMEAT PIE. How could a person from a non-English culture understand that SWEETMEAT is in fact a candy, whereas SWEETBREAD, which is not sweet, is made from meat?

Even though the name used for a food by the population that consumes it is very useful in identifying and retrieving the food in a database, it is often inadequate and even misleading to those who are not closely acquainted with the local language and culture. A common name may be misleading when the same name is used for different foods in different regions or when it is used for foods having different scientific names For example, the FishBase Global Information System on Fishes[6] includes 388 species that can be called "catfish".

Likewise, one may not recognise some terms used by people in other parts of the world or even the same country. Language and culture play a crucial role in food identification, and mutual comprehension cannot always be assumed. For example, "pudding" is a creamy dessert for an American but for the British refers to any dessert or sweet finish to a meal (and to confuse things even more, "black pudding" refers to a meat product). The following table gives some more examples of equivalent food terms used in these two English-speaking countries, where differences may lead to serious confusions.

Table 1. Equivalent food terms in the United States and the United Kingdom

US term	UK term	US term	UK term
beets	Beetroot	fish stick	fish finger
broil	Grill	french fries	(potato) chips
can	Tin	frosting	Icing
candy	Sweet	fruit pie	fruit tart
chicory	endive	gelatin dessert	Jelly
chips (potato)	(potato) crisps	green onion/scallion	spring onion
confectioner's sugar	icing sugar	ground beef	beef mince
cookie/cracker	biscuit	molasses	Treacle
corn	maize/sweetcorn	oatmeal	Porridge
corn meal	maize flour	raisin bread	currant loaf
corn syrup	golden syrup	romaine	cos lettuce
cornstarch	cornflour, corn flour	rutabaga	swede
cotton candy	candy floss	snow pea	mangetout
croquette	rissole	sweet roll	bun
eggplant	aubergine	wheat	corn
endive	chicory	whole wheat flour	whole meal flour
fava bean	broad bean	zucchini	courgette

---

[5] Rand W.M. and Young V.R. (1984). Report of a planning conference concerning an international Network of Food Data Systems (INFOODS). *Amer. J. Clin. Nutr.*, **39**, 144-1551.

[6] URL: http://www.fishbase.org/home.htm

The situation is further confused by homonyms, synonyms, identical brand names for different products, and culinary or technological terms. Foods that are ethnic or national in origin often differ in various countries because of the necessity to comply with local regulations and consumer tastes.

1.2 FOOD IDENTIFICATION IN DATABASES

The primary outcome of work on national and international food composition data has traditionally been the publication of national or regional printed food composition tables with limited space for a thorough description of data. Therefore, the level of detail given in these printed tables is generally not sufficiently specific to be used as input for compilers in other countries. The format and content of the tables has primarily been designed for end-users.

The problem of food terminology is not the difficulty of finding the best terms or the best ways of classifying foods, but the fact that differing, inconsistent, and often incompatible terminologies are used. Each method has its own description language or code of minimal simplicity designed to satisfy the immediate requirements of the scientific work and of the project initiator. Consequently, it is difficult to exchange data between countries, between organisations within the same country, or even between workers in the same institution. This calls for a global standardisation of terminology and classification. An international understanding of standardised food identification would solve many of the problems arising from the mis-identification of foods.

To solve the problem of food recognition in databases, two separate and seemingly opposing methods have been used: classify foods in "universal" **food groups** or add **food description** to the database. *Food classification and food description may have very different goals, and this leads to very different appearances of the systems.*

A classification system tends to group or aggregate foods with similar characteristics; it is a tool of the "end-user" of data. A variety of food classification systems have been developed, some to describe food habits, and others to fulfil requirements set by regulatory/legal bodies (e.g. with respect to food safety and risk assessment). Classification systems are often standardised, as they may be based on legal documents, the most standardised "vocabularies".

In the second approach, a description system seeks to identify the food as precisely as possible, without the necessity of aggregating them. It is a tool of the data originator.

2   REVIEW OF FOOD CLASSIFICATION SYSTEMS

2.1 FOOD GROUPS IN NATIONAL AND REGIONAL COMPOSITION TABLES

Food classifications are embedded in context, varying from culture to culture and setting to setting. For example, depending on the context, the same food may be classified as a meal

ingredient, a social symbol, or a medical prescription[7]. Ideas about food are affected by cultural and regional differences in food customs, as well as by the norms of the culture to which they belong, for example in defining "breakfast food", "vegetables, "fruits", "starches".

Table 2. Comparison of major food groups used in composition tables

FAO food tables [8]	British food tables [9]	Pacific Islands [10]
Cereals and grain products	Cereals and cereal products	Cereals and cereal products
Starchy roots, tubers and fruits	Vegetables	Starchy staples
Grain legumes and legume products	Vegetables	Legumes
Vegetables and vegetable products	Vegetables	Green leaves
Vegetables and vegetable products	Vegetables	Other vegetables
Nuts and seeds	Nuts	Nuts and seeds
Nuts and seeds	Nuts	Coconut products
Fruits	Fruit	Fruits
Sugars, syrups and sweets	Sugars, preserves and snacks	Confectionery
Meat and poultry	Meat and meat products	Meat and poultry
Meat and poultry	Meat and meat products	Wild animal foods
Eggs	Eggs	Eggs
Fish and shellfish	Fish and fish products	Fish
Fish and shellfish	Fish and fish products	Seafood
Milk and milk products	Milk and milk products	Milk and milk products
Oils and fats	Fats and oils	Fats and oils
Beverages	Beverages	Beverages
Beverages	Alcoholic beverages	Beverages
Miscellaneous	Soups, sauces and miscellaneous foods	Herbs, spices and sauces
	Herbs and spices	Herbs, spices and sauces
		Processed foods
		Mixed cooked dishes

Most national and regional databases use country specific food classification systems, based on national criteria, and the food groups may be very specific. This is mainly due to national legal aspects and traditions, besides the economic and cultural importance of foods. Some examples of national and regional food classification/coding systems include the food composition tables of the Pacific Islands, where there is a separate group for coconut products, the Central America and Panama (INCAP) database with groups for bananas, maize, and cornbreads, and the Thai food composition database with a group for edible insects[11]. Table 2 gives examples of overlapping food groups in national and regional databases. National or regional classification

---

[7] Furst T., Connors M., Sobal J., Bisogni C., Falk L.W. (2000). Food Classifications: Levels and Categories. *Ecology of Food And Nutrition*, vol 39, pp 331-335.

[8] FAO (1982). *Food Composition Tables for the Near East*. Food and Agriculture Organization of the United Nations, Rome.

[9] Food Standards Agency (2002). *McCance and Widdowson's The Composition of Foods*, Sixth summary edition, Royal Society of Chemistry.

[10] Dignan D.A., Burlingame B.A., Arthur J.M., Quigley R.J., Milligan G.DC. (1983). *The Pacific Islands Food Composition Tables*. South Pacific Commission, New Zealand Institute for Crop & Food Research Ltd and International Network of Food Data Systems.

[11] Burlingame B.A. (1998). *Food Nomenclature and Terminology: Standards and Harmonisation for Food Composition Databases and Food Trade*. Montreal.

systems are most often difficult to use on international basis, as the food classes defined may not be applicable to all cultures.

2.2 HIERARCHICAL FOOD CODING SYSTEMS

2.2.1 Principle

The number of single food items being marketed in a country may be much higher than 10,000, not counting synonyms for the same food in different regions or provinces of that country. It is understandable that in many countries, lists of food groups and of single food items exist in order to assure proper understanding.

More than a simple classification of foods into food groups, this approach identifies each food by a unique code in a faceted hierarchy. Such codes may be numerical or alphanumeric with or without special characters such as hyphen or point. The code format has certain similarities to the widely used Dewey library classification system[12], although fixed codes may lead to difficulties when numbers are exhausted and new terms cannot find a place. The following table lists some of the advantages and disadvantages of hierarchical food coding systems[13].

Table 3. Advantages and disadvantages of hierarchical food codes

Advantages	Disadvantages
Definite and unequivocal definitions	Necessary to look up codes
Built-in hierarchies	Difficult to include new products
Possible to retrieve a truncated code	Difficult to insert extra digits to existing food codes
Limited space required in data forms and in electronic data processing	Impossible to cover all foods on the market
Faster handling of information	National/regional differences in foods

Codes are arranged in a hierarchical structure that may vary to accommodate the needs of the originator of the coding system or to reflect the purpose for which the list was made. If the purpose of a hierarchy is to identify a single raw food item as precisely as possible in order to estimate its potential for pesticide residues (e.g. Codex Alimentarius classification of foods and feeds), its hierarchical structure would follow the biological system, e.g., foods of vegetable origin → fruits → citrus fruits → orange. Other uses would need other hierarchies, e.g. based on nutritional aspects or food processing.

---

[12] http://www.oclc.org/dewey/

[13] Weigert P., conti M., Lia F. and Meigs G. (1994). *International Synonyms System – A Software Approach to Merge Different Coding Systems*. CARE Telematics Project within the European Nervous System (ENS), EUR/HFA target 22, World Health Organization, Copenhagen.

2.2.2 Food Research Institute of Bratislava

A good example of the food coding approach is the faceted system with a 20-digit food code designed by the Food Research Institute of Bratislava[14]. Foods are identified by codes that describe foods progressively, according to defined classification principles. Each product is gradually characterised with increasing detail from digit 1 to digit 20, so the food code contains much substantial information about the given food. The Slovak system works very well for simple foods and can be used, with some adaptation, for dishes. It is essentially a faceted system, clearly sophisticated and an example of a highly developed locally applicable product.

A priori, the use of 20-digit codes should allow enough room for inclusion of new foods. However, fixed digit coding systems in general have a disadvantage that the creation of an additional food class may necessitate extensive re-coding of food items. Moreover, the food classes defined may not be applicable to all cultures.

Table 4. Code characteristics used by the Food Research Institute of Bratislava

Digit	Characterises	Examples
1	Food group	0- General items; 1- Diets; 2- Meals; 3- Dishes; 4-- Foods; 5- Flavourings; 6- Beverages
2-3	Food commodity and subcategories	41- Meat and meat products; 411- Meat (Beef, Pork, Veal); 412- Game; 413- Poultry; 414- Fish
4-8	Taxonomic information	-610-00- Clupeidae; -610-01- Clupea harengus L. -610-05- Sprattus sprattus (L.)
9	State of maturity or ripeness	411991151 – Veal; 411991155 – Beef
10-13	Anatomy, morphology, technological particularities	-0006- Fish eggs; -0130- Muscles; -0210- Root; -6700- Smoked meat and fish products
14-15	Technology, processing	-3- Pasteurisation; -5- Drying, dehydration
16	Special technology	-7- Gluten-free products; -8- Extruded products
17	Recipe calculation measure	-1- Composition of 1 portion (serving); -3- Composition of 100g
18	Method of expression	-0- Composition of food as eaten; -1- Composition of food as purchased
19	Type of data obtained	-0- Experimental data; -1- Balance calculation; -5- Borrowed data
20	Food type	-0- Primary foods; -2- Semi-manufactured products; -3- Meals and dishes from recipes; -4- Food products

2.2.3 BLS food coding system

The German Nutrient Data Base (Bundeslebensmittelschlüssel, BLS) is since May 2004 maintained by the German Federal Research Centre for Nutrition and Food (BfEL) in Karlsruhe, Germany[15]. Untill May 2004 the Data Base was administered by the Federal Institute for Health Protection of Consumers and Veterinary Medicine in Germany[16].

---

[14] Holcíková K., Simonová E. (1993). *Slovak Food Databank and Possibilities of its Application in the Framework of the Eurofoods-Enfant Project*. Report of the FLAIR Eurofoods-Enfant Third Annual Meeting, Vilamoura, Portugal.

[15] German Federal Research Centre for Nutrition and Food URL: http://www.bfel.de

[16] Klemm Ch., Mathis G., Christ M., Gebhardt G., Hamami E., Pathasart B., Wagner U., Dehne L. I. (1999) *The German food Code and Nutrient Data Base - Supplementation of the manual of the German Food Code and Nutrient Data Base (BLS II.3) - Conception, structure and documentation of the Data Bank blsdat*. Federal Institute for Health Protection of Consumers and Veterinary Medicine (BgVV).

The BLS consists of a food coding system (BLS-code) and a nutrient database, designed as a standard instrument for the assessment and analysis of nutritional surveys in the Federal Republic of Germany. It contains approximately 11000 coded foods, menus and menu components in different stages of processing. Each food item is characterised (or identified) by a distinctive, seven-digit code.

The first character of the code is a letter describing the main group of the food (e.g. 'F' for fruits), the second digit its subgroup, the 3rd and 4th digits code individual foods. The significance of the 5th to the 7th digits varies according to the food group. For example, in the group 'Fruit', the 5th digit encodes industrial processing techniques such as deep freezing, drying or canning. In the group 'Dairy products', it encodes different contents of fat, and in the group 'Bread' different ingredients such as raisins or herbs. The following table shows examples of coding in the 'Fruit' group.

Table 5. Food codes of the BLS

Digit	Characterises	Examples
1	Food group	C- Cereal products, grains; D- Cakes pastries and biscuits, E- Eggs and egg products, F- Fruits, G- Vegetables
2	Sub group	F-1 Pome, F-2 Drupe, F-3 Berries, F-4 Wild fruit, F-5 Tropical fruit
3-4	Food commodity	F2-01 Apricot, F2-02 Nectarine, F2-03 Peach
5-7	Classification according to nutritional or processing criteria	F203-111 Peach edible portion, F203-121 Peach home-cooked, F203-211 Peach deep-frozen, F203-700 Peach drink, F203-911 Peach canned, F203-902 Peach canned drained

Similar to the food codes of the Food Research Institute of Bratislava, the BLS-code is structured in such a way that foods having a similar chemical composition are combined into groups. Additional digits give more exact description of the food but signify only minor differences in the nutrient content. It is adapted to the BLS databank, where 10% of the values involve basic foods, from which the other nutrient values are calculated.

