Guidelines for food classification and description in food databases

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Food identification

- Shortcomings of natural language
  - *Strawberry? Gooseberry?*
  - *Eggplant? Grapefruit? Headcheese? Mincemeat pie?*
  - *Sweetmeat? Sweetbread?*
- Methods of food identification
  - Classify foods in “universal” categories
  - Add food description to foods in a database

Comparison of major food groups used in composition tables

FAO food tables	British food tables	Pacific Islands
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

Food classification systems (1)

- Codex Alimentarius Food Standards
  - **Advantages**
    - Includes standards for important foods
    - Deals with foods as marketed
  - **Disadvantages**
    - Not a classification system
    - Does not cover all foods

Food classification systems (2)

- CIAA Food Categorization System
- Codex Food Categorization System
  - **Advantages**
    - Serve as allocation tools for food additives
    - Deal with foods as marketed
  - **Disadvantages**
    - Food additive driven
    - Emphasis on processed foods
    - Do not cover all prepared dishes

Food classification systems (3)

- Codex Classification of Food and Animal Feed Commodities (CCPR)
- Codex General Standard for Contaminants and Toxins in Foods (GSC)
  - **Advantages**
    - Lists food commodities in trade
  - **Disadvantages**
    - Based on pesticide residues or contaminants
    - Only foods important in trade

Food classification systems (4)

- Harmonized Commodity Description and Coding System
  - **Advantages**
    - Used used for international trade
    - Implemented in all countries
  - **Disadvantages**
    - Single, unprocessed foods
    - Not used in the context of food composition data

Food classification systems (5)

- Food Balance Sheets
- Household Budget Surveys
  - Harmonised set of data for all member states
  - Commodities in broadly defined food groups
- Other
  - Eurocode 2
  - Classification of Foods and Physical Properties

Eurofoods 2 classification
http://www.ifse.dk/eurocode/

1. Milk and milk products
    - 1.1 Milk
    - 1.2 Cream
    - 1.3 Kefir
    - 1.4 Yoghurt
    - 1.5 Whey
    - 1.6 Other fermented milk products
    - 1.7 Cheese
    - 1.8 Cheese substitutes
    - 1.9 Ice cream
    - 1.10 Milk and milk products for dietetic use
2. Egg and egg products
3. Meat and meat products
4. Fish, molluscs, reptiles, crustaceans and their products
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

Euro-Food Groups (EFG) classification

- Cost Action 99/Eurofoods & EFCOSUM Project*
- Food description and classification for international comparisons of food consumption and food availability surveys
- based on :
  - FAO Food Balance Sheet,
  - WHO GEMS/FOODS regional diets,
  - DAFNE classification system for Household Budget Survey (HBS)
  - Eurocode 2 classification
  - National French, Dutch and British food consumption surveys
- Resulting 33 food groups chosen as the "least common denominators"

*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	EFG class
1	Bread and rolls
2	Breakfast cereals
3	Flour
4	Pasta
5	Bakery products
6	Rice and other cereal products
7	Sugar
8	Sugar products excluding chocolate
9	Chocolate
10	Vegetable oils
11	Margarine and lipids of mixed origin
12	Butter and animal fats
13	Nuts
14	Pulses
15	Vegetables excluding potatoes
16	Starchy roots or potatoes
17	Fruits
18	Fruit juices
19	Non alcoholic beverages
20	Coffee, tea, cocoa powder
21	Beer
22	Wine
23	Other alcoholic beverages
24	Red meat and meat products
25	Poultry and poultry products
26	Offals
27	Fish and seafood
28	Eggs
29	Milk
30	Cheese
31	Other milk products
32	Miscellaneous foods
33	Products for special nutritional use

Food classification systems (6)

- Advantages
  - Designed by and for people who know the foods involved
  - Can be used to classify and/or aggregate foods
- Disadvantages
  - Information needed by outside users often absent
  - Food codes not specific or detailed enough to replace national codes in food composition or consumption databases

Food Classification Systems: conclusions

- **Conclusions**
  - **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.**
  - **Although some people always want to have a universal classification system, there is no single classification system that can serve all the needs of every food composition database compiler**

Food description systems (1)

- LanguaL Thesaurus
  - **Advantages**
    - Multilingual faceted thesaurus
    - Language-independent (underlying code)
    - Suitable for use in numerical databases
    - http://www.langual.org
  - **Disadvantages**
    - Missing terms
    - Needs software

