Report of the pre-conference meeting between EuroFIR and INFOODS on component nomenclature held in Bangkok, Thailand, on 30 September 2009

I. Summary

During a satelite meeting to the 8th International Food Data Conference, 16 participants from INFOODS and EuroFIR discussed possibilities and needs for harmonization of the component identification systems of the two organisations[1], i.e. INFOODS the component identifiers and the EuroFIR Component Thesaurus. Agreement was reached that harmonization is possible, while some fundamental differences between the two systems will remain (inclusion vs exclusion of method and data expression information, use of non alpha-numeric characters, e.g., colon, identification of unknown or mix of methods and definitions, and nomenclature of conversion factors). Future efforts on harmonization will include the following: (1) joint decision making on existing and future component names, as far as possible, (2) urgent attention to the fatty acid nomenclature (outline proposed during this meeting), and (3) establishing a formal consultation mechanism between the two organizations before publishing new sets of component identifiers.

The list of participants and the agenda are found in Annex 1 and 2.

II. Accepted differences between INFOODS and EuroFIR component identifiers

Even though EuroFIR components are based on INFOODS component identifiers, some fundamental differences exist and will remain:

1. Empirical versus rational methods and data expression

INFOODS provides different tagnames for the same component name if (1) empirical methods intent to measure different fractions of complex components (e.g. carbohydrates, fibre and fat) or (2) different expressions (e.g. monosaccharide equivalents vs. by weight) result in significantly different values. For rational methods or one data expression, only one tagname per component exists. Therefore, users of INFOODS tagnames are immediately informed which values are comparable and can therefore be combined.

In general, EuroFIR does not have different components identifiers for empirical methods or different expressions, nor do they provide any information to users on the comparability of components with different methods and expressions. To this rule there are a few exceptions: Vitamin equivalents, fibre (covering three major methods: FIBC for crude fibre, NSP for non-starch polysaccharides, FIBT for total dietary fibre determined by AOAC or related methods, which represent the three main empirical methods for fibre) or carbohydrates (three expressions: CHOU for unspecified carbohydrates, CHO for [available] carbohydrates and CHOT for total carbohydrates). For carbohydrates or fibre, INFOODS has 7 and 11 component identifiers respectively, which take minor methods into account (e.g. FIBTG for total dietary fibre; determined gravimetrically by the AOAC total dietary fibre method, PSACNS – now changed to NSP - for polysaccharides, non-starch, FIBTS for total

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dietary fibre; sum of non-starch polysaccharide components and lignin, FIBAD for fibre; determined by acid detergent method, FIBND for fibre; determined by neutral detergent method, FIBC for crude fibre, and FIB- for unknown or mixed methods for fibre).

In both interchange schemes[2], INFOODS and EuroFIR component identifiers should be interchanged in conjunction with method information, units and denominators, and additional information on calculation, or mode of expressions, where applicable.

2. Use of colon
Because the INFOODS system is conceived to use component identifiers as mark-up language tags in electronic data interchange, the use of colon is prohibited. EuroFIR uses the component identifiers as attributes in data interchange and is therefore free to use the colon in their component identifiers. This is done in fatty acids, e.g. lauric acid has the component identifiers F12:0 in EuroFIR and F12D0 in INFOODS.

3. Use of U (for unspecified), UN (for unidentified) or UNK (for unknown) in EuroFIR vs. the use of the dash (–) for unknown or unspecified or mixed method of determination
INFOODS will continue to use a dash – for unknown or unspecified or mixed method of determination while EuroFIR will use the three notations U, UN or UNK.

4. Conversion factors
In INFOODS, conversion factors are regarded as components and always start with X. It was agreed during the meeting that conversion factors should consist of X followed by the tagname to which it applies. This eliminates the potential problem when the conversion factor can have different values depending on the food group or definition used. In EuroFIR, conversion factors are not a component but a food attribute.

5. Equivalents
Equivalents of vitamins (e.g. niacin equivalent, retinol equivalent, retinol activity equivalent, beta-carotene equivalent) or of available carbohydrates or sugars expressed in monosaccharide equivalent are in EuroFIR units/ activity unit; they do not have metric units and are not constructed as sums of the contributing components (e.g. 1 Niacin equivalent = 3.3 mg Niacin". "1 Niacin equivalent = 1 mg free Niacin" "1 Niacin equivalent = 1 mg Nicotinamide" 1 Niacin equivalent = 1 mg Niacin, 1 Niacin equivalent = 1/60 mg tryptophan). A Method Indicator (e.g. "Niacin equivalents calculated from niacin and tryptophan" [MI0421]) would indicate how to calculate the niacin equivalent. INFOODS treats them as component identifiers with metric units and where all vitamin equivalents are the sums of the contributing components which are adjusted for their relative vitamin activity by specific conversion factors (e.g. NIAEQ = NIA + TRP/60).