2.3 INTERNATIONAL FOOD CLASSIFICATION/CODING SYSTEMS FOR LEGISLATION AND TRADE

Food lists have also been created by international organisations such as the Codex Alimentarius Committee for unmistakable handling of e.g., pesticide residue in food. The so-called Customs Tariff was created to facilitate international trade through standardised product names. Code lists with different structures were also created by various other originators for various purposes, including internal trade issues, nutritional surveillance programmes, national or regional reporting systems, monitoring systems, etc.

2.3.1 Harmonized Commodity Description and Coding System / European Combined Nomenclature

The World Trade Organization's Harmonized Commodity Description and Coding System is used for international trade and by national governments to generate trade statistics[17,18,19]. The same food trade classification system is agreed upon internationally and implemented in all countries. In Europe, it corresponds to the European Combined Nomenclature[20]. It provides the tariff and statistical nomenclature for the Common Customs Tariff.

The coding system comprises 20 sections, four of which apply to foods. The titles of the sections, chapter and sub-chapters are only for reference; for legal purposes, classification is determined according to the terms of the heading (see table below). Products are listed in order to define customs tariffs, foods as bought, i.e. single, unprocessed foods. Thus, the list does not contain all the foods found in nutrient databases and especially lacks prepared foods and food products. As far as known, these coding systems are not used in the context of food composition or food consumption data.

Table 6. Examples of foods in the European Combined Nomenclature

Code	Examples of Commodities
0703	Onions, shallots, garlic, leeks and other alliaceous vegetables, fresh or cultivated
0703 10	- Onions and shallots:
0703 10 11	- - Onions; Sets
0703 10 19	- - Onions; Other
0703 10 90	- Shallots
0703 20 00	- Garlic
0703 90 00	- Leeks and other alliaceous vegetables
0704	Cabbages, cauliflowers, kohlrabi, kale and similar edible brassicas, fresh or chilled:
0704 10	- Cauliflowers and headed broccoli:
0704 10 05	- - From 1 January to 14 April

2.3.2 United Nations Standard Products and Services Code

The **United Nations Standard Products and Services Code** (UNSPSC)[21] is the result of a merger of the **United Nations' Common Coding System** (UNCCS) [22] and Dun & Bradstreet's Standard Products and Services Codes (SPSC) in 1999. Since then, it has been managed as an open standard, where updates are user-driven[23]. Businesses and governments must use this

---

[17] World Trade Organization, (1996). *Harmonized commodity description and coding system*. Brussels (Belgium), 2nd ed.

[18] European Commission (1993). *The International Convention on the Harmonized Commodity Description and Coding System*. Customs Co-operation Council, Brussels.

[19] URL http://english.customs.go.kr/hp/eng/data_24/hs.pdf

[20] European Commission (1996). Regulation No 1734/96 of 9 September 1996 amending Annex I to Council Regulation No. 2658/87 on the tariff and statistical nomenclature and on the Common Customs Tariff. *Official Journal of the European Communities*, L 238, Volume 39. URL: http://www.conex.fr/nc8/en/nc8.html

[21] URL http://www.unspsc.org/

[22] United Nations (1994). *United Nations Common Coding System* (UNCCS). Thesaurus Numerical index of goods, Alphabetical index of goods, Index of services, Country and currency codes; 3. ed., UNDP, Copenhagen.

[23] http://www.novationco.com/pressroom/releases/news_030408.asp

coding system to identify their goods and services for visibility in the UNCSD (United Nations Commission on Sustainable Development).

The structure of UNSPSC is a 5 level hierarchical taxonomy for the classification and identification of products and services. Each level contains a two-character numerical value and a textual description. The code levels identify Segment, Family, Class, Commodity and Business Function. An extract of the UNSPSC is shown below.

Table 7. Extract of the UNCCS

ID	Name
50110000	Meat and poultry products
50111500	Meat and poultry
50111510	Fresh meat or poultry
50111511	Frozen meat or poultry
50111512	Shelf stable meat or poultry
50112000	Processed and prepared meats
50112001	Fresh processed or prepared meats
50112002	Frozen processed or prepared meats

2.3.3 Bar Code

The Bar Code was designed to make it ideal for coding products, as it can be printed on a product and scanned easily. Bar codes can thus be applied to any product by a manufacturer. Several coding systems exist, predominately the **Universal Product Code** (UPC) [24] for the United States and the **European Article Numbering** (EAN[25]). The codes are constructed in different ways, but a typical example is EAN-13 in the format "CCMMMMMPPPPPX", where:
- CC is the code of the originating country
- MMMMM is the code manufacturer code
- PPPPP is product/article number (chosen by the manufacturer)
- X is a check digit

As several coding systems coexist, the Global Trade Item Number (GTIN) [26] was developed to unify the different systems. GTN is the original UPC or EAN-code right-adjusted to 14 digits. However, there is neither an authorative body for the use of codes for foods, nor a definition of how foods can be described and coded within the current barcode-systems.[27]

---

[24] *Uniform Code Council, Inc., Princeton Pike Corporate Center, 1009 Lenox Dr., Suite 202, Lawrenceville, New Jersey 08648, Telephone: 609-620-0200, Fax: 609.620.1200.* http://www.uc-council.org/

[25] URL: http://www.ean-int.org/index800.html

[26] URL http://www.upcdatabase.com/

[27] URL http://www.adams1.com/pub/russadam/upccode.html ; http://www.uc-council.org/ean_ucc_system/pdf/GTIN.pdf

2.3.4 Codex Alimentarius Food Standards

The Codex Alimentarius Food Standards[28] is a comprehensive collection of food standards and related information prepared by the Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO) Codex Alimentarius Commission. The standards prepared by the Commission are formally submitted to Member Governments for acceptance and incorporation into national food legislation. Codex standards can be used as basic sources of information for the food industry, food technologists, universities, consumers and many other groups interested in the quality and safety of foods.

The Codex Alimentarius contains more than 300 standards for individual foods or groups of foods. In addition, it includes the General Standard for the Labelling of Pre-packaged Foods, the Codex General Guidelines on Claims and the Codex Guidelines on Nutrition Labelling, all of which are aimed at ensuring honest practices in the sale of food while also providing guidance to consumers in their choice of products. Priority is given to food safety and consumer protection. There are 16 volumes of food standards and related recommendations and a series of thematic references and codes of good manufacturing, food hygiene and food labelling. The Codex Alimentarius includes standards for all the principal foods, whether processed, semi-processed or raw, for distribution to the consumer. Some examples are given in the following table.

Table 8. Examples of Codex Standards for individual food commodities and products

Volumes	Examples of Standards
04 Foods for special dietary uses including foods for infants and children	Gluten-free foods; Infant formula; Baby foods
05 Processed and quick-frozen fruits and vegetables	Canned tomatoes; Canned peaches, Quick frozen peas; Quick frozen peas strawberries
06 Fruit juices, concentrated fruit juices and fruit nectars	Orange juice preserved exclusively by physical means

Although the Codex Alimentarius standards do not constitute a single food classification system in themselves, some Codex Alimentarius food standards contain food classification systems dedicated to special aspects of food safety; i.e. the Codex Food Categorization System (food additives), the Codex Classification of Foods and Animal Feeds (pesticides) and the Codex Alimentarius General Standard for Contaminants and Toxins in Foods. These will be described further on.

---

[28] URL: http://www.codexalimentarius.net/web/index_en.jsp

2.4 INTERNATIONAL FOOD CLASSIFICATION/CODING SYSTEMS FOR EXPOSURE STUDIES

2.4.1 *Codex Classification of Foods and Animal Feeds*

The FAO/WHO Codex Classification of Foods and Animal Feeds[29,30] moving in trade and the description of the various items and groups of food and animal feedstuffs have been developed by the Codex Committee on Pesticide Residues (CCPR). It was first adopted by the 18th session of the Codex Alimentarius Commission (1989).

The classification includes food commodities and animal feedstuffs, classified into groups on the basis of the commodities' similar potential for pesticide residues. The food commodities selected for this classification are mainly those having current or potential significance in international or national trade. A limited number of commodities of regional importance have also been included.

The categorisation system, maintained by the CCPR, consists of five main classes, covering primary food commodities of plant and of animal origin, primary feed commodities and processed commodities of plant and of animal origin. These classes reflect differences in exposure to pesticides and metabolites of pesticides. The classes are subdivided in 19 types and 93 groups, which are identified by code numbers and letters.

The "Type" definitions developed for this classification are based on physical characteristics and traditional use and to a lesser extent on botanical or zoological associations. Within the "Types", groups have been developed whose members show similarities in their behaviour with respect to residues and in the nature of the agricultural practices to which they are subjected and, to a certain extent, in their botanical or zoological associations. Multi-ingredient manufactured foods containing ingredients of both plant and animal origin are listed as plant or animal origin depending upon the main ingredients. The following table lists the 5 main classes and 19 types and an example of how one type (fruits) is broken down further into groups.

Table 9. Codex classification for pesticide residues: classes, types and some groups

Class A. Primary food commodities of plant origin
01 Fruits
01 Citrus fruits (FC)
02 Pome fruits (FP)
03 Stone fruits (FS)
04 Berries and other small fruits (FB)
05 Tropical and sub-tropical fruit, edible peel (FT)
06 Tropical and sub-tropical fruit, inedible peel (FI)
02 Vegetables
03 Grasses
04 Nuts and Seeds
05 Herbs and Spices
Class B. Primary food commodities of animal origin

---

[29] Codex Alimentarius Commission (1968). *Codex Classificaiton of Foods and Animal Feedstuffs*. Joint FAO/WHO Food Standards Programme, part 4, CAC/PR4, FAO, Rome and WHO, Geneva.

[30] Codex Alimentarius Commission (1993). *Classification of Foods and Feeds*. Codex Alimentarius, Volume 2, p.150-157.

```
01 Mammalian products
02 Poultry products
03 Aquatic animal products
04 Amphibians and reptiles
05 Invertebrate animals
Class C. Primary animal feed commodities
01 Primary feed commodities of plant origin
Class D. Processed foods of plant origin
01 Secondary food commodities of plant origin
02 Derived products of plant origin
Class E. Processed foods of animal origin
01 Secondary food commodities of animal origin
02 Derived products of animal origin
03 Manufactured food (single ingredient) of animal origin
03 Manufactured food (multi-ingredient) of animal origin
```

The Classification is intended to promote harmonisation of the terms used to describe commodities that are subject to maximum residue limits and of the approach to grouping commodities with similar potential for residue for which a common group maximum residue limit can be set.

2.4.2 Codex Alimentarius General Standard for Contaminants and Toxins in Foods

The food categorisation system of the Codex Alimentarius General Standard for Contaminants and Toxins in Foods (GSC)[31] uses the system that was developed in the framework of the Codex Committee on Pesticide Residues (CCPR), as it is also suitable for contaminants. It extends the CCPR classification to include processed products but goes no further than type or group level. The GSC is intended to promote harmonisation of the terms used to describe commodities that are subject to maximum residue limits and of the approach to grouping commodities with similar potential for residues for which a common group maximum residue limit can be set. It may also be appropriate for other purposes such as setting maximum levels for other types of residues or for other contaminants in food.

Table 10. Complementary categorisation system for the GSC: classes and types

```
Class D. Processed foods of plant origin
01 Secondary commodities of plant origin (5 groups)
02 Derived commodities of plant origin (7 groups)
03 Manufactured commodities of plant origin, multi-ingredient (1 group)
Class E. Processed foods of animal origin
01 Secondary commodities of animal origin (2 groups)
02 Derived animal products of animal origin (4 groups)
03 Manufactured food (single ingredient) of animal origin (2 groups)
04 Manufactured food (multi-ingredient) of animal origin (1 group)
Class F. Multi-ingredient manufactured foods
01 Beverages
```

---

[31] Codex Alimentarius Commission, GSC. *General Standard for Contaminants and Toxins in Foods*..Codex Alimentarius Annexe V.

02 Sauces, salad dressings, soups, bouillons, etc.
03 Chocolate and other confectionery
04 Margarines & other multi-ingredient fatty foods
05 Multi-ingredient bakery wares
06 Multi-ingredient foods for special dietary uses
Class G. Other edible products
01 Water, minerals and organic compounds

Multi-ingredient manufactured foods containing ingredients of both plant and animal origin are listed as plant or animal origin depending upon the main ingredients. The food commodities selected for these classifications are mainly those having current or potential significance in international or national trade. A limited number of commodities of regional importance have also been included.

2.4.3 GEMS/Food

Since 1976, the World Health Organization has implemented the Global Environment Monitoring System / Food Contamination and Monitoring Program (GEMS/Food) to assess the levels and trends of potentially hazardous chemicals in food and their significance for human health and trade. As part of this dietary exposure assessment mandate, GEMS/Food has developed five regional diets that are currently used for predicting dietary intake of pesticide residues.[32] [33] Food consumption estimates are based on Food Balance Sheet (FBS) data compiled by the Food and Agriculture Organization of the United Nations (FAO), i.e. based on raw agricultural commodities. The following table lists the main classifications of the GEMS/Food Regional Diets.

Table 11. GEMS/Food Regional Diets

Cereals	Roots and Tubers
Pulses	Sugars and Honey
Nuts and Oilseeds	Vegetable Oils and Fats
Stimulants	Spices
Vegetables	Fish and Seafood
Eggs	Fruits
Milk and Milk Products	Meat and Offals
Animal Oils and Fats	

2.4.4 EU Presumptive Diet

Similar to the GEMS/Food Regional Diet, the basic objective of the EU Presumptive Diet program[34] is to provide an estimate of food intake (or a range of food intakes) that might form the basis of an initial and crude estimate of food chemical intake in the European Union. This was a task of the EU Scientific Cooperation (SCOOP) project involving 14 countries, which

---

[32] World Health Organization (1998). *GEMS/Food Regional Diets*. WHO/FSF/FOS/98.3.