LanguaL thesaurus (1)

CHARACTERISTIC	FACET
FOOD GROUP	**A. Product Type** Derived from a combination of consumption, functional, manufacturing and legal characteristics Includes Codex Alimentarius Classification for Food and Feeds and other Codex classifications
FOOD ORIGIN	**B. Food Source** Species of plant or animal, or chemical food source
	C. Part of Plant or Animal
PHYSICAL ATTRIBUTES	**E. Physical State, Shape or Form** Ex.: Liquid, semiliquid, solid, whole natural shape, divided into pieces
PROCESSING	**F. Extent of Heat Treatment**
	G. Cooking method Cooked by dry or moist heat; cooked with fat; cooked by microwave
	H. Treatment Applied Additional processing steps, including adding, substituting, or removing components
	J. Preservation Method Primary preservation method
PACKAGING	**K. Packing Medium**
	M. Container or Wrapping Container material, form, and possibly other characteristics
	N. Food Contact The surface(s) with which the food is in contact
DIETARY USES	**P. Consumer Group/Dietary use** Human or animal; special dietary characteristics
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

Food description systems (2)

- INFOODS/Truswell System
  - **Advantages**
    - Exchange of data between data sources and compilers of food composition databases
    - Faceted description designed to capture all available information
    - Description in free text ⇨ detailed information
  - **Disadvantages**
    - Natural language
    - Lacks thesauri

INFOODS Guidelines (1)

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 *

Food description systems (3)

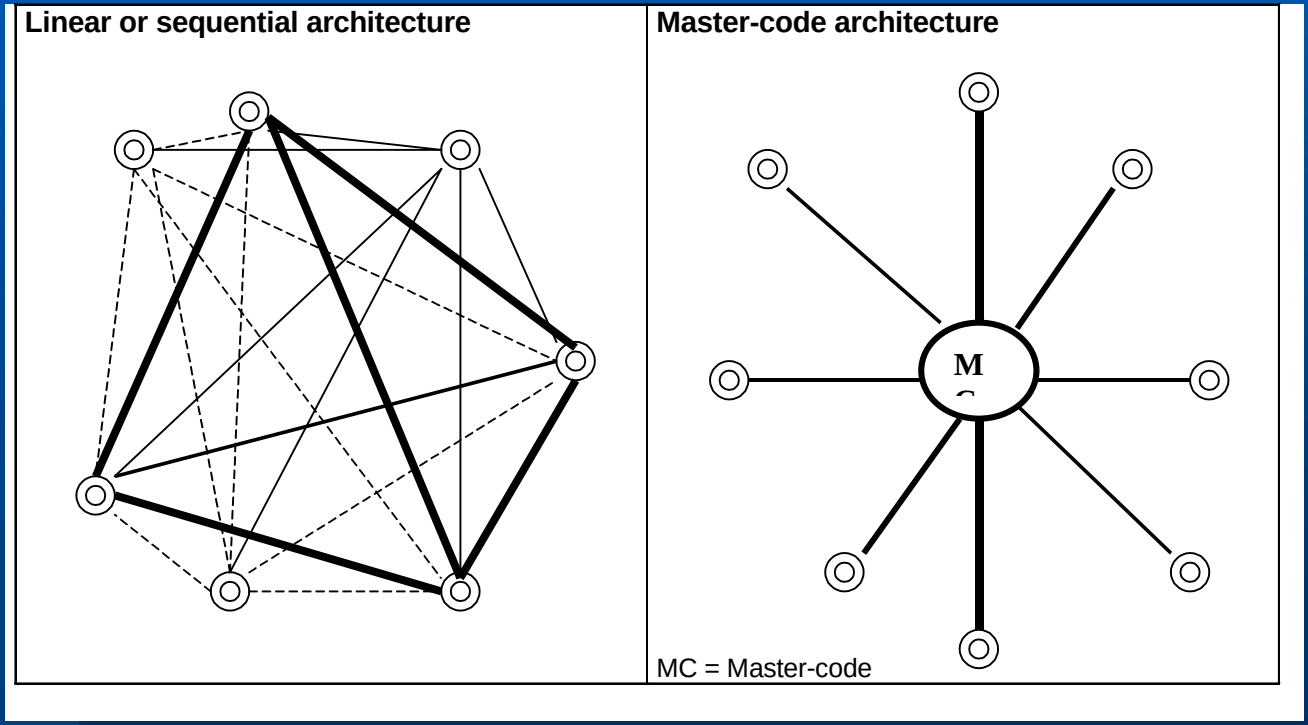
- Comparison of food description systems
  - **LanguaL thesaurus**
    - Well-defined terms
    - Language and culture independent
    - Maintenance of thesaurus
  - **INFOODS/Truswell system**
    - Free text
    - “Friendliness” to data compilers
    - “Local usefulness” for users of food data
    - Practical, in-the-field system

