Capacity development in food composition through distance learning and formal education

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Outline

- Introduction
- Food composition Study Guide
  - General information
  - Use in food composition courses
  - Use in university curricula
- Conclusion

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October 1-3, 2009

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Shift in learning

Face to Face (teacher-driven)
On Food composition
- 550 professionals trained in courses since 1992
- limited coverage in formal training

Distance Education
(student-driven)
-Increasingly used in formal training (e.g. universities) and on-the job training
- does not exist yet for food composition
-only means for many to obtain knowledge

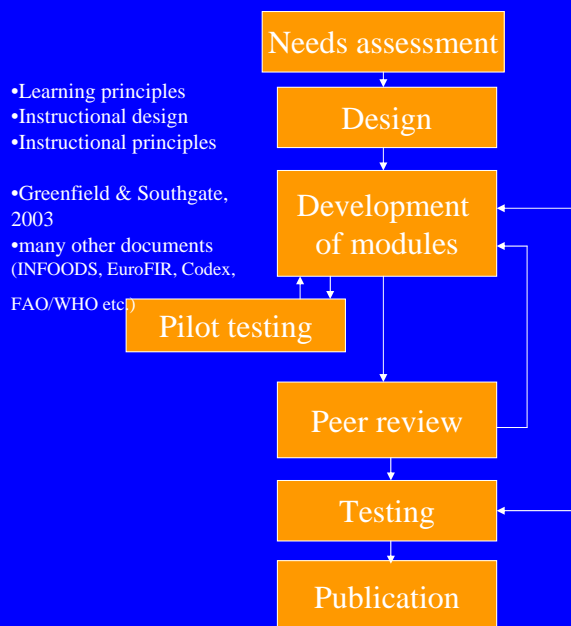# ➔ Food Composition Study Guide developed by FAO/INFOODS

Objectives

- To reach a wider audience cost-effectively, which otherwise would never be served
- To assist learners to fill their specific knowledge gaps and assess their knowledge acquisition
- To assist learners to perform better when generating, managing or using food composition data
- To assist teachers to prepare lessons and test students

Target Population

- self-learners, FoodComp courses, universities: compilers and users and also analysts; teachers and students

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Development of the Food Composition Study Guide

Needs assessment → Design → Development of modules → Pilot testing → Peer review → Testing → Publication

- Learning principles
- Instructional design
- Instructional principles

- Greenfield & Southgate, 2003
- many other documents (INFOODS, EuroFIR, Codex, FAO/WHO etc)

Nr.	17 modules	Relevant for compilers/ users	Relevant for analysts
1	Basic principles of a food composition programme	•••••	••
2	Use of food composition data	•••••	••
3	Selection and nomenclature of foods in food composition databases	•••••	••
4	Components in food composition databases		
4.a	Component selection	•••••	•
4.b	Component nomenclature	•••••	•••••
4.c	Component conventions and units	•••••	•••••
4.d	Methods of analysing components	••	•••••
5	Sampling	•••••	•••••
6	Quality aspects of analytical data	••	•••••
7	Resources concerning food composition and publishing food composition information	•••••	••
8	Calculations of missing data and recipes	•••••	•
9	Database management systems, metadata and data interchange	•••••	•
10	Compilation and documentation	•••••	•
10.a	Additional exercises on comparing and compiling data from other food composition databases	•••••	
10.b	Additional exercises on translating food intake to nutrient intake	•••••	
11	Quality considerations in data compilation	•••••	••
12	Biodiversity	••••	

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17 modules

Cover all areas of food composition and include biodiversity

Structure of each module

(1) Learning objectives

(2) Required reading, exercise material, resources, relevance for compilers/professional users or analysts, estimated time

(3) Questions (mostly closed questions)

(4) Exercises

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(5) Answers to questions

(6) Expected answers to the exercises

(7) General feedback using self rating

Questions and exercises according to
Bloom's taxonomy of cognitive objectives

1. Knowledge
   – Define
   – Match
   – List
2. Comprehension
   – True/false
   – Describe
   – Explain
   – Indicate
3. Application
   – Select/ choose
   – Apply formula, criteria or instructions
   – Internet search: find
   – Match concepts
   – Interpret

4. Analysis
   – Categorize
   – Calculate
   – Compare
5. Synthesis
   – Prioritize
   – Organize
   – Arrange
   – Improve
   – Collect
   – Construct
   – Propose
6. Evaluation
   – Rate

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Example of a question (1)

IVc.Q6 Is it advisable to copy energy values from one food composition data source to another? Select the correct response. (1 point)
Answer:

	Copy energy values
	Yes, because all food composition databases use the same energy conversion factors.
	No, because all food composition databases use the same energy conversion factors and may have different macronutrient values.
x	No, because food composition databases may use different energy conversion factors and may have different macronutrient values.

For your information:
The energy values to be published should always be calculated within the own food composition database. They should never be copied from other sources (except for comparison) because the different energy calculation systems used in the different sources can have a significant impact on the energy value. This is the golden rule about generating energy values in a food composition database.

Examples of a question (2)

III.Q5 Food groups are defined differently in different countries and regions. Name nine generally accepted or widely-used food groups. (4.5 points – ½ point for each correct response)
Answer (see pp. 36-39):
You should have listed nine of the following 13 most used food groups:
- Cereals and cereal products
- Starchy roots and tubers and their products
- Legumes and their products
- Vegetables and their products
- Fruits and their products
- Sugar, sweets and syrup
- Meat and poultry and their products
- Eggs and their products
- Fish and their products
- Milk and their products
- Fat and oils
- Beverages
- Miscellaneous

For your information:
Many food composition databases also use subgroups, e.g. for cereals and their products:
Grains and flours; Breads; Pasta; Prepared foods; Tortillas; Sweet biscuits; Savoury biscuits; Cakes; Doughs; Crispbread; Breakfast cereals
Food groups are often merged into one if only few foods of several food groups are consumed, e.g. 'meat, poultry, fish and their products'. Other countries add specific food groups because of the high consumption or importance of specific foods in their diet, such as coconut products in the Pacific Islands.

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Example of an exercise (1)

Expenses	US$
Salary per compiler per year (producing data for 200 calculated/ borrowed foods and for 20 analysed foods)	20,000
Cost per food analysis if outsourced, analysed in duplicate: - of main nutrients (macronutrients, minerals, selected vitamins) - of macronutrients (water, ash, AOAC dietary fibre, protein, fat, ash) - of fatty acid profile - of amino acid profile - of minerals (ICP-MS method for 22 elements) - per vitamin	1,000 300 150 100 200 100
Sampling cost for all food samples for one food (including collection, purchase and transportation of several representative food samples collected in accordance with the sampling plan)	500
Running costs of a laboratory per year (rent, salaries, chemicals, etc.)	40,000
Purchase of essential laboratory equipment	100,000
Purchase of computer and basic software	3,000
Cost of food composition database management system	10,000
Cost of purchasing other food composition databases and tables	1,000
Expert consultant costs per week	1,000
Cost of one meeting with steering committee	500
Publication costs (printing of 1,000 copies, website, dissemination)	3,000
Cost of meeting to launch user database	1,000
Cost of participating in the International Food Data Conference	2,000
Cost of participating in a regional INFOODS meeting	1,000
Cost per participant in food composition course	5,000
Use of distance learning tool 'Food Composition Study Guide' to increase knowledge on food composition	0
Annual running costs (telephone, photocopying, electricity, office administration, etc.)	5,000
Possible income	
Price per printed food composition table	20

Example of an exercise (2)

III.E1 Match the foods from the sample survey below with the foods found in the food composition table, also given below. In some cases, several foods from the food composition table can be matched to a single food in the survey, e.g. tea with milk and sugar = 1 + 2 + 3. (10 points: 1 point for each correct response)

Foods from the food consumption survey:
- a. Tea with milk and sugar
- b. Pork chop, grilled, the visible fat not consumed
- c. Chicken breast, roasted, skin not consumed
- d. Tomato, grilled
- e. Aubergine (eggplant), fried in olive oil
- f. Rice, red, fried
- g. Rice, white, boiled
- h. Mutton in sauce
- i. Mixed vegetables, boiled
- j. Mango, dark orange flesh, very ripe
- l. Mars bar

Foods found in the national food composition table:
- 1. Tea
- 2. Sugar
- 3. Low-fat milk
- 4. Standard milk
- 5. Fortified semi-skimmed milk
- 6. Milk powder, full fat
- 7. Pork, lean
- 8. Pork, medium
- 9. Pork, fat
- 10. Chicken
- 11. Chicken, dark meat
- 12. Chicken, light meat
- 13. Chicken, grilled
- 14. Chicken, grilled, bones in
- 15. Mutton, fat
- 17. Tomato
- 18. Aubergine (eggplant)
- 19. Vegetable oil
- 20. Rice
- 21. Rice, boiled
- 22. Spinach
- 23. Carrot
- 24. Mango
- 25. Tap water
- 26. Chocolate bar

Dissemination

→**2 volumes**: Questions and exercises, and Answers

→**Published** in English (French and Spanish to follow in 2010)

  → on INFOODS website
    http://www.fao.org/infoods/publications_en.stm

  → as printed workbooks

  → CD

Compilation tool developed

A Compilation tool needed to be developed to allow learners to exercise and understand:

- Component identification
- Recipe calculation
- Documentation
- Compilation

→in Excel, as more learners know Excel than sql or Access

→At http://www.fao.org/infoods/software_en.stm

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Use in food composition courses

- Bratislava in 2008: Module 12
- Iran in 2008: Modules 1-4c, 5
- Benin and Ghana in 2009: all modules

→different applications:
  - used in courses: participants completed during the course
  - certain modules as prerequisites before the course
  - as basis to prepare lectures
  - as basis for test

Feedback on modules

- backbone of course
- allowed reinforcement of lectures and gave new knowledge
- learned a lot
- facilitated understanding and immediate application of the new knowledge
- gives in-depth understanding of the course
- offered practical hands-on exercises
- great to assess own understanding
- created discussions through which participants better understood the issues

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Use in University of Vienna (1)

Seminar on 'Correct Use of food composition data' in 2008 together with Heinz Freisling as part of curricula in nutrition

- three days course (food and component nomenclature, compilation, recipe calculation, quality considerations)
- 15 participants (doctorate, diploma, master)
- all lectures were followed by practical exercises
  - selection of components
  - match foods from Austrian FFQ questionnaire to OELS foods
  - define tagnames of OELS
  - compile data into Compilation tool
- used modules 4a-4c of the Study Guide as homework and some exercises during course

Use in University of Vienna (2)

- between initial and final test, students improved significantly (by 2.8 marks out of 5)
- they learned a lot through modules and other applications (FFQ, OELS, compilation)
- students appreciated course even though it was very intense

→ Food composition courses in universities are cost-effective knowledge transfer to future professionals
→ If based on Study Guide
  → standardized content
  → good basis to prepare lectures and tests

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Survey in universities on nutrition in Europe in 2009

Number of universities

- contacted: 215
- replied: 34 (16%)
- food composition in curricula at various degrees: 25
- interested in using Study Guide in curricula : 15 yes and 9 perhaps

Future applications

As distance learning package

- in universities (Europe, Australia, Africa, etc) 2009-2010
- as an e-food composition course – with or without facilitator
- with self-learning professionals already working in food composition area or intending to do so

In classroom

- in conjunction with food composition courses
- in universities

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Conclusion

- Reaching a wide audience cost-effectively in 3 languages (English, French and Spanish)
- Students can choose modules of interest, time, place and repeat if necessary
- Comprehensive and standardized content
- Various applications (self-learners, universities, FoodComp courses)
- Excellent feed-back from users, especially on deepening understanding, application of knowledge, and gain of self-confidence

➔ And first tool to allow universities to teach food composition easily, comprehensively and in a standardized way

Acknowledgement (1)

Course preparation
- inputs from Marie Luccioni, Edouard Oddo, Enrica Biondi, Prapasri Puwastien

Cover
- Oman Bolbol

Testing
- Natasha Danster, Renee Sobolewski, Nino dePablo, T. Longvah, Rekia Belahsen, Beatrice Mouille, Annalisa Sivieri, participants of courses in Bratislava, Iran, Vienna, Benin, Ghana.

Foreword
- Nevin Scrimshaw

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Acknowledgement (2)

Peer reviewers

Gary Beecher, Rakesh Bhardwaj, Carol Byrd-Bredbenner, Isabel Castanheira, Paolo Colombani, Roger Djoule, Marie Claude Dop, Lois Englberger, Nino dePablo, Jean Francois Hausman, David Haytowitz, Venkatesh Iyenger, Paul Hulshof, Jehangir Khan Khali, John Klensin, Harriet Kuhnlein, T. Longvah, Alison Paul, Pamela Pehrsson, Jean Pennington, Janka Porubska, Prapasri Puwastien, Hettie Schönfeldt, Louwrens Smit, Ian Unwin, Ana Vasquez-Caicedo, Elizabete Wenzel.
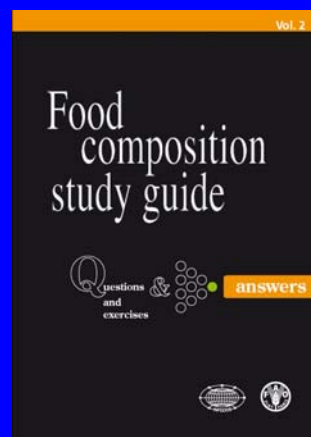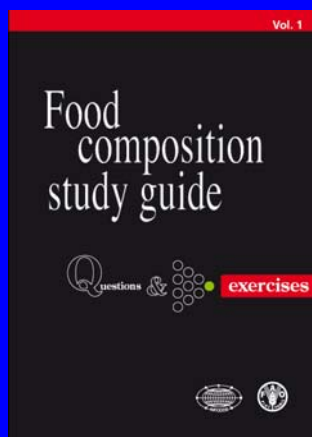

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