[33] URL http://www.who.int/foodsafety/chem/gems/en/

[34] European Commission (1995). *The Presumptive Diet*. Directorate-General III Industry, Scientific Committee for Food, Working Group on Intake and Exposure, Document CS/INT/CONSUM/3.

assessed the capabilities of existing food consumption databases in Europe and a presumptive European diet based on existing national databases. Two food categorisation systems were selected for this project:

1. For the purpose of food additive assessment, the hierarchical categorisation system proposed by the CIAA;
2. For the purposes of monitoring agro-chemical intake from food, the Codex Commission Pesticide Residue (CCPR) categorisation.

The following table displays the Presumptive Diet categories for dairy products, eggs and meat.

Table 12. Examples of EU Presumptive Diet categories

1.1.a Condensed milk
1.1.b Milk: pasteurised, long life, raw
1.1.c Yoghurts to drink
1.2 Cheese
1.3 Yoghurts and dairy based desserts
1.4.a Fresh cream
1.4.b Powdered milk
2.1 Eggs
3.1 Fresh carcass meat, poultry and game
3.2 Fresh offal
3.3.a Convenience meat products
3.3.b Sausages, ham, frozen meat based products
. . .

2.4.5 CIAA Food Categorisation System

The CIAA Food Categorisation System[35,36] is a European approved and accepted system, developed by the Confederation of the Food and Drink Industries of the EEC (Confédération des Industries Agro-Alimentaires de la CEE)[37]. It is a hierarchical food classification system, designed to serve as an allocation tool for food additives as a basis for their authorisation at the European Community level[38].

All foodstuffs have been divided into 16 main categories; each main category is then divided into subcategories, sometimes even further. The system covers all foodstuffs, even some categories and sub-categories that may not require additives. The Categorisation System is hierarchical, i.e., when the use of an additive is permitted is a certain category, it is automatically permitted in all its sub-categories, unless otherwise stated. The following table lists the main categories and an example of how one category (dairy products) is broken down further to provide greater detail.

---

[35] CIAA (1994). *The CIAA Food Categorization System, a tool for allocating additives*. CIAA Document ADD/385/90E rev. 5.

[36] CIAA (1999). *Database on Food Additives : Users' Guide*. CIAA Document.

[37] URL: http://www.ciaa.be/pages_en/homepage.asp

[38] European Directives on Colours, Sweeteners and 'Miscellaneous' additives (EU Directives 89/107, 94/35, 94/36, 95/2 and 98/72).

Table 13. CIAA Food Categorisation System: main categories and some subcategories

0.   General categories
1.   Dairy products
1.1 Milk and dairy based drinks
1.1.1   Milk
1.1.2   Sterilised and UHT goats milk
1.1.3   Buttermilk (plain)
1.2 Fermented and renneted milk products (plain), excluding drinks
1.3 Condensed milk (plain) and analogues
1.4 Cream (plain) and the like
1.5 Milk powder and cream powder (plain)
1.6 Cheese
1.7 Dairy based desserts including flavoured and composed products
2.   Fats and oils
3.   Edible ices
4.   Fruits and vegetables
5.   Confectionery
6.   Cereals and cereal products
7.   Bakery wares
8.   Meat and meat products
9.   Fish and fish products
10. Egg and egg products
11. Sugars and honey
12. Salts and spices, soups, sauces and salads, protein products etc.
13. Foodstuffs intended for particular nutritional uses
14. Beverages
15. Ready-to-eat savouries
16. Foods that could not be placed in any of the groups above

The CIAA Food Categorisation System deals with foods as marketed. Products offered in a concentrated or dried form, including recipe products to be prepared before consumption, belong to the category of the corresponding "ready-to-eat" foodstuffs. Most frozen foods and dietetic foods are covered by the categories of their normal counterparts. Generally, substitute or analogue products are classified in category 16. However, when such products have a technological need for the use of the same additives as the products to which they are alternatives, they are integrated in the categories of their normal counterparts. There are no special categories for prepared dishes, as they are allowed to contain the additives allocated to the categories to which their ingredients belong.

The CIAA Food Categorization System lays the basis for the Codex Food Categorization System and the food classification used in the food additive "positive lists" in the Nordic countries.[39] The CIAA Food Categorisation System is also used in some European food composition databanks (e.g. Denmark).

---

[39] *Food additives in Europe 2000. Status of safety assessments of food additives presently permitted in the EU*; Tema Nord 2002:560. Nordic Council of Ministers, Copenhagen 2002. URL: www.norden.org

2.4.6 Codex Food Categorization System

The Codex Food Categorization System (CFCS) was presented by the FAO/WHO Codex Alimentarius Commission on Food Additives and Contaminants (CCFAC) in the Codex General Standard on Food Additives[40][41]. The CFCS was developed from CIAA Food Categorization System and is intended to simplify data reporting, worksheet construction, and GSFA development. As in the CIAA system, foods are classified in 16 main food categories, then sub-categories, according to additive authorisations. When the use of an additive is permitted is a certain category, it is automatically permitted in all its sub-categories, unless otherwise stated.

Both classifications cover all foodstuffs, even those where additives are not allowed. They deal with foods as marketed, thus making the systems interesting also in a food consumption context. Both classifications are food additive driven and hence emphasise processed foods, as the methods of preparation and conservation of foods condition the use of certain additives. There are some special categories for prepared dishes, but they do not cover all prepared foods. The latter are allowed to some extent to contain the additives allocated to the categories to which their ingredients belong.

2.5 FOOD CLASSIFICATION/CODING SYSTEMS USED IN CONSUMPTION STUDIES

2.5.1 National food grouping systems

Most national food consumption surveys use country specific food classification systems, based on national criteria, and the food groups may be very specific. This is mainly due to national legal aspects and traditions, besides the economic and cultural importance of foods. The table in Annex 1 shows the differences between the food grouping systems used for the **French INCA-1 Survey**[42] and the **Dutch National Food Consumption Survey** of 1998[43]. For example, the French survey separates "BAKERY PRODUCTS" and "BISCUITS AND PASTRY", whereas the Dutch survey proposes more specific groups for cereal-based foods ("BREAD", "PASTRY, CAKES AND BISCUITS", "CEREALS AND CEREAL PRODUCTS") but does not distinguish breakfast cereals and pasta. The two national surveys also treat fruit juices differently: for the French, juices are "NON-ALCOHOLIC BEVERAGES" and for the Dutch they are "FRUITS". The COST Action 99 thus recommended the creation of a separate group for fruit juices in future surveys, in order to be able to compare results[44].

Bockhahn K. Et al (1995) [40] *Tilsætningsstoffer til levnedsmidler* . TemaNord 199:614

[41] Codex Alimentarius Commission (1996). *Codex Food Categorization System (CFCS) for the General Standard for Food Additives (GSFA)*. Codex Commission on Food Additives and Contaminants. Document no. CL 1996/14-FAC, Part II.

[42] Volatier J.L. (2000). *Enquête Individuelle et Nationale sur les Consommations Alimentaires*. Éditions Tec et Doc Lavoisier.

[43] Anonymous. Zo eet Nederland 1998. Resultaten van de Voedselconsumptiepeiling 1998. Voedingscentrum , Den Haag, 1998.

[44] Ireland, J.; van Erp-Baart, AMJ; Charrondiere, UR.; Møller, A.; Smithers, G.; Trichopoulou, A. (2002). Selection of a food classification system and a food composition database for future food consumption surveys. *European Journal of Clinical Nutrition*, 56 Supplement 2, S33-S45

2.5.2 FAO Food Balance Sheet, WHO GEMS/FOODS regional diets

Food Balance Sheets (FBS) are compiled by the FAO[45], OECD[46] and EUROSTAT[47] on an annual basis. A food balance sheet (FBS) presents a comprehensive picture of a country's food supply (the total quantity produced for human consumption and excluding exports) during a specific reference period. It shows for each food item (i.e. primary commodity and a number of processed commodities) the areas of supply and its utilisation. FBS express food consumption in kg/head/year for broadly defined food groups (e.g. "Bovine meat"). They have the advantages of providing a harmonised set of data for all member states, being carried out on an annual basis, and providing information for member states who do not have national food consumption surveys.

Table 14. Main categories of FAO food balance sheets

Vegetable products	Animal products
Cereals (excluding beer)	Meat (slaughtered)
Starchy roots	Bovine meat
Sugar roots	Mutton/goat meat
Sugar crops	Pig meat
Pulses	Poultry meat
Tree nuts	Other meat
Oil crops	Offals
Vegetable oils	Animal fats
Vegetables	Milk (excl. Butter)
Fruit (excluding wine)	Eggs
Stimulants	Fish and sea food
Spices	
Alcoholic beverages	
Miscellaneous	

The **FAO food balance sheet classification[48]** is based on trade balance of food and agricultural commodities. The **WHO GEMS/FOODS**[49] records the FAO food balance consumption to estimate intake of pesticide residues. Both of these systems classify foods at the commodity level, not by their use. For example, CEREALS are classed by biological origin (WHEAT, RICE, BARLEY, MAIZE, RYE, OATS, MILLET, SORGHUM, OTHER), and it is not possible to distinguish how the cereals were consumed (bread, bakery products, pasta…). Both systems have separate classes for Vegetables and for Starchy roots and tubers, extended beyond the common potato. On the other hand, they do not differentiate Fruit and Fruit juice.

---

[45] FAO (1999). *Food Balance Sheets* 1994-1996. FAO, Rome; URL http://www.fao.org/

[46] URL: http://www.oecd.org/

[47] EUROSTAT (1993). *Consumption and Self Sufficiency*. European Commission. The Agricultural Situation in the Community
URL: http://europa.eu.int/comm/dgs/eurostat/index_en.htm -

[48] See http://www.fao.org/infoods/nomenclature_en.stm for definitions of commodity groups

[49] GEMS/FOOD REGIONAL DIETS. World Health Organization, 1998
URL http://www.who.int/foodsafety/publications/chem/regional_diets/en/

2.5.3 DAFNE classification for Household Budget Surveys

Household Budget Surveys (HBS) are periodically conducted by the National Statistical Offices of most European countries in country-representative samples of households. HBS are not primarily designed to collect nutritional information, but by recording data on the values and quantities of food available to household members (purchases, own production, gifts and payment in kind) they can depict the dietary patterns prevailing in representative population samples.

The EU **DAFNE** (DAta Food NEtworking) Project[50] is based on information collected in the context of household budget surveys in sixteen European countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Norway, Hungary, Poland, Portugal, Spain Sweden, and the United Kingdom)[51]. Currently the DAFNE network and the generated databank is being expanded with the inclusion of eight new European countries (Albania, Croatia, Cyprus, Latvia, Malta, Serbia and Montenegro, the Slovak Republic and Slovenia). DAFNE food grouping is used for inter-country comparisons of daily individual food availability, at different levels of detail, ranging from 57 analytical to 15 aggregated main food groups (see table below). This food grouping has enhanced the PROCOME and COICOP classification schemes, placing more emphasis on goods such as food and improving comparability with other international food classifications[52]. The DAFNE team has also submitted a proposal to EUROSTAT for amendments in the COICOP classification system; this proposal is available at the Commission's website[53].

Table 15. DAFNE: main food groups

CEREALS AND CEREAL PRODUCTS	VEGETABLES (VEGETABLE JUICES EXCLUDED)
MEAT, MEAT PRODUCTS AND DISHES	NUTS
FISH, SEAFOOD AND DISHES	FRUITS (FRUIT JUICES EXCLUDED)
MILK AND MILK PRODUCTS	VEGETABLE AND FRUIT JUICES
EGGS	SUGAR AND SUGAR PRODUCTS
TOTAL ADDED LIPIDS	NON-ALCOHOLIC BEVERAGES
POTATOES AND OTHER STARCHY ROOTS	ALCOHOLIC BEVERAGES
PULSES	

The DAFNE food classification system has been published by the EC Directorate for Health and Consumer Protection[54]. Although HBS food classifications concern ingredients and foods available in the household, DAFNE has recently included dishes in its food groups. The revision improved comparability with other international classifications. The EFCOSUM project showed that DAFNE compares well with the other food classification systems studied (see Appendix 1).

---

[50] URL: http://www.nut.uoa.gr/english/dafne/DafneEN.htm

[51] Lagiou, P., Trichopoulou, A. and the DAFNE contributors (2001). The DAFNE initiative: the methodology for assessing dietary patterns across Europe using household budget survey data. *Public Health Nutrition*, October 2001;**4**(5B): 1135-1142.

[52] Trichopoulou A. and Lagiou P. (1997). Methodology for the exploitation of HBS and results on food availability in five European countries. *European Commission*, EUR 17909 EN.

[53] http://europa.eu.int/comm/health/ph_projects/1999/monitoring/fp_monitoring_1999_annexe8_01_en.pdf

[54] European Commission. Directorate General for Health and Consumer Protection. Directorate C2-Health Information. *The DAFNE Food Classification System. Operationalisation in 16 European countries.* Luxembourg, 2005.

For example, DAFNE distinguishes "Bread and rolls", "Pasta" and "Bakery products", within the main group "Cereals", although it does not separate breakfast cereals from other cereal products. The DAFNE system also compares well with the vegetable and fruit groups of the other systems, especially since it has added a separate class for fruit juices and vegetable juices, following recommendations of COST Action 99. [55]

2.5.4 Eurocode

The project of developing a uniform coding system in order to exchange food consumption data efficiently and facilitate epidemiological surveys was also supported through the European FLAIR (Food-Linked Agricultural and Industrial Research) Concerted Action program EUROFOODS-ENFANT (European Network on Food and Nutrition Tables) and the COST Action 99 "Food consumption and composition data - Eurofoods". The resulting Eurocode system was intended to be a total food coding system with three components: Eurocode-1 (product codes), Eurocode 2 (classification system) and Eurocode 2 descriptor system. [56], [57], [58]

Eurocode 1 was designed as a system for identifying specific products, at the brand-name level, by reference to a list of such products available in Europe. Eurocode-1 had no classification value, as it was supposed to assign a product reference serial number for each food on the market in Europe. Faced with the enormity of such a task, the Eurocode-1 project was abandoned. Because Eurocode tries to cover foods in all European countries, it cannot be not detailed or specific enough to replace national codes in food composition or consumption databanks,.