Harmonised food identification (1)

- 2nd IFDC Workshop on “Food description, nomenclature and terminology”
  - Encompass several complementary schemes
  - Structured food identification
  - Robust to accommodate different languages
  - Flexible for use by all users and for all types of foods
  - Specific enough to avoid misclassification
  - Adequately documented
  - Internationally acceptable

Mapping systems

- Create links between food identification systems, by “mapping” one system to another
- Architecture for code translation systems:



FDA "International Interface Standard": 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)

Eurofoods Properties for Food Description

Property Name	Property ID	Data Type	Prio	Scope Note
Source	SOURCEID	FKY	M	Link to the data source
Food Name and Identification				
Food Name	FOODNAME	{STR}	M	
Original Food Code	ORIGFDCD	{STR}	R	.
Original Food Group Code	ORIGGPCD	{STR}	R	.
Standard Classifications			M	.
Product Type	PRODTYPE	{THS}	R	LanguaL facet A.
CODEX Food Standards	CDXFDSTD	THS	O	.
CODEX Food Categorization System for the General Standards for Food Additives	CDXFDADD	{THS}	O	
FAO Food Balance Sheet Classification	FAOFBS	THS	O	
CIAA Food Categorization	CIAA	{THS}	R	
Eurocode2	EC2	{THS}	R	
Genera lDescription				
Manufacturer	MANUFACT	{FKY}	R	Link to Organisation table
Food Source	FOODSRCE	THS	R	LanguaL facet B
Agricultural Production Conditions	AGRICOND	{MEM}	O	Brief description.
Specific Image	SPCIMAGE	{FIL}	R	file names of specific images
Part of Plant or Animal	PARTPLAN	THS	R	LanguaL facet C].
Nature of Waste	NATWASTE	{STR}	R	
Extent of Heat Treatment	HEATREAT	THS	R	LanguaL facet F].
Treatment Applied	TREATAPP	{THS}	R	LanguaL facet H].
Cooking Method	COOKMETH	{THS}	R	LanguaL facet G].

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Example of Food Description Table

ENTITYID	PROPID	VALUE	MEMO	LANG	PREF	REMARKS
...						
336	SOURCEID	1			1	
336	ORIGFDCD	11008			1	
336	ORIGGPCD	26			1	
336	FOODNAME	Ketchup		fr	1	
336	FOODNAME	Tomato ketchup		en	1	
336	PRODTYPE	A0286			1	
336	FOODSRC	B1276			1	
336	IMAGE	KETCHUP.JPG			1	
336	PARTPLAN	C0138			1	
336	PHYSTATE	E0135			1	
336	HEATREAT	F14			1	
336	TREATAPP	H0136			1	
336	TREATAPP	H0151			1	
336	TREATAPP	H0227			1	
336	COOKMETH	G0001			1	
336	PRESMETH	J0001			1	
336	PACKMED	K0003			1	
336	FDCTSRFC	N0001			1	
336	CONTWRPG	M0001			1	
336	LBLCLAIM	P0024			1	
337	SOURCEID	1			1	
337	ORIGFDCD	11009			1	
337	ORIGGPCD	26			1	
337	FOODNAME	Levure alimentaire		fr	1	
337	FOODNAME	Yeast, brewer's		en	1	
...						

Harmonised food identification (2)

- FDA *"International Interface Standard"*
  - Encompass several complementary schemes
  - Not internationally accepted
- COST Action 99 *"Recommendations for Food DB Management & Data Interchange"*
  - More detail than the INFOODS Guidelines
  - More homogeneous structure than IIS
  - Free text and standardised thesauri