FAO/INFOODS Food Composition Database for Biodiversity

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Outline

- Introduction
- Description of the database
- Future plans
- Conclusion

Definition

Food biodiversity: the diversity of plants, animals and other organisms used for food, covering the genetic resources within species, between species and provided by ecosystems

Schema of taxonomic names

Schema	Plant – example	Plant – example	Fish - example	Animal – example
Family	*Rosaceae*– Rose family	*Poaceae*– Grass family	*Pleuronectidae*	*Bovidae Caprinae*
Genus	*Prunus* L. – plum	*Triticum* L. – wheat	*Platichthys*	*Ovis*
Species	*Prunus domestica* L. – European plum	*Triticum aestivum* L. – common wheat	*Platichthys flesus* (Linnaeus, 1758)	*Ovis aries* – sheep
Subspecies	*Prunus domestica* L. subsp. *domestica*			(rarely used)
Variety Cultivar Breed	*Prunus domestica* L. var. *domestica* – European plum *Prunus domestica* 'Cacak's Beauty'	*Triticum aestivum* 'Pioneer 2163'	*Platichthys flesus* var. *marmorata* Nordmann, 1840 - European flounder	Suffolk

Biodiversity & Nutrition Rationale

- Wild species and intraspecies biodiversity have key roles in global food security
- Different varieties have statistically different nutrient contents
- Nutrient content needs to be among criteria in cultivar promotion
- Knowledge on nutrient data on existing biodiversity needs to be a prerequisite for decision-making in GMO work
- Knowledge on nutrient data and intake data of varieties is essential in order to understand the impact of biodiversity on food security

→investigate and disseminate the nutrient and non-nutrient composition of wild foods and of foods at cultivar level

→include biodiversity questions and/or prompts in food consumption surveys

Differences in food composition

	Protein g	Fibre g	Iron mg	Vitamin C mg	Beta-Carotenes mcg
Rice	5.6 - 14.6		0.7 - 6.4		
Cassava	0.7-6.4	0.9-1.5	0.9-2.5	25-34	*<5-790*
Potato	1.4-2.9	1-2.23	0.3-2.7	6.4-36.9	1-7.7
Sweet potato	1.3-2.1	0.7-3.9	0.6-14	2.4-35	100-23100
Taro	1.1-3	2.1-3.8	0.6-3.6	0-15	5-2040
Eggplant		9 - 19		50 - 129	
Mango	0.3 - 1.0	1.3-3.8	0.4-2.8	22-110	20 – 4320
GAC					6180 – 13720
Apricot	0.8-1.4	1.7-2.5	0.3-0.9	3.5-16.5	200-6939 (beta carotene equivalent)
Banana			0.1-1.6	2.5-17.5	<1 – 8500

Impact of food biodiversity on dietary adequacy

Protein content	Protein content (g/100 g)	Cassava intake in Congo g/d/p	Part of the RDI for protein covered by cassava intake, in %
Average	3.24	286	20.6
Minimum	0.95	286	6.0
Maximum	6.42	286	40.8

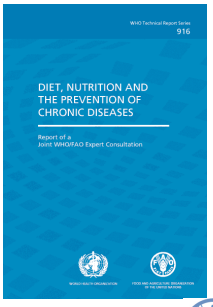
Banana	β-carotene content in mcg/100 g	Banana intake in Philippines in g/d/p	Vitamin A intake through banana in mcg RE/d/p	RDI for vitamin A covered by banana intake, in %
USDA	26	93	4	0.7
Lacatan	360	93	56	9.3
Utin Iap	8508	93	1318.7	219.8

The double burden of malnutrition

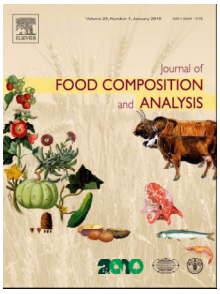
Food composition data form the basis by which dietary adequacy is assessed – both under- and overnutrition.

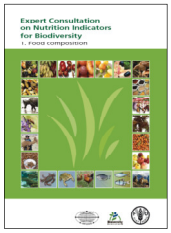
Food composition data are the fundamental information by which dietary intake goals can be established and achieved.

The importance of wild and underutilized species and of different foods varieties to food security – relevant to both the health and agriculture sectors – will only be realized when more data are available on composition and intake.