Eurocode 2 is a classification of foods according to groups and subgroups that are useful in dietary studies. Eurocode 2 has been used in some European countries (e.g. Denmark, Finland, Germany, Greece, Spain). The Eurocode 2 classification system consists of three main levels, with a further one for recording a recipe identifier for mixed dishes[59]. At the top level, the classification assigns foods to one of 13 main food groups. These are divided into sub-groups, which can be further divided into a food item level (which in some cases may be lower level sub-groups, e.g., code 3.11.l "Meats; Meat products; Offals"). The following table lists the main categories.

Table 16. Eurocode 2: main food groups

1. Milk and milk products
2. Egg and egg products
3. Meat and meat products
4. Fish, molluscs, reptiles, crustaceans and their products

---

[55] Ireland J, Erp-Baart AMJ van, Charrondiere UR, Møller A, Smithers G, Trichopoulou (2002): Selection of a food classification system and a food composition database for future food consumption surveys. *European Journal of Clinical Nutrition*, 56 Supplement 2, S33-S45.

[56] Arab L., Wittler M., Schettler G. (1987). Eurocode 2. In *European Food Tables in Translation*. Springer, Heidelberg

[57] Poortvliet EJ, Klensin JC and Kohlmeier L. (1992). *Rationale document for the Eurocode food coding system*. European Journal of Clinical Nutrition;45 (Suppl 5): S9-S24.

[58] Kohlmeier L.(1992) *The Eurocode 2 Food coding system*. European Journal of Clinical Nutrition;45 (Suppl 5): S25-S34

[59] Poortvliet E.J. and Kohlmeier L. (1993). *Manual for Using the Eurocode 2 Food Coding System*. Draft March 1993. Report of the FLAIR Eurofoods-Enfant Project, Wageningen.

> 5. Oils, fats and their products
> 6. Grains and grain products
> 7. Pulses, seeds, kernels, nuts and their products
> 8. Vegetables and vegetable products
> 9. Fruit and fruit products
> 10. Sugar, chocolate and related products
> 11. Beverages (non-milk)
> 12. Miscellaneous, soups, sauces, snacks and products
> 13. Products for special nutritional use

Like the BLS classification, Eurocode 2 classification emphasises nutritional aspects (e.g., dietetic use, fat content). For example, category 6: GRAINS AND GRAIN PRODUCTS includes grains and their milled products and substitute flours obtained from non-cereal sources, but also cereal products such as pasta and breads, breakfast cereals, savoury and sweet products and dishes; it excludes sweet corn eaten as a vegetable.

Eurocodes were to be supplemented by recipe and descriptor systems for describing food items in greater detail. However, these associated parts are less developed and tested than the Eurocode 2 classification. Furthermore, Eurocode contained several food definitions that were not in agreement with standards set by Codex Alimentarius and/or directives issued by the European Commission, thus making its use difficult. Another problem with the Eurocode classification was the difficulty to define logical rules for assigning a given food item to a specific main group (particularly for mixed foods). Anomalies were also created because the categorisation policy differed between the main groups.

A revision of the draft of the Eurocode 2 Food Coding System[60] was undertaken as part of the tasks in the framework of the European COST Action 99 to address and correct these problems[61]. This should enable it wider adoption for recording dietary surveys and for food classification/aggregation in composition databases.

2.5.5 EPIC SOFT food classification

The European Prospective Investigation into Cancer and Nutrition (EPIC) studies diet, health and lifestyle of 500,000 people in ten European countries (Denmark, France, Germany, Greece, Italy, Netherlands, Norway, Spain, Sweden, United Kingdom). The food classification used in the EPIC SOFT software[62] was initially developed with the methodological purpose of grouping together foods that could be described, quantified and checked similarly. The EPIC-SOFT food classification system in 17 main groups and underlying 124 sub-groups was used to classify the 1500 to 2000 items reported in the EPIC study. The original classifications were carried out by the project co-ordinator, but in order to enable international use of the classification system and the software, scope notes have been added.

EPIC SOFT food classification was also used in the **Epic Nutrient Data Bank** (ENDB) containing the nutrient composition of EPIC survey foods from the national food composition

---

[60] URL http://www.foodcomp.dk/eurocode/ & http://www.ianunwin.demon.co.uk/eurocode/docmn/index.htm

[61] Unwin I., Møller A. (2006) *Eurocode 2 Position Paper on the Eurocode 2 Coding System*. EuroFIR publication

[62] Slimani *et al* (2000) Standardization of the 24-hour diet recall calibration method used in the European Prospective Investigation into Cancer and Nutrition (EPIC): general concepts and preliminary results. *European Journal of Clinical Nutrition*, 54, 900-917

databases of the 10 EPIC countries. This food classification system can thus be used to map national food groups of the participating countries.

Table 17. EPIC food classification: main groups

01	Potatoes and other Tubers	10	Fat
02	Vegetables	11	Sugar and Confectionery
03	Legumes	12	Cakes
04	Fruits	13	Non Alcoholic Beverages
05	Dairy Products	14	Alcoholic Beverages
06	Cereals and Cereal Products	15	Condiments and Sauces
07	Meat and Meat Products	16	Soups, Bouillon
08	Fish and Shellfish	17	Miscellaneous
09	Eggs and Egg Products		

2.5.6 EUROPEAN-FOOD GROUPS (EFG)

The EFG system was developed, as a project of COST Action 99/Eurofoods, in an attempt to evaluate the level of food description and classification that would permit international comparisons of the results of food consumption and food availability surveys at main group level.

In order to formulate the EFG system, the following international and national classification schemes used for recording food intake were compared:

- International: FAO Food Balance Sheet, WHO GEMS/FOODS regional diets, DAFNE classification system for Household Budget Survey data, and Eurocode 2 core classification (levels 1 and 2);
- National: French INCA Food Consumption Survey (1999), TNO Dutch National Food Consumption Survey (1998), DFVF Danish food consumption survey and British National Food Survey.

The task was difficult, as these classification schemes are designed for different levels of reporting consumption: the FAO Food Balance Sheet and the WHO GEMS/FOODS regional diets describe food at the commodity level (e.g. "Cereals"), the DAFNE classification describes ingredients and foods as available in the household (e.g., "Flour", "Processed fruits"), whereas Eurocode and national surveys include both ingredients and foods as consumed (e.g., soups, sauces). An additional difficulty is that these classification schemes often overlap.

Appendix 1 compares some of the above classification systems used in food consumption surveys and illustrates the difficulties in finding common grounds for food classification. The reason why EFG classification compares well with the other classification schemes studied is that it was created as a "least common denominator" among them.

It was decided to use the definitions of the corresponding food groups in Eurocode 2 food categorisation system, because Eurocode was the only one of the above systems that was fully documented at the time. EFG was created in an attempt to compare consumption data collected using different food classification systems, but more work needs to be done to refine this system, provide more detailed subgroups and harmonise definitions.

Table 18. EFG food grouping system [63]

	EFG class	Includes
1	Bread and rolls	Leavened and unleavened breads, crispbreads, bread sticks, rusks, breadcrumbs
2	Breakfast cereals	Breakfast cereals
3	Flour	Cereal flours and starches (wheat, rye, oats, maize, rice, buckwheat); Substitute flours and starches (soya, potato, carob, arrowroot, tapioca)
4	Pasta	Plain noodles, egg noodles, rice noodles
5	Bakery products	Fine bakery wares, savoury and sweet biscuits, croissants, dough cakes, scones, doughnuts, pastry, pies, cakes
6	Rice and other cereal products	Whole grain cereals, bulgur, semolina, rolled oats, barley meal, rice
7	Sugar	Sugar (sucrose), glucose, fructose, maltose, lactose, honey, maple syrup, molasses, treacle
8	Sugar products excluding chocolate	Jams & marmalades, non-chocolate confectionery (e.g. boiled sweets, chewing gum, nougat, cereal bar), sugar products (e.g. marzipan, candied fruit), non-dairy ices
9	Chocolate	Chocolate and chocolate products: cocoa powder, chocolate bar, filled chocolate, chocolate-coated confectionery bars
10	Vegetable oils	Vegetable fats and oils
11	Margarine and lipids of mixed origin	Margarines, fat spreads
12	Butter and animal fats	Butter, animal fats (e.g. beef, pork, goose, duck) and marine oils
13	Nuts	Nuts, peanuts, seed products
14	Pulses	Pulses (e.g. dried pea, lentil) and pulse products (e.g. soya paste)
15	Vegetables excluding potatoes	Leaf vegetables, brassicas, stalk vegetables, shoot vegetables, onion family, root vegetables, fruit vegetables, pod vegetables, sprouted seed vegetables, edible fungi, herbs, vegetable mixtures
16	Starchy roots or potatoes	Potatoes and other tubers (Jerusalem artichoke, sweet potato, yam, cassava, taro)
17	Fruits	Malaceous fruit, prunus fruit, berries, citrus fruit, apple sauce
18	Fruit juices	Fruit and/or vegetable juices and nectars
19	Non alcoholic beverages	Non-milk beverages (e.g. carbonated soft drinks, water), imitation milk products
20	Coffee, tea, cocoa powder	Infusion drinks (coffee, tea, herbal tea), cocoa powder, milk beverage powders
21	Beer	Beers and malt beverages
22	Wine	Wines, fortified and liqueur wines
23	Other alcoholic beverages	Ciders, perries and similar drinks, liqueurs, spirits, alcoholic mixed drinks
24	Red meat and meat products	Meat (beef, veal, pork, mutton, other mammals), meat products and preserved meats
25	Poultry and poultry products	Poultry meat (chicken, turkey, duck, other birds) and poultry products
26	Offals	Liver, kidney, tongue, heart, other offals
27	Fish and seafood	Fish, crustaceans, molluscs, amphibians, reptiles, insects and fish products
28	Eggs	Egg (e.g. chicken, turkey, duck, goose, quail) and egg products
29	Milk	Liquid milk (e.g. cow, goat), processed milk (flavoured, condensed, dried), whey, cream
30	Cheese	Cheese (fresh, soft, semi-hard, hard, blue, smoked, processed)
31	Other milk products	Yogurt and other fermented milk products, ice cream
32	Miscellaneous foods	Dishes, soups, sauces, condiments, dressings, spices, seasonings and extracts, baking

---

[63] Ireland, J.; van Erp-Baart, AMJ; Charrondiere, UR.; Møller, A.; Smithers, G.; Trichopoulou, A. (2002). Selection of a food classification system and a food composition database for future food consumption surveys. *European Journal of Clinical Nutrition*, 56 Supplement 2, S33-S45

	EFG class	Includes
		goods and other ingredients
33	Products for special nutritional use	Sugar substitutes, Substitute flours and starches

2.5.7 EFCOSUM recommendations for classification in consumption studies

The EU **EFCOSUM** (European Food Consumption Survey Methods) project[64] compared the EFG food grouping to food classification systems used in food consumption surveys at commodity level, ingredient level and at food level, showing that, in general, the groups compare well. An exercise was then undertaken in which all countries participating in the EFCOSUM project were asked to classify the available food consumption data at edible ingredient level according to EFG. The result was that in general, most countries indicated that they could use the EFG system to classify foods in food consumption surveys. They also expressed the need for further directions to assign foods to the different food groups in a comparable way. The EFCOSUM project recommended using the EFG system for food classification, with Eurocode definitions, as a minimum requirement in food consumption surveys.

The underlying definitions of EFG food groups were taken from Eurocode 2, but questions remain (e.g. the place of commodities), it is thus essential to review these definitions. The same could be said for the other food classification systems studied (both international and national): users have less difficulty in assigning correct classification of foods when scope notes are available, and it would thus be worthwhile to provide definitions for the food classification systems when they are lacking.

2.6 OTHER FOOD CLASSIFICATION SYSTEMS

Worth to mention is the system called **Classification of Foods and Physical Properties**[65]. The intention of this classification system is to provide a framework for the collection on the physical properties of food. The system is dendritic ('tree-like'). It consists of 14 primary food groupings, progressively subdividing into subgroups, which end with a specific food. With its food technological background, the system also includes classification on treatments, such as preparation, processing, preservation, filling and closing conditions, pack type, etc. Along these lines, a more recent research project[66] has classified foods according to their **texture** (index of chewing instruction).

Other food classification system have been created for research, such as the **Current Research Information System** (CRIS) of the United States Department of Agriculture (USDA),

---

[64] Ireland, J.; van Erp-Baart, AMJ; Charrondiere, UR.; Møller, A.; Smithers, G.; Trichopoulou, A. (2002). Selection of a food classification system and a food composition database for future food consumption surveys. *European Journal of Clinical Nutrition*, 56 Supplement 2, S33-S45

[65] Jowitt R. (1989). *A Classification of Foods and Physical Properties*. Food Science Publishers Ltd.

[66] Koga T., Koga Y., Nakata S., Ohta H. (2003) Characterization and classification of foods by texture of food. *Nippon Shokuhin Kagaku Kogaku Kaishi*, 50 (12), Pages 582-589.

to index ongoing and recently completed research projects in agriculture, forestry, and food and nutrition.[67]

2.7 COMPARISON OF FOOD CLASSIFICATION SYSTEMS

All of these food classification systems have been designed by and for people who know the foods involved and the uses that will be made of the data. The corollary of this is that information needed by outside users may be absent. Another common characteristic observed is that their codes are generally not specific or detailed enough to replace food codes in comprehensive food composition or consumption databases, especially for nutritional calcula-tions. They can, however, be used to classify and/or aggregate foods in these databases.

Classification systems have been created for different purposes and reflect different criteria. For example, in the classification of cheeses, the CIAA system (additive driven) first differentiates unripened, ripened, processed and analogue cheese; secondary criteria are conditioning, conservation and presence of rind. In Eurocode 2 (food consumption surveys), cheeses are first classed in function of their consistency (hard, soft, fresh), then according to their fat content. DAFNE (household budget surveys) simply classes all cheeses under "Cheese", and CCPR (residue and contaminant driven) they are "Secondary milk products". Another example of differences in the various categorisation systems is given in the table below: for fruits, DAFNE distinguishes fresh or processed, CIAA food processing, and CCPR the type of peel.

Table 19. Examples of "Fruit" categories

DAFNE	Eurocode 2	CIAA	CCPR
FRESH FRUITS - Apples - Citrus - Bananas - Grapes - Plums - Berries - Apricots and peaches - Cherries and sour cherries - Pears - Other fresh fruits PROCESSED FRUITS	FRUITS AND FRUIT PRODUCTS: Malaceous fruit Prunus species fruit Other stone fruit Berries Citrus fruit Miscellaneous fruit Fruit mixtures Fruit products	Fresh fruit Untreated fruit Surface treated fruit Peeled and/or cut fruit Frozen fruit Processed fruit Dried fruit Fruit in vinegar, oil, brine or alcohol Canned or bottled fruit Jams and the like – jams, jelly, marmalade Fruit based spreads other than chestnut puree Candied fruits Fruit preparations, including pulp Fruit-based desserts	Citrus fruit Pome fruit Stone fruit Berries & other small fruits Assorted tropical & sub-tropical fruit, edible peel Assorted tropical & sub-tropical fruit, inedible peel Dried fruits

These different approaches result from the different objectives of each system. The FAO food balance sheet classification is based on trade balance of food and agricultural commodities. The CCPR categorisation (residue driven), and to a lesser extent DAFNE (household budget surveys) also emphasise commodities. The CIAA system (additive driven) emphasises processed foods, as the methods of preparation and conservation of foods condition the use of

---

[67] URL: http://www.nal.usda.gov/ttic/coagra/cris.htm

certain additives. The Eurocode 2 classification (consumption surveys) puts more accent on nutritional aspects (e.g., dietetic use, fat content). Mixed foods are described methodologically in Eurocode 2, where a set of rules have been defined, such as the priority of meat over vegetables. In the CIAA classification, mixed dishes are allowed the same additives as for each of its ingredients, so it was not necessary to develop a more sophisticated system.

As the different systems are each valid in their domain, some attempts have been made to create links between food identification systems, by "mapping" one system to another. This was the approach chosen for a project linking sets of LanguaL descriptors to each of the Eurocode 2 food groups[68]. In a more recent comparison of food classification systems used in European food composition databases, national food groups were mapped to Eurocode 2 and EFG; it was found that mapping was only possible at the main group level, as many of the food groups in food composition databases overlap.[69]

There is no universal food classification system, and the different approaches result from the different objectives of each system. Classification systems have been created for different purposes and reflect different legislations. They are often contradictory, and their very existence shows that there can be no single satisfactory international classification system. Another approach is to identify foods in databases by internal codes plus comprehensive descriptions.

3   REVIEW OF FOOD DESCRIPTION SYSTEMS

Food classification and food description may have very different goals, and this leads to very different appearances of the systems. A classification system tends to group or aggregate foods with similar characteristics; it is a tool of the "end-user" of data. A description system, on the other hand, is a tool of the data originator, who wants to give a description of the food, as precise as possible, without the necessity of aggregating them.

3.1   SYSTEMATIC FOOD NOMENCLATURE

3.1.1   British structured food nomenclature

A description of a food may be contained in the food name. Thus, the British food composition tables[70] use a system of **structured food nomenclature** to identify foods. Foods are listed in the tables in groupings having up to 3 levels, for example a cream may be classified as *Milks and milk products; Creams; UHT Creams* and be stored with a group code 'BJP'. In general, the food name is structured into 7 fields consisting of 3 types. Firstly there is a field for the 'main name', with a second type of field for up to 3 'auxiliary names' which qualify the main name. A third food

---

[68] Møller A., Ireland-Ripert J., Smith E., Hendricks T. and Holden J. (1993). *LANGUAL translation of Eurocode 2.* COST Action 99 report, Wageningen.

[69] Ireland J.(2005) *Food classification and description in European food composition databases.* EuroFIR report.

[70] Food Standards Agency (2002). *McCance and Widdowson's The Composition of Foods*, Sixth summary edition, Royal Society of Chemistry.

name field accommodates phrases further describing the food item - these are the parts of the name appearing in italics in the printed tables. These phrases describe features such as processing or cooking, parts of the basic food in the edible sample and variable or additional components. They are used pragmatically to give a 'natural' order of phrases within the food name and also so that items are sorted into a 'logical' order when generating lists of foods[71].

The British structured food nomenclature is a pragmatically developed, informal faceted system that combines food classification, naming and description, and which is especially suitable for producing printed food composition tables. The structuring of description data within the naming system supports other functions necessary for the effective presentation of food names, including listing in a logical order, formatting within the name (e.g. highlighting with bold or italic), formatting between items (e.g. dropping repeated elements of the name) and formatting in context (e.g. modifying the name according to the food group). On the other hand, the system lacks a list of controlled terms to be used in the facets to describe foods. The addition of a controlled food description language would standardise the choice of terms and facilitate data interchange.

Table 20. USDA Qualifying Terms

Facets	Examples of terms
A. Treatment applied	Aged, such as with cheese or meat; Blanched with steam
B. Preserving technique	None, preserving technique; Bottled; Canned; Frozen
C. Processing technique	Acidified heat processed; Aseptic, canning technique
D. Cooking method	Cooked, unspecified; Cooked, partially; Baked; Baked, partially
E. Physical state	Chips; Cut; Cubed; Diced; Sliced
F. Portion analysed	Leaves, portion analyzed; Leaves with stems, portion analyzed
G. Packaging and storage conditions	Fiberboard or cardboard, package; <-10 F <-23 C storage
H. Grade, quality, appearance, size and color	Grade A; Marbling, abundant; All sizes; Blue
I. Maturity and conditions of growth and production	Calf; Mature; Ripe; Fertilized; California grown; 1984
J. Special descriptors	65 Proof, alcohol content; Extraction medium, hexane
K. Other descriptors including treatments and conditions not covered under A & E	Artificial; Creamed; Decaffeinated; Instant; Industrial; Imported; Uncooked
L. Category of varietal type	Holstain; Blackeye, type; California style; Vine ripened
N-R Components of mixed dishes	Water; Lentil, dry; Sugar, unspecified; Antioxidants

3.1.2 USDA Qualifying Terms

The United States Department of Agriculture[72] also describes foods through systematic names using carefully selected points of view, or facets. They have established a glossary of Qualifying Terms, with definitions for processes and treatments, parts of foods, stages of maturity, and other terms that may need clarification[73]. The following table lists the facets and gives examples of these descriptive terms. The food identification code in the database is composed of a food code plus a

---

[71] Unwin I.D.(1992). *Food Naming and Description Using Faceted Descriptors*. FLAIR Eurofoods-Enfant Project meeting, Killeney Bay, Ireland.

[72] URL: http://www.nal.usda.gov/fnic/foodcomp/

[73] Butrum R.R. and Gebhardt S.E. (1976) Nutrient Data Bank: Computer-Based Management of Nutrient Values in Foods. J.*am.Oil Chemists' Soc.*,**53** No.12, 727A-730A.

series of Qualifying Term codes. For example, OBKF.B006.E019.I406.P001.R426 identifies "Alberta peach, frozen, sliced, California grown, sugar added, vitamin C added".

On the other hand, the USDA Qualifying Terms are simply listed within each facet, with no hierarchical structure, and only in American English. With an unstructured list, there is a danger that an indexer may select one term the first time, then select a related, but slightly different term, the next. In this case, the success of indexing is very much dependent upon the consistency of memory of the indexer.

3.2 INFIC / ENFIC THESAURUS

More consistent indexing and retrieval can be attained using faceted thesauri, in which vocabulary control is achieved by deliberately restricting the scope of terms and through its display of hierarchical relationship[74]. Due to its flexible structure, such a vocabulary can be amended by adding new viewpoints for food description or by including more detail within facets. A faceted thesaurus is thus well adapted to describe the features of foods.

Moreover, multilingual thesauri allow foods to be described or searched, independently of the language[75]. Such tools are essential, as they allow everyone entering or retrieving information on foods to work in one's native language or at least in one which is familiar. It is clear that multilingual thesauri can play an important role in mastering information exchange. A multilingual thesaurus should not be confused with a translation dictionary; the goal of a dictionary is to give equivalent terms in different languages and not to transpose notions in natural language to controlled language. Moreover, a thesaurus systematically presents semantic relations between its terms, relations not found in dictionaries.

Table 21. INFIC/ENFIC facets

Facets	Examples of normalised keywords
Origin	WHEAT; OATS; PEA; LUPINE
Origin specification	DURUM (wheat); WRINKLED (pea); YELLOW (lupine)
Scientific name	TRITICUM AESTIVUM; AVENA SPP.
Part/product eaten	SEED; OIL MEAL; PODS WITHOUT BEANS; GLUTEN FEED
Part undergoing separation	SEED; OIL MEAL; MIDDLINGS
Process	MILLING; POLISHING; CALCIUM CARBONATE ADDED
Stage of maturity	EARLY VEGETATIVE; FULL-BLOOM, MILK STAGE
Cutting of crop	CUT 1; CUT 2
Commercial grade	48 (soybean meal 48)
Synthetic grade	CRUDE FIBRE >5%DM
Country	FRANCE
Brand name	
Producer	

An example of a successful implementation of a faceted thesaurus is the INFIC/ENFIC System (International Network of Feed Information Centres / European Network of Feed Information Centres), which owes its origin to Dr. Harald Haendler (University of Hohenheim, Stuttgart) and

---

[74] International Standard ISO 2788 (1986). *Documentation – Guidelines for the establishment and development of monolingual thesauri*.

[75] International Standard ISO 5964 (1985). *Documentation – Guidelines for the establishment and development of multilingual thesauri.*

co-workers in Germany & Utah, USA[76,77]. This nomenclature system was designed first for people involved in the nutrition and practical feeding of farm animal, but also intended to be understandable by people dealing with feeds (trade, regulation, customs). It is essentially a reference tool whenever an international level is to be considered for communicating about feeds (official documents and scientific publications) or disseminating or exchanging feed data. The thesaurus is maintained in English, with provision for other European languages, and uses the following facets[78].

Although the INFIC/ENFIC thesaurus is unsuitable for human needs, it is an example of successful identification and description system that is widely used throughout the world and a reference point for all concerned in the composition of animal feeds.

3.3 LANGUAL THESAURUS

In multilingual thesauri, corresponding terms of different languages are not always semantically equivalent. A first approach would be to limit the terms of different languages in which the descriptors are provided. Another is to render them language-independent. This approach was chosen by the LanguaL thesaurus, which is used in the USA and Europe for numeric data banks on food composition (nutrients and contaminants), food consumption and legislation. Each descriptor in the thesaurus possesses an underlying code that points to equivalent terms in different languages (currently English, French, Danish, Hungarian, and parts in Spanish, Dutch, Czech, German). This renders the system both language-independent and suitable for use in numerical databases.

Initially called Factored Food Vocabulary (FFV)[79], the thesaurus was begun in the late 1970's by the Center for Food Safety and Applied Nutrition (CFSAN) of the United States Food and Drug Administration (FDA), as an ongoing co-operative effort of specialists in food technology, information science and nutrition. Since then, LanguaL has been developed in collaboration with the US National Cancer Institute (NCI), and, more recently, its European partners, notably in France, Denmark, Switzerland and Hungary. Since 1996, the European LanguaL Technical Committee has administered the thesaurus. Altogether, over 40,000 food products have been described in various countries using the thesaurus.

Moreover, although it was not designed to be used in dietary software, parts of the LanguaL thesaurus have been adapted for use in the European EPIC epidemiological study[80]. The advantages of using a faceted description system in international studies are the standardisation of the level of food description as collected from different populations and the preservation of the original data detail. Disadvantages include the fact that the thesaurus does

---

[76] Harris L.E., Haendler H., Riviere R., et al. (1980). *International feed databank system: An introduction into the system with instructions for describing feeds and recording data*. INFIC Publication No 2, 1980. International Feedstuffs Institute, Utah State University, Logan, Utah (USA).

[77] Haendler H. (1985). Methods of identifying data units for retrieval purposes, as applied in an international data bank system for feed analyses. *In* Glaeser P.S. (ed.), *The Role of Data in Scientific Progress*. Elsevier Science Publishers, 401-404.

[78] EU AIR Concerted Action "Animal Feed and Nutrition", URL http://home.wxs.nl/~enfic/

[79] McCann A., Pennington J.A.T., Smith E.C., Holden J.M., Soergel D., Wiley R.C. (1988). FDA's Factored Food Vocabulary for Food Product Description. *J. Am. Diet. Assoc.*, **3**, 336-341.

[80] Dehaveng G *et al.* (1998). Comparison of nutrients in food composition tables available in the nine European countries participating in EPIC. *European Journal of Clinical Nutrition*, 52, 1-20.

not contain all facets of nutritional or etiological interest for a complete study and that food description increases the size of the databank by a factor of 5, which can burden its use and management, particularly when matching consumption to composition data[81].

The LanguaL thesaurus is organised in fourteen facets characteristic of the nutritional and/or hygienic quality of foods, e.g. the biological origin, the methods of cooking and conservation, and technological treatments[82]. The thesaurus has been harmonised[83] and significantly modified over the last years. The European LanguaL Technical Committee has introduced links to international food categorisation systems (e.g., CIAA Food Categorisation System and Codex Classifications) and coding systems (e.g., E-numbers for additive identification)[84,85,86]. An official international version of the thesaurus has been published on the LanguaL Internet site[87], where copies of the thesaurus and the corresponding "Thesaurus Manager" (a means to browse the thesaurus) are available upon request. A prototype user interface on the site allows the search of foods available in food composition databases, in order to promote data interchange and provide a useful tool for persons looking for food composition data, as well as publicity for national databases.

Conversely, many food and nutrition professionals find the thesaurus difficult to use[88]. Some facets need further clarification, and it lacks some terms or specific food groups that may be used in national food composition tables. A European food classification is needed in parallel to the original food grouping in facet A (Product type, USA), which is based on US legislation. There is also a need for software to index foods more easily. The European LanguaL Technical Committee is currently addressing these issues.

Table 22. LanguaL Facets and Examples of Terms

CHARACTERISTIC	FACET
FOOD GROUP	**A. Product Type** Derived from a combination of consumption, functional, manufacturing and legal characteristics Ex.: Dairy product, poultry/poultry product, beverage, gravy or sauce, sweetener
FOOD ORIGIN	**B. Food Source** Species of plant or animal, or chemical food source Ex.: Cattle, abalone, wheat, carob, bean, garlic
	C. Part of Plant or Animal Ex.: Leaf, fruit, skeletal meat, organ meat
PHYSICAL ATTRIBUTES	**E. Physical State, Shape or Form** Ex.: Liquid, semiliquid, solid, whole natural shape, divided into pieces

---

[81] Slimani N *et al.* (1998) Structure of the standardized computerized 24-hour diet interview used as reference method in the 22 centers participating in the EPIC project. *Computer methods and programs in biomedicine*.

[82] Hendricks T. (1992). LanguaL: An Automated Method for Describing, Capturing and Retrieving Data about Food. In *International Food Data Bases and Information Exchange* (Simnopoulos A.P., Butrum R.R., eds.). *World. Rev. Nutr. Diet.*, Basel, Karger, vol. 68, 94-103.

[83] Schlotke F. (1996). *Langual - harmonization of different national versions*. Report of the European Langual Technical Committee, Institute of Scientific Computing, Zurich.

[84] Møller A. and Ireland J. (2000) *LanguaL 2000: Thesaurus*. European Commission, COST report EUR 19542.

[85] Møller A. and Ireland J. (2000) *LanguaL 2000: Introduction and Users' Manual*. European Commission, COST report EUR 19540.

[86] Møller A. and Ireland J. (2000) *LanguaL 2000: Updates*. European Commission, COST report EUR 19541.

[87] URL: http://www..langual.org

[88] Deary J. (1993). *Report of LanguaL Coding Experiment*. FLAIR Concerted Action Programme N°12: Eurofoods-Enfant Project. MAFF, London.

CHARACTERISTIC	FACET
PROCESSING	**F. Extent of Heat Treatment** Ex.: Fully heat-treated, partially heat-treated, not heat-treated
	G. Cooking method Cooked by dry or moist heat; cooked with fat; cooked by microwave Ex.: Sautéed, baked or roasted, griddled, toasted, popped, deep-fried
	H. Treatment Applied Additional processing steps, including adding, substituting, or removing components Ex.: Enriched, sweetened, egg added, fat or oil added, fat removed, decaffeinated
	J. Preservation Method Primary preservation method Ex.: Dehydrated or fried, frozen, preserved by adding chemicals
PACKAGING	**K. Packing Medium** Ex.: Packed in broth, packed in gelatine, packed in gravy or sauce
	M. Container or Wrapping Container material, form, and possibly other characteristics Ex.: Paperboard tray with wrapper, Plastic boil-in-bag, Glass container
	N. Food Contact The surface(s) with which the food is in contact Ex.: Ceramic, paperboard, glass, metal, plastic
DIETARY USES	**P. Consumer Group/Dietary use** Human or animal; special dietary characteristics Ex.: Human food no age specification, low fat, sodium free food, reduced calorie food
GEOGRAPHIC ORIGIN	**R. Geographic Places and Regions** ISO-code (ISO 3166) for country of origin, local codes for region
MISCELLANEOUS CHARACTERISTICS	**Z. Adjunct Characteristics of Food** Additional miscellaneous descriptors Ex.: Pink fish flesh, shoulder (meat cut), edible sausage casing, mould rind, dry mix

3.4 INFOODS NOMENCLATURE SYSTEM

The INFOODS Guidelines for Describing Foods were prepared by the INFOODS Food Nomenclature and Terminology Committee in 1987[89]. The purpose of the INFOODS nomenclature system was to provide a framework for the exchange of data between data sources and compilers of food composition databases. The system is a broad, multifaceted and open-ended mechanism designed to capture all information which might be available and which might be of some use to someone.

The INFOODS Guidelines propose criteria for deciding whether a food is "Single" or "Mixed" (multiple ingredients), and provide different sets of descriptive facets for these two classes of foods. According to the Guidelines, institutions or organisations are expected to make their own selection of useful facets and suppression of unnecessary facets. It is an open-ended, free-text food description system, a listing of features or entities that might influence the composition of food and that collectors of data should be encouraged to record, as shown in the following table.

---

[89] Truswell, A.S., Bateson, D.J., Madafiglio, K.C., Pennington, J.A.T., Rand, W.R. and Klensin, J.C. (1991). INFOODS Guidelines for describing foods: a systematic approach to describing foods to facilitate international exchange of food composition data. *J. Food Comp. Anal.* **4**: 18-38.
A copy of this article is available in PDF format from http://www.fao.org/infoods/nomenclature_en.stm

Table 23. INFOODS facets

A. Identification of the sender
1. Name of the person transmitting the data
2. Name of the institution / organisation to which sender belongs and position within it
3. Mailing address of institution / organisation
4. International telephone number
5. Telex number and/or cable code
6. Date of data transmission

B. Source of data on food
1. Identification of analytical laboratory
2. Identification of nutrient data base and code for food therein
3. Literature reference(s)

C. Single versus mixed food classification

D. Name and identification of food
1. Name of food in national language of the country in which it is intended for consumption; Name of national language
2. Local name(s) of food; Name of local language or dialect
3. Nearest equivalent name of this food in an international language; Name of international language
4. Country in which food is intended for consumption *
5. Food group and code of food in food tables and nutrient data base used in this country
6. Food group and code for food in national or regional food tables and nutrient data bases
7. INFOODS food indexing group

E. Further identification of SIMPLE FOODS
1. Food source; Scientific name; Variety *
2. Part of plant or animal *
3. Country or area of origin *
4. Proprietary name or trade name; name and address of manufacturer
5. Other ingredients or additives *
6. Food processing *
7. Food preparation *
8. Degree of cooking *
9. Agricultural production conditions
10. Maturity or ripeness
11. Storage conditions
12. Grade
13. Container and food contact surface *; Packing medium *
14. Physical state, shape or form *
15. Colour
16. Other
17. Photograph or line drawing

F. Further identification of MIXED FOODS
1. Ingredients
2. Recipe; Reference for recipe; File reference for flow diagram of recipe
3. Type of place where mixed food was made
4. Photograph or line drawing
5. Proprietary name or trade name; name and address of manufacturer
6. Container and food contact surface *; Packing medium *
7. Storage conditions
8. Final preparation of mixed food

G. Food consumption patterns

1. Typical portion size	
2. Frequency and season of consumption	
3. When is the food primarily eaten in the day, and if important, at what stage of the meal	
4. Food users *	
5. Specific purpose for food *	

correspond to facets in LanguaL thesaurus

As can be seen, the INFOODS System is somewhat similar to the LanguaL/FFV thesaurus, both as a model, since its design structure has the inherent flexibility required, and as a source for descriptive facets. However, LanguaL/FFV was not judged sufficient for INFOODS needs due to its emphasis on potential problems of contaminants and additives (thus its strong section on preparation and packaging) and its cultural biases (i.e., originally developed for use in the United States and by English speaking people).

Although information is recorded in free text, it was always the intention to develop thesauri for the different facets of the INFOODS system, in order to provide the indexer/retriever with a list of possible terms for any aspect. A thesaurus of terms for food processing and preparation was produced in draft, based on consultation with food scientists, chefs, caterers and dictionaries for food science and food preparation. The first draft was reviewed at INFOODS secretariat and revised; the second draft consists of Part 1, alphabetical list showing preferred and alternative terms, and Part 2, definitions of 203 preferred terms[90]. However, due to unforeseen circumstances, the thesaurus draft did not have extensive circulation for comment and was never published.

Table 24. Thesauri meant to accompany the INFOODS System

B2. List of nutrient data bases	to be prepared by INFOODS
B3. List of food composition tables	INFOODS International Directory of Food Composition Tables
D4. Names of Countries	ISO 3166
E2. Preferred names for parts of animals and plants	to be prepared by INFOODS
E3. Names of major fishing areas	Yearbook of Fishery Statistics. 1977, volume 44. FAO
E5 Alphabetical list of additives and their 'E' Code numbers	to be prepared
E6. Terms for food processing and preparation	Prepared by INFOODS Terminology Group, 1986
E6. List of places where food processing and preparation occur	to be prepared by INFOODS
E8. List of preferred terms to describe degree of cooking	to be prepared by INFOODS
E10.List of preferred terms to describe maturity and ripeness	to be prepared by INFOODS
E13. List of preferred terms to describe container type and food contact surface	to be prepared by INFOODS
E13. List of preferred terms to describe packing medium terms	to be prepared by INFOODS

The following Work Plan[91] was thus proposed:

---

[90] Truswell, A.S., Bateson, D.J. and Madafiglio, K.C. (1986). *Manual to accompany scheme for naming and describing foods in food composition tables and data bases.* Part 1. Alphabetical list, showing preferred and alternative names. Part 2. Definitions of preferred terms. INFOODS document.

[91] Truswell A.S. (1994). Terminology and Nomenclature of Foods. *FAO/UNU Discussions on Food Composition Data for Developing Countries.* Tunis.

1. Re-examine the INFOODS Guidelines and compare against other food naming and description systems. Where other systems are seen to have a feature that can improve the INFOODS system, modify the latter accordingly.

2. Prepare, circulate for comment and publish thesauri for use with the INFOODS Guidelines.

3. Set up field test(s) of INFOODS Guidelines, e.g. in South America (LATINFOODS) and Africa. A particular aim of this work will be to see how the system can be streamlined where resources are limited and how it can work in a major language other than English.

The INFOODS System, or customised forms of it, is used in New Zealand, the South Pacific, several ASEAN countries, two African countries and ten Latin American countries. It is also being incorporated into the working systems in Middle Asia and South Asia[92].

3.5 OTHER FOOD DESCRIPTION SYSTEMS

Several other thesauri exist in the domain of foods, principally for managing bibliographic information:

- **AGROVOC** thesaurus[93] used by the FAO AGRIS (International Information System for the Agricultural Sciences and Technology)[94] and CARIS (Current Agricultural Research Information System)[95] databanks with focus on agriculture and agricultural research;

- **CAB** thesaurus (more than 47,000 descriptors in the scope of life sciences) used to index the CAB Abstracts and Global Health databases, from which Nutrition Abstracts and Reviews[96] is derived,

- **IFIS** thesaurus used by the Food Science and Technology Abstracts[97];

- **UKAT** thesaurus, created to support indexing and searching in the UK archive sector[98];

- **UNESCO thesaurus**, a high-level thesaurus with terminology covering education, science, culture, the social and human sciences, information and communication, politics, law and economics[99].

These thesauri are comprehensive and international but were designed for more general documentation purposes. They do not have the specificity to describe foods and are therefore not suitable for identifying foods in food composition databases.

---

[92] Burlingame B.A. (1998) *Food Nomenclature and Terminology: Standards and Harmonisation for Food Composition Databases and Food Trade*. Montreal.

[93] FAO (2004). *AGROVOC. Multilingual Agricultural Thesaurus*. Rome (URL: http://www.fao.org/agrovoc/).

[94] URL: http://www.fao.org/AGRIS/

[95] URL: http://www4.fao.org/caris/

[96] URL: http://www.cabi-publishing.org/journals/abstract/nara/

[97] URL: http://www.foodsciencecentral.com/

[98] URL: http://www.ukat.org.uk/thesaurus/

[99] URL: http://databases.unesco.org/thesaurus/

3.6 COMPARISON OF FOOD DESCRIPTION SYSTEMS

In all of the above systems, the description of food products is divided into broad facets, some of which are common to all (e.g., food group, processing). They also share common preoccupations:
- nutrition and health, with frequent reference to conservation of nutrients during transformation and micro-biological protection;
- consumer group and use;
- tracability of the food product through the different steps of its transformation (e.g., degree of cooking, process, preservation, container).

Table 25. Summary of principal faceted food description systems for databases

British Structured Food Nomenclature	Informal faceted system combining food classification, naming and description, especially suitable for producing printed food composition tables, but lacks thesaurus
USDA Qualifying Terms	Terms simply listed within each facet, no hierarchical arrangement of terms, only in American English
INFIC System	Faceted thesaurus, hierarchical arrangement of controlled terms, but unsuitable for human needs
LanguaL Thesaurus	Multilingual faceted thesaurus, hierarchical arrangement of controlled terms, language-independent
INFOODS System	Broader faceted description allowing to capture more information, but in free text, lacking thesauri

The two major international systems created to describe foods in food composition databases are the LanguaL thesaurus, with well-defined terms, and the INFOODS system, in free text dependent on national language. A comparison of these two systems was carried out by INFOODS regional data centre co-ordinators[100] :

- The LanguaL thesaurus scored better in relation to addressing issues of barriers of language and culture, which is also the reason for its adoption in Europe. On the other hand, the candidates in the test judged that maintenance of LanguaL descriptors and codes in a database to be time consuming. However, this task is a necessary procedure for all thesauri and one that is also used in the INFOODS food component nomenclature system[101].

- The INFOODS System scored better in relation to "friendliness" to data compilers and local usefulness by conventional users of food composition data. As the answers to the questions are given in free text, the INFOODS System is simpler and quicker to use and does not necessitate looking up terms and codes in lists. Free-text food descriptions allow more detailed information to be included and are not limited by insufficiencies in the choice of terms in a thesaurus.

In fact, the two food-description languages are complementary, each possessing its assets. The INFOODS system can be used by surveyors in the field who are unable to index foods immediately, and LanguaL codes can be added at a later date when information is stored in a database. Moreover, it may be possible to merge the two systems by including LanguaL terms in the INFOODS facets, as originally proposed by the INFOODS Food Nomenclature and Terminology Committee members.

---

[100] Burlingame B.A. (1998) *Food Nomenclature and Terminology: Standards and Harmonisation for Food Composition Databases and Food Trade.* Montreal.

[101] Klensin J.C. (1992). *INFOODS Food Composition Data Interchange Handbook.* The United Nations University, Tokyo.

The demand for a language-independent thesaurus (like LanguaL) and the requirement for a practical, in-the-field system (like the INFOODS System) for food description in databases makes a strong case for linking the two systems to create a minimum set of standards and a harmonised approach for identifying foods world-wide. Examples of this combined approach are "system mapping" and the "International Interface Standard for Food Databases", described in the next section.

4   COMBINED APPROACHES FOR IDENTIFYING FOODS

Food classification and food description may have very different goals, and this leads to very different appearances of the systems. A classification system tends to group or aggregate foods with similar characteristics; it is a tool of the 'end-user' of data. A description system, on the other hand, is a tool of the data originator, who wants to give a description of the food, as precise as possible, without the necessity of aggregating them. Because users need to retrieve increasingly diverse aspects of the data, and also because of the inherent flexibility and expandability needed in the input to such a system, it is obvious that neither a strict hierarchical classification nor a rigid faceted description system can be employed.

4.1   EFFORTS TO HARMONISE FOOD DESCRIPTION, NOMENCLATURE AND TERMINOLOGY

In order to discuss the construction of an international food language, a task group of **CODATA** (Committee on Data for Science and Technology) on "Systematic Nomenclature for Foods in Numeric Data Banks" was created by several users and compilers of nutrient databases in 1988.

In March 1994, a **FAO/UNU meeting on Food Composition** was held in Tunis. An IUNS Task Group on Food Nomenclature was proposed to extend co-operation and collaboration between experts of the two major description systems (LanguaL thesaurus and INFOODS Nomenclature system).

In June 1995, a meeting was organised by Gary Beecher (USDA) and Nevin Scrimshaw (UNU/IUNS) in Washington DC, to assess whether there was a need to continue work in the area of food nomenclature and terminology. Participants from the USA, New Zealand, Thailand, Chile and Zimbabwe affirmed the need to re-convene an international committee pertaining to food terminology, nomenclature and description. The tasks for this committee, as recommended by this working group, were as follows: review systems currently in use to determine the feasibility of linking them, determine if it is possible for a single food description language or a set of minimum criteria to be adopted among various countries; assume responsibility for the compilation of an electronic international food description dictionary/thesaurus/concordance, possibly including food images; describe and contrast the various systems for users, perhaps on the Internet, to see where the systems are complementary and where are they in conflict; and prepare an update, as a continuation of the development of the INFOODS Nomenclature system.

In August 1995, the **Second International Food Data Conference** (Lahti, Finland) included a workshop on "Food Description, Nomenclature and Terminology". The goal defined by the participants was the creation of a food identification system encompassing several parallel, complementary schemes. The recommendation was therefore formulated that work continue in the field of food description, nomenclature and terminology, through the creation of an international committee. In spite of this, sponsorship for an international committee was not obtained, so work has been confined to the local level. The workshop defined the following criteria for a harmonised food identification system.

- Food identification should be able to encompass several parallel, complementary schemes, such as those mentioned above.
- Food description should be structured, e.g., using a faceted approach. It should be suitable for use in numeric database by the use of codes and controlled vocabulary (thesauri) where appropriate.
- Food identification must be robust to accommodate different national languages, e.g. using multilingual thesauri and classification systems. The food name should be given in the local language and in some standardised language.
- It should be flexible for use by all users and for all types of foods. Its characteristics must include flexibility in accepting new terms and names, flexibility in retrieval of information, and ease of use and understanding.
- It should be specific enough to avoid misclassification. The level of detail needed to describe a food depends on the level of aggregation of the food item.
- It should be adequately documented, and should provide definitions of all facets and controlled terms. Copies of the thesauri and updates should be available on the Internet.
- Food identification should be internationally acceptable. It should use already existing international standards: ISO standards, Codex food standards referenced when possible, and primary reference sources including reference databases on the Internet.

4.2 FDA *"INTERNATIONAL INTERFACE STANDARD FOR FOOD DATABASES"*

A food description system encompassing several complementary schemes was developed several years ago by the United States Food and Drug Administration (FDA): the "International Interface Standard for Food Databases" (IIS)[102,103]. Its title has led to some confusion and discussions in the past, and suggestions have been made to modify it (e.g., "Standardised Interface to Food Databases from Different Countries"). The concept of an international interface standard for food-related data arose at a Committee on Data for Science and Technology (CODATA) meeting held in March 1990. The FDA took the draft ideas of the meeting and formulated them into an interface. The purpose of the IIS is to facilitate retrieval of information from food databases and to improve and standardise food descriptions.

The following table shows the categories of descriptive information included in the IIS. The software, written under contract by Technical Assessment Systems (TAS), allows retrieval using categories I, II, III and VI to formulate queries, with LanguaL as the primary basis, allowing the user to find relevant foods in the available data sources.

---

[102] Penington J.A.T. and Hendricks T.C. (1992). Proposal for an international interface standard for food databases. *Food Additives and Contaminants*, 1992, **9**, 3, 265-275.

[103] Penington J.A.T, Hendricks T.C., Doublas J.S., Petersen B., Kidwell J. (1995). International Interface Standard for Food Databases. *Food Additives and Contaminants*, 1995, 12, pp. 809-820.

Table 26. IIS descriptive information

Categories of Information	*Example: Homemade Lasagna*
I. Food names (in different languages)	Lasagne à la Bolognaise (French)
II. LanguaL facet terms	(A) Pasta dish; (B) Durum wheat; (C) Seed or kernel, skin removed, germ removed; (E) Whole, shape achieved by forming, thickness 1.5-7 cm; (F) Fully heat treated; (G) Baked or roasted; (H) Flavoring, spice or herb added; Vegetable added; Meat added; Cheese added; (J) No preservation method used; (K) No packing medium used; (M) No container or wrapping; (N) Glass; (P) Human food, no age specification, regular diet
III. Ingredient/recipe information	Lasagne pasta 10 oz; Canned tomatoes 1 lb.; Ground beef 1 lb.; Cottage cheese 3 cups; Tomato paste 12 oz; Mozzarella cheese ½ lb.; Parmesan cheese ½ cup; Parsley 2 Tbs.; Basil 1 Tbs.; Garlic 1 clove; Salt 2 ½ tsp.; Pepper ½ tsp.
IV. Other characteristics (e.g., INFOODS facets)	0% refuse; Portion size 170 g (6 oz.); Prepared in institutional kitchen
V. Other food classification systems (e.g., Eurocode2), Standards (e.g., CODEX)	
VI. Data source(s)	FDA Total Diet Study 1982-89 (*J Food Comp analysis* 3:145-165. 1990)

The IIS is an invaluable step towards the definition of the relevant types of meta-data in the domain of food databases. It includes food name, LanguaL terms, recipe information, INFOODS facets and other classification systems. On the other hand, the IIS stores this information in different categories even when they use the same hierarchical structure, which could be a drawback for generalized use. Moreover, it has not yet been tested and accepted at an international level.

4.3 COST ACTION 99 RECOMMENDATIONS FOR FOOD COMPOSITION DATA

Following upon IIS, a Working Group of the European COST Action 99 "Food consumption and composition data – Eurofoods" published recommendations for food composition data management and interchange[104]. The COST Action 99 Recommendations define attributes for food description in more detail than the INFOODS Guidelines and in a more homogeneous structure than the IIS. Food description includes food name(s), classification, sampling procedures, and information about such properties as food source, agricultural production and storage conditions, preservation and cooking methods, food additives etc. In all, more than 50 properties that influence the nutritional value of a food have been listed. Images are also a possible means to describe foods and may be included. A separate recursive table is used to relate foods to their ingredients (which are also foods), thus enabling simple recipe management and so-called full ingredient coding and description.

According to the nature of the food attribute, the description will be in free text or point to terms in a standardised thesaurus (e.g., LanguaL, ISO). Different national languages are

---

[104] Schlotke F., Becker W., Ireland J., Møller A., Ovaskainen M.L., Monspart J., Unwin I.(2000). Eurofoods Recommendations for Food Composition Database Management and data Interchange. Report by the COST Action 99 – Eurofoods Working Group on Food Management and Interchange. Report No. EUR 19538, European Commission.

accommodated by using multilingual thesauri and classification systems and by allowing the food name to be given in more than one language. Finally, the Recommendations incorporate already existing international standards for international acceptability. The COST Recommendations thus allow food identification that is detailed, structured, flexible and suitable for use in numeric database.

Table 27. COST Action 99 Data Interchange Recommendations

Attributes for the description of foods	Data Type
Food Name and Identification	
Food Code	Free text
Food Group Code	Free text
Food Name, language	Free text
Standard Classifications	
Product Type	LanguaL thesaurus
CODEX Food Standards	Thesaurus
CODEX Food Categorization System for Food Additives	Thesaurus
CODEX Classification for Foods and Animal Feeds	Thesaurus
CODEX Food Categorization System for Contaminants	Thesaurus
FAO Food Balance Sheet Classification	Thesaurus
CIAA Food Categorization	Thesaurus
Eurocode2	Thesaurus
European Article Number	Thesaurus
Universal Product Code	Thesaurus
E-Number	Thesaurus
INS-Code	Thesaurus
General Description	
Manufacturer, Wholesale distributor, Retailer	Key
Food Source	LanguaL thesaurus
Genetically Modified	Y/N
Agricultural Production Conditions	Free text
Colour	Free text
Image	File
Part of Plant or Animal	LanguaL thesaurus
Nature of Edible Portion	Free text
Physical State Shape or Form	LanguaL thesaurus
Extent of Heat Treatment	LanguaL thesaurus
Cooking Method	LanguaL thesaurus
Treatment Applied	LanguaL thesaurus
Recipe Procedure	Free text
Preservation Method	LanguaL thesaurus
Packing Medium	LanguaL thesaurus
Container or Wrapping	LanguaL thesaurus
Food Contact Surface	LanguaL thesaurus
Storage Conditions	Free text
Areas of Origin, of Processing, of Consumption	LanguaL thesaurus
Customary Uses of Food	
Consumer Group Label Claim	LanguaL thesaurus
Typical Serving Size	Number
Frequency and Season	Free text
Place of Food in Diet	Free text
Cuisine	Thesaurus
Sampling And Lab Handling	

Attributes for the description of foods	Data Type
Date of Sampling	Date
Sampling Strategy	Free text
Sample Handling	Free text
Reason For Analysis	Free text
Remarks	Free text

5 RECOMMENDATIONS AND WORK TO BE DONE

As clear food classification and thorough food description are very important in international comparison of food composition and food consumption data, it is essential and critical that these issues be developed and agreed upon in an international audience. Without international agreement, comparison of data across borders is an illusion[105].

A first breakthrough in food identification has been the clear recognition of the advantages of using a **multifaceted approach for describing foods** in food-related databases (composition, consumption). A second breakthrough has been the recognition of the need to **include alternate classification/description systems**.

Criteria for such a combined system were laid down by the *International Interface Standard*. They were further stated at the workshop on "Food description, Nomenclature and Terminology" during the Second International Food Data Conference: encompassing several parallel complementary schemes, structured, robust to accommodate different national languages, flexible for use by all users and for all types of foods, specific enough to avoid misclassification, adequately documented, and internationally acceptable.

At the **Third International Food Data Conference** (Rome, Italy, 1999)[106], it was proposed to continue work in the field of food identification in food composition databases through an international IUNS/FAO Task Force. This Task Force would have the task of overviewing and focusing the work done on food classification and description in order to harmonise international use of these issues. This work could include:
- Reviewing the COST Action 99 Recommendations for Food Data Interchange,
- Defining which facets are essential to food description,
- Re-examining the INFOODS Guidelines,
- Updating the LanguaL thesaurus,
- Providing adequate documentation,
- Testing the systems in different national/regional centres.

Unfortunately, the proposed Task Force never came into existence, but its goals were incorporated into the European Network of Excellence **EuroFIR (European Food Information Resource Network)**, which began in January 2005. The aim of EuroFIR is to build and disseminate a comprehensive, coherent and validated databank providing a single, authoritative

---

[105] Deharveng G., Charrondière U.R., Slimani N., Southgate D.A.T., Riboli E. (1998) Comparison of nutrients in the food composition tables available in the nine European countries participating in EPIC. *European Journal of Clinical Nutrition*, 52, 1-20.

[106] URL: http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/004/Y2657T/Y2657T00.HTM

source of food composition data in Europe for nutrients, and newly emerging bioactive compounds with positive health effects.

To enable the integration and comparison of foods in this pan-European information platform, it is necessary to harmonize existing food classification and description systems used in food composition databases, consistent with European dietary habits and needs in European intake assessments. After proposing food categorisation and description systems for the European food composition database, EuroFIR will seek to link the food categorisation and description systems used for managing food composition data with those used for managing food intake data, at different levels of aggregation. It will propose a common standard for the classification and description of foods in European food composition databases that allows for application of state-of-the-art concepts in database linking and management and their comparability as well as the comparison and interchange of food composition data.

One of the major goals of EuroFIR is the adoption of a common food categorisation and description system for managing data on nutrients, bioactive substances and contaminants in the European food composition database. Thus, in the future it will be possible to establish risk-benefit using both "negative" and "positive" components.

In order to be effective and not duplicate work, EuroFIR will evaluate and build on results of previous efforts to harmonise food description world-wide (EU COST Action 99 – Eurofoods, EFCOSUM and International Interface Standard) and using a multifaceted approach for identifying foods. It will propose a classification system corresponding to European foods and eating habits and recommendations to improve the LanguaL food description thesaurus, to render it more international and easier to use. An important challenge for the EuroFIR network will be to establish an architecture taking into account precise analytical results but also including the same results aggregated by larger categories at a level compatible for all components.

APPENDIX 1 : COMPARISON OF FOOD GROUPING SYSTEMS USED IN CONSUMPTION SURVEYS [107]

EFG Class	FAO Food Balance Sheet	WHO GEMS/FOOD	DAFNE	Eurocode 2	French survey	Dutch survey	EPIC soft
1. Bread and rolls			CEREALS AND CEREAL PRODUCTS: Bread and Rolls	6 Grains and grain products : 6.40 Leavened breads 6.44 Unleavened breads and crispbreads 6.48 Bread products	1 Bread, crispbread, rusks	2. Bread	06 CEREALS AND CEREAL PRODUCTS : 06 03 BREAD, CRISPBREAD, RUSKS
2. Breakfast cereals				6 Grains and grain products : 6.70 Breakfast cereals	2 Breakfast cereals	9. Cereals and cereal products	06 CEREALS AND CEREAL PRODUCTS : 06 04 BREAKFAST CEREALS
3. Flour	CEREALS (EXCLUDING BEER)	CEREALS	CEREALS AND CEREAL PRODUCTS : Flour	6 Grains and grain products : 6.10 Wheat basic products 6.12 Rye basic products 6.28 Substitute flours and starches			06 CEREALS AND CEREAL PRODUCTS : 06 01 FLOUR, FLAKES, STARCHES, SEMOLINA USED AS FLOUR
4. Pasta			CEREALS AND CEREAL PRODUCTS : Pasta	6 Grains and grain products : 6.30 Pasta and noodles	3 Pasta	9. Cereals and cereal products	06 CEREALS AND CEREAL PRODUCTS : 06 02 PASTA, RICE, OTHER GRAIN
5. Bakery products			CEREALS AND CEREAL PRODUCTS : Cereal and Bakery Products (grains, flour and pasta excluded)	6 Grains and grain products : 6.50 Fine bakery wares	6 Bakery products 7 Biscuits 8 Pastry	8. Pastry, cakes and biscuits	06 05 SALTY BISCUITS, APERITIF BISCUITS, CRACKERS 06 06 DOUGH AND PASTRY (PUFF, SHORT-CRUST, PIZZA) 12 CAKES
6. Rice and other cereal products	CEREALS (EXCLUDING BEER)	CEREALS	CEREALS AND CEREAL PRODUCTS : Rice and Cereals	6 Grains and grain products : 6.14 Oats basic products 6.16 Barley basic products 6.18 Maize basic products 6.20 Rice basic products 6.25 Basic products of other cereals	4 Rice and semolina 5 Other cereals	9. Cereals and cereal products	06 02 PASTA, RICE, OTHER GRAIN
7. Sugar	SUGAR CROPS SWEETENERS: SUGAR NON-CENTRIFUGAL SUGAR (RAW EQUIV) SWEETENERS, NES HONEY	SUGARS AND HONEY	SUGAR	10.10 Sugar (sucrose)	30 Sugar and products	20. Sugar, sweets, sweet spreads and sweet sauces	11 01 SUGAR, HONEY, JAM
8. Sugar products excluding chocolate			SUGAR PRODUCTS	10 Sugar, sugar products, chocolate products and confectionery	30 Sugar and products	20. Sugar, sweets, sweet spreads and sweet sauces	11 SUGAR AND CONFECTIONERY

[107] Ireland J, Erp-Baart AMJ van, Charrondiere UR, Møller A, Smithers G, Trichopoulou (2002): Selection of a food classification system and a food composition database for future food consumption surveys. *European Journal of Clinical Nutrition*, 56 Supplement 2, S33-S45.

EFG Class	FAO Food Balance Sheet	WHO GEMS/FOOD	DAFNE	Eurocode 2	French survey	Dutch survey	EPIC soft
9. Chocolate				10.50 Chocolate and chocolate products 10.55 Chocolate-coated confectionery bars	29 Chocolate	20. Sugar, sweets, sweet spreads and sweet sauces	11 02 CHOCOLATE, CANDY BARS, PASTE, CONFETTI/FLAKES
10. Vegetable oils	VEGETABLE OILS	VEGETABLE OILS AND FATS	VEGETABLE OILS: Olive oil Seed oils	5 Fats and oils : 5.60 Vegetable fats and oils	14 Vegetable oils	21. Fat, oils, mayonnaise and spicy sauces	10 01 VEGETABLE OILS 10 04 DEEP FRYING FATS
11. Margarine and lipids of mixed origin			VEGETABLE FAT: Margarine Vegetable fat (margarine excluded)	5.20 Margarine 5.30 Fat spread 5.70 Compound fats and oils	15 Margarine	21. Fat, oils, mayonnaise and spicy sauces	10 03 MARGARINES
12. Butter and animal fats	ANIMAL FATS: BUTTER, GHEE CREAM FATS, ANIMAL, RAW FISH, BODY OIL FISH, LIVER OIL	BUTTER OF COW MILK ANIMAL FATS AND OILS	BUTTER ANIMAL FAT (BUTTER EXCLUDED)	5.10 Butter 5.40 Animal fat 5.50 Marine oil	13 Butter 16 Animal fats	21. Fat, oils, mayonnaise and spicy sauces	10 02 BUTTER 10 06 OTHER ANIMAL FAT 10 05 MARINE OIL
13. Nuts	TREE NUTS OIL CROPS	NUTS AND OILSEEDS	NUTS	7 Pulses, seeds, kernels, nuts and products	27 Nuts and oleaginous grains	14. Nuts, seeds and snacks	04 02 NUTS AND SEEDS (+ NUT SPREAD)
14. Pulses	PULSES BEANS PEAS PULSES, OTHER	PULSES	PULSES	7.10 Pulses 7.60 Pulse products	25 Pulses	15. Pulses	03 LEGUMES
15. Vegetables excluding potatoes	VEGETABLES TOMATOES ONIONS VEGETABLES, OTHER	VEGETABLES	VEGETABLES : Fresh vegetables Processed vegetables	8 Vegetables and vegetable products	23 Vegetables (excluding potatoes)	10. Vegetables	02 VEGETABLES 15 03 SPICES, HERBS AND FLAVOURINGS
16. Starchy roots or potatoes	STARCHY ROOTS: POTATOES SWEET POTATOES CASSAVA YAMS ROOTS, OTHER	ROOTS AND TUBERS: CASSAVA POTATOES POTATOES, SWEET YAMS ROOTS AND TUBERS NES	POTATOES AND OTHER STARCHY ROOTS	8.34 Tubers	24 Potatoes and similar	1. Potatoes	01 POTATOES AND OTHER TUBERS
17. Fruits	FRUIT (EXCLUDING WINE)	FRUITS	FRUITS: Fresh Fruits Processed Fruits	9 Fruits and fruit products	26 Fruits 42 Cooked fruits	7. Fruit	04 FRUITS
18. Fruit juices		FRUIT JUICE NES ORANGE JUICE CONCENTRATED LEMON JUICE SINGLE-STRENGTH PINEAPPLE JUICE SINGLE-STRENGTH	FRUIT AND VEGETABLE JUICES	11.60 Fruit juices 11.64 Vegetable juices 11.68 Fruit and vegetable nectars	32 Refreshing non alcoholic beverages	5. Non alcoholic beverages	13 01 FRUIT AND VEGETABLE JUICES

EFG Class	FAO Food Balance Sheet	WHO GEMS/FOOD	DAFNE	Eurocode 2	French survey	Dutch survey	EPIC soft
19. Non alcoholic beverages			NON-ALCOHOLIC BEVERAGES: Mineral Water and Soft Drinks	11.40 Carbonated soft drinks 11.44 Non-dilution still drinks 11.48 Dilution drinks 11.56 Water	32 Refreshing non alcoholic beverages 31 Water	5. Non alcoholic beverages	13 02 CARBONATED/SOFT/ISOTONIC DRINKS, DILUTED SYRUPS 13 04 WATERS
20. Coffee, tea, cocoa powder	STIMULANTS: COFFEE COCOA BEANS TEA	STIMULANTS: CHICORY ROOTS COCOA COFFEE GINGER, ROOT TEA	NON-ALCOHOLIC BEVERAGES: Stimulants: Coffee Tea and Infusions Cocoa	11.52 Infusion drinks	34 Coffee 35 Hot beverages	5. Non alcoholic beverages	13 03 COFFEE, TEA AND HERBAL TEAS
21. Beer	BARLEY BEER		ALCOHOLIC BEVERAGES: Beer	11.10 Beers and malt beverages	33 Alcoholic beverages	4. Alcoholic beverages	14 03 BEER, CIDER
22. Wine	WINE		ALCOHOLIC BEVERAGES: Wine	11.20 Wines 11.24 Fortified and liqueur wines	33 Alcoholic beverages	4. Alcoholic beverages	14 01 WINE 14 02 FORTIFIED WINES (SHERRY, PORTO, VERMOUTH…)
23. Other alcoholic beverages	BEVERAGES, ALCOHOLIC ALCOHOLIC BEVERAGES, MISCELLANEOUS		ALCOHOLIC BEVERAGES: Spirits	11.15 Ciders, perries and similar drinks 11.28 Liqueurs 11.30 Spirits 11.35 Alcoholic mixed drinks	33 Alcoholic beverages	4. Alcoholic beverages	14 03 BEER, CIDER 14 04 SPIRITS, BRANDY 14 05 ANISEED DRINKS (PASTIS…) 14 06 LIQUEURS 14 07 COCKTAILS, PUNCHES
24. Red meat and meat products	BOVINE MEAT MUTTON/GOAT MEAT PIG MEAT OTHER MEAT	ASSES MEAT BEEF AND VEAL BEEF CANNED/DRIED SALT SMOKED BUFFALO MEAT CAMEL MEAT CATTLE MEAT GAME MEAT HORSEMEAT MEAT (MAMMALIAN) MEAT (CATTLE, GOAT, HORSE, PIG, SHEEP) MUTTON AND LAMB PIG MEAT RABBIT MEAT	MEAT AND MEAT PRODUCTS : Red Meat (fresh and frozen) Pork meat Beef, veal and calf meat Red meat, other than pork or veal Canned Meat and Meat Products Meat Dishes	3 Meat and meat products : 3.10 Beef, carcass meat 3.15 Veal, carcass meat 3.20 Pork / piglet, carcass meat 3.25 Mutton / lamb, carcass meat 3.29 Mammals, other 3.50 Preserved meats 3.60 Meat products 3.65 Meat dishes	17 Red meat 20 Processed meats	23. Meat, meat products and poultry	07 01 01 BEEF 07 01 02 VEAL 07 01 03 PORK 07 01 04 MUTTON/LAMB 07 01 05 HORSE 07 01 06 GOAT 07 02 05 RABBIT (DOMESTIC) 07 03 GAME 07 04 PROCESSED MEAT
25. Poultry and poultry products	POULTRY MEAT	CHICKEN MEAT DUCK MEAT, GAME MEAT GOOSE MEAT POULTRY MEAT TURKEY MEAT	MEAT AND MEAT PRODUCTS: Poultry (fresh and frozen)	3.30 Chicken 3.32 Turkey 3.39 Birds, other	18 Poultry and game	23. Meat, meat products and poultry	07 02 POULTRY 07 03 GAME 07 04 PROCESSED MEAT

EFG Class	FAO Food Balance Sheet	WHO GEMS/FOOD	DAFNE	Eurocode 2	French survey	Dutch survey	EPIC soft
26. Offals	OFFALS	CATTLE, KIDNEY CATTLE LIVER CHICKEN LIVER EDIBLE OFFAL (MAMMALIAN) OFFALS (CATTLE, GOAT, HORSE, PIG, SHEEP) POULTRY OFFAL	MEAT AND MEAT PRODUCTS : Offals (fresh and frozen)	3.40 Liver 3.42 Kidney 3.49 Other offal	19 Offals	23. Meat, meat products and poultry	07 05 OFFALS
27. Fish and seafood	FISH AND SEA FOOD	FISH AND SEA FOOD	FISH AND SEAFOOD	4 Fish and fish products	21 Fish 22 Crustaceans and molluscs	22. Fish	08 FISH AND SHELLFISH
28. Eggs	EGGS	EGGS	EGGS	2 Egg and egg products	12 Eggs and products	6. Eggs	09 EGGS AND EGG PRODUCTS
29. Milk	MILK (EXCL. BUTTER)	MILK AND MILK PRODUCTS	MILK AND MILK PRODUCTS: Milk	1 Milk and milk products 1.10 Liquid milks 1.15 Processed milks	9 Milk	13. Milk and milk products	05 01 MILK 05 02 MILK BEVERAGES 05 07 DAIRY AND NON DAIRY CREAMS 05 08 MILK FOR COFFEE AND CREAMERS
30. Cheese		CHEESE (SKIM COW MILK) CHEESE (WHOLE COW MILK)	MILK AND MILK PRODUCTS: Cheese	1.40 Cheese	11 Cheese	12. Cheese	05 05 CHEESES (INCLUDING FRESH CHEESES)
31. Other milk products			MILK AND MILK PRODUCTS: Milk products	1.30 Yoghurt 1.35 Other fermented milk products 1.70 Ices	10 Fresh milk products 28 Ice cream 41 Desserts	13. Milk and milk products	05 03 YOGHURT 05 04 FROMAGE BLANC, PETITS SUISSES 05 06 CREAM DESSERTS, PUDDINGS (MILK BASED) 11 05 01 ICE CREAM
32. Miscellaneous foods	SPICES	SPICES	MISCELLANEOUS FOODS	12 Miscellaneous, soups, sauces, snacks and products	36 Pizzas, quiches and savoury pastries 37 Sandwiches, snacks 38 Soups 39 Mixed dishes 40 Entrées 41 Desserts 43 Condiments and sauces	3. Other 11. Savoury sandwich spread 14. Nuts, seeds and snacks 16. Preparations 17. Mixed dishes 18. Soups 19. Soy products 21. Fat, oils, mayonnaise and spicy sauces	15 CONDIMENTS AND SAUCES 16 SOUPS, BOUILLON 17 03 SNACKS
33. Products for special nutritional use				13 Products for special nutritional use	44 Foods for special nutritional use	16.Preparations	17 02 DIETETIC PRODUCTS