[2] **FAO**, 2004. *Report of the Technical Workshop on Standards for Food Composition Data Interchange.* FAO, Rome. Available at: ftp://ftp.fao.org/es/esn/infoods/interchange.pdf

In order to facilitate the comprehension by the users, in the publications of their component identifiers and when necessary in related documents, the differences between INFOODS and EuroFIR systems should be mentioned.

III. Tentative agreement on harmonizing component identifiers between EuroFIR and INFOODS (see Annex 3)

During and after the meeting, tentative agreements were reached between EuroFIR and INFOODS which needed to be discussed within the respective organizations before final acceptance. INFOODS also communicated to EuroFIR some inconsistencies in the EuroFIR component thesaurus version 1.0 such as missing links to existing INFOODS tagnames, incorrect links between EuroFIR and INFOODS component identifiers, differences in names in some component identifiers and non-existing tagnames.

IV. Fatty acid nomenclature

In view of advances in analytical chemistry, more fatty acid isomers can be analysed nowadays which demands a more detailed description of fatty acids as compared to 20 years ago when INFOODS tagnames were created. The following agreements were reached:

- For technical reasons, INFOODS will keep the D and EuroFIR the colon to indicate the number of double bonds.
- Both organizations will use only uppercase letters
- For the cis/trans isomers, both organizations will:
  - use C and T (not Z and E);
  - put C for cis or T for trans in front of double bond position counting from the COOH end, if it is known where they occur;
  - put at the end of the component identifier either a single T if at least one double bond is trans or a single C if it is known that all double bonds are cis isomers;
  - identify unknown positions of known cis/trans isomers by putting at the end of component identifier as many C and T as double bonds while putting C first followed by T, e.g. CCT if two cis isomers and one trans exist without knowing their position;
  - for individual fatty acids with unknown cis/trans isomers, both INFOODS and EuroFIR will not add any specific sign, e.g. F16D2 or F16:2, respectively;.
  - for fatty acids with unknown number of double bounds, INFOODS will not add any sign and EuroFIR UN for unidentified, e.g. F16 vs. F16:UN
  - for the sum of polyunsaturated fatty acids (FAPU), it is recommended to create new component identifiers in both systems to indicate cis/trans fatty acids (e.g. FAPUC and FAPUT) and promote their use.
- iso/anteiso: I and AI
- for sums of fatty acids, additional info on which fatty acids are included should be added

In the future, EuroFIR and INFOODS will agree on radical naming over e-mail, telephone or additional meeting.

The problem of natural vs. introduced trans isomers through hydrogenation was discussed but no solutions proposed. Switzerland has the requirement to only indicate trans fatty acids from plant origin because this approach excludes the natural from of trans fatty acids from animal sources (e.g. in milk).

V. Component identifiers from INFOODS and EuroFIR ready for publication

List of 109 newly proposed INFOODS tagnames

The list of newly proposed tagnames was discussed. The new components mainly derive from CABig NCI ontology, EuroFIR, new demands (e.g. LATINFOODS), or following the recommendations of the meeting on update of tagnames of 2003 (add conversion factors as tagnames and minerals with different valence states). This list was send via e-mail prior to the meeting to all participants of the meeting. During the meeting, agreement was reached to add the proposed tagnames, sometimes with modifications in name or scope notes:

- agreement to add mineral with valence states, e.g. AS3+
- agreement on nomenclature for conversion factors: X followed by tagname (e.g. XA to become XALC)
- FEANI1 (and PROANI1) to be changed to FEMFP (PROMFP)
- SOLID: a scope note is missing on the definition (Anders Moeller to provide after contacting USDA)
- ISOMALT: replace existing definition with that of EuroFIR
- indicate for flavonoids whether they are free or conjugated (as glycosides)
- add the definition of sums the individual components, e.g. AAE7
- PROCYA: missing definition (Lilia Masson provided a definition and synonyms: They are a class of flavanols and essentially they are polymer chains of flavonoids as catechins or epigallocatechingallates. Synonyms: Proanthocyanidin, oligomeric proanthocyanidin, leukocyanidin, leucoanthocyanin, condensed tannins)
- to complete recommended units for all components
- COUMESTROL to change to COUMEST
- probably to add WATERKF (Lilia Masson provided text for the comment field: The Karl Fischer method is recommended to be used in lyophilized foods or foods with very small water content.)

The tentative agreements reached between INFOODS and EuroFIR around the meeting are detailed in Annex 3.

INFOODS Component Identifier Database

INFOODS agreed to add version numbers to their future releases of component identifiers and to add a field with the corresponding EuroFIR component names.

EuroFIR component identifier thesaurus 1.1

The new additions and modifications intended in the EuroFIR component identifier thesaurus 1.1 were not discussed. They are publicly available at the EuroFIR website and non-EuroFIR partners can provide comments.