Improving the Evidence





Food Composition Database for Biodiversity - Objective

To provide analytical data on the composition of foods at the level of food biodiversity free-of-charge to any professional in need of such data enabling them to:

- include more food biodiversity data into national and regional FCDB
- study the contribution of food biodiversity to nutrition (e.g. adequacy) and food security
- select foods with an interesting nutrient profile for increased agricultural research and production, and for nutrition education
- provide alternatives for food fortification or supplementation

Compilation

- Using the FAO/INFOODS Compilation Tool after adaptation (e.g. new fields and nutrient profile adapted according to food group)
- INFOODS tagnames
- data from the scientific literature (mostly) and from unpublished sources (rarely)
- Data entry by FAO (interns, volunteers, consultants) or by researchers providing additionally a paper, lab report and/or other documentation
- Any data owner or data compiler are welcomed to contribute data (their name will be included in list of data provider), also of 'orphan data' (e.g. with n=1)

Compilation - structure

- As Excel file
- Database contains only analytical data without value estimations (except sometimes for unit change)
- 182 components (macronutrients, vitamins, minerals and heavy metals, phytoestrogenes, FA, AA)
- Foods as defined under food biodiversity with at least one component:
  - at variety/ cultivar/ breed level for common foods
  - species level for wild/ indigenous/ underutilized foods
- together with
  - bibliographic reference
  - country, region, season, other specification
  - food name in own language and English
  - scientific name incl. cultivar/variety/breed name
  - sample size
  - initials of compiler
  - additional comment if relevant
  - value documentation and sampling information (not done)
  - quality index (not done)

Compilation - problems

- Funding to pay data collection and entry at FAO
- Quality of data description and presentation in scientific papers (bad description of foods, methods, expression, nutrients or units
  => ca. 30% of articles not usable or only with assumptions and estimations)
- Option to either enter more data or add systematically data evaluation code. Option 1 was chosen and real bad articles were excluded

Content

- 01 cereals (28)
- 02 starchy roots and tubers (25 + 200)
- 0201 potatoes (1512)
- 03 legumes (22)
- 04 nuts and seeds (28)
- 05 vegetables (30 + 500)
- 06 fruits (314 + 300)
- 07 meat and poultry (0)
- 0701 insects 0)
- 08 eggs (0)
- 09 fish and shellfish (0 + 3000)
- 10 milk (442)
- 11 herbs and spices (0)
- 12 miscellaneous (0)

Version 1.0 (December 2010) had about 2400 food entries
Version 1.1 (September 2011) has about 2600 food entries
Version 2.0 (December 2011) is expected to have 6400 food entries

Publication

- Database can be downloaded from the INFOODS website
  http://www.fao.org/infoods/biodiversity/index_en.stm
- Version 1.0 launched in December 2010, version 1.1 published in September 2011, version 2.0 planned for December 2011 and a yearly release thereafter

Scientific articles on nutrient variations and biodiversity

- Burlingame, B., Mouillé, B., Charrondière, R. (2011). Nutrients, bioactive non-nutrients and anti-nutrients in potatoes. *Journal of Food Composition and Analysis*, 22 (6), pp. 494-502.
- Stadlmayr, B., Nilson, E., Charrondiere, U.R., Medhammer, E., Mouille, B., Burlingame, B. (2011). Nutritional Indicator Biodiversity for Food Composition - A report on the progress of data availability. *Journal of Food Composition and Analysis*, 24 (4-5), 692-69.
- Olango, T.M., Stadlmayr, B., Charrondiere, U. R. (2011). Diversity in Nutrient Composition of Underutilised Root and Tuber Crops. Submitted to *Acta Horticulturae*.
- Medhammer, E., Wijesinha-Bettoni, R., Stadlmayr, B., Nilsson, E., Charrondiere, U. R., Burlingame, B. (2011). Composition of milk from minor dairy animals and buffalo breeds: a biodiversity perspective. Accepted in *Journal of the Science of Food and Agriculture*.

Future plans

- Enter more data: additional data for fish, fruits and vegetables are already foreseen in FAO
- Search for additional funds to enter data at FAO
- Motivate others to provide data and/or data sources
- Send letter to the editors of scientific journals with suggested improvements to be able to use more data from articles for databases
- Publicize the database widely, e.g. conferences, biodiversity meetings etc
- Write scientific articles on nutrient variations and on database development

Conclusion

- The FAO/INFOODS FCDB for Biodiversity is a global repository of analytical data on food biodiversity of acceptable data quality. It will be an essential tool in the investigation and promotion of the sustainable use of food biodiversity and when mainstreaming food biodiversity into nutrition.

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Data entry

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