The grouping of components was not discussed because of limited time.

VI. Future work

<u>1. New components</u>
There are about 8000 components that can be determined in foods, including e.g. contaminants or pesticides. Both organizations agreed to add only those components which are used in food composition and/or are determined separately for food composition purposes. No firm agreement was reached on additives (e.g. cyclamate).

<u>2. Components and conversion factors in food composition databases for different purposes (e.g. labelling)</u>
Many food composition databases hold not only components with definitions according to the database requirements but also for e.g. labelling purposes with different definitions and values according to legal requirements. It was suggested to add '_LABEL' for all conversion factors and components in the database for labelling purposes. However, this requires further discussions.

<u>3. Formal mechanism to update component identifiers in the future</u>
It was agreed to shift from an informal ad hoc consultation on new component identifiers to a more formalized approach between INFOODS and EuroFIR with the purpose to harmonize future component identifiers prior to their publication. It was therefore agreed that in the future, when EuroFIR or INFOODS have a new set of component identifiers ready for publication, that they should be the same between both organizations (except fatty acids for the colon vs. D, components determined with empirical methods and unspecified components, conversion factors). This means that after finalisation of internal discussions on new component identifiers within each organization, but prior to their publication, the two organizations will prepare a list of the new component identifiers (new and updated ones) and send it to the other organization with the objective to agree as much as possible on a common set of component identifiers.

In the future, progress reports on the achieved harmonisation will be published.

Annex 1

List of participants

Name	Country
Simone Bell (rapporteur)	Germany-Switzerland
Barbara Burlingame	FAO, Italy
Ruth Charrondiere	FAO, Italy
Paolo C. Colombani	Switzerland
Jayne Ireland	Denmark
Kunchit Judprasong	Thailand
Jehangir Khalil	Pakistan
T. Longvah	India
Lilia Masson	Chile
Adriana Blanco Metzler	Costa Rica
Anders Møller	Demark
Suzanne Murphy (chair)	USA
Andreia Porto	Portugal
Prapasri Puwastien	Thailand
Teresita R. Portugal	Phillipines
Norma Cristina Sammán	Argentina
Elizabete Wenzel de Menezes	Brasil

Annex 2

Draft Agenda

- Welcome
- Introduction
- Selection of chairman and rapporteur
- Review on philosophy on component nomenclature (empirical vs. rational method)

Coffee break

- Settle outstanding issues on the 142 tagnames
- Review of existing components
- Fatty acids

Lunch

- Discuss the components ready for publication by EuroFIR (components 1.1) and INFOODS

Coffee break

- Discuss the components ready for publication by EuroFIR (components 1.1) and INFOODS (continued)
- Discussion on mechanisms for updating components in the future between EuroFIR and INFOODS

Annex 3

Tentative agreements between INFOODS tagnames and EUROFIR components needing final confirmation within both organizations

- CARTOID: carotenoids, total (EuroFIR will replace CAROTENS)
- QUINAC: quinic acid (EuroFIR will replace CHIAC)
- CHLNP: phosphatidyl choline (lecithin) (EuroFIR will replace CHLMP)
- CHOCALOH: 25-hydroxycholecalciferol. Use for 25-hydroxy vitamin D3 (INFOODS will replace CHOCALHY)
- CHORL: cholesterol vs CHOL- (only if method of determination no known or a mix!! if not CHOLC or CHOLE (INFOODS proposes to keep CHOL as CHOL is nearer to cholesterol than CHORL and to delete CHOLC and CHOLE.)
- CHOT:.total carbohydrates (INFOODS will replace CHOCDF)
- EuroFIR will replace CHO available carbohydrates by CHOAVL, CHOAVLDF, CHOAVLM
- DDZEIN: daidzein (EuroFIR will replace DAIDZE)
- DM: dry matter (EuroFIR will replace DRYMAT)
- FATAN: fat, animal (INFOODS will replace FATCAN)
- FATPL: fat, plant (INFOODS will replace FATCPL)
- FOLAC: folic acid (EuroFIR will replace FOLACID)
- FOLCH3H4: 5-Methyltetrahydrofolate (EuroFIR and INFOODS will change)
- FOLHCOH4: 5-Formyltetrahydrofolate (EuroFIR and INFOODS will change)
- FOLCH3H2: 5-methyl-dihydrofolic acid (EuroFIR and INFOODS will change)
- FOLHCO10H4: 10-formyldihydrofolate (EuroFIR and INFOODS will change)
- FOLHCO10: 10- formylfolic acid (EuroFIR and INFOODS will change)
- FOLSUM: folate, sum of vitamers, determined by HPLC (EuroFIR will add)
- FOLFRE: folate, free/unconjungated (new scope note)
- GNSTEIN: genistein (EuroFIR will replace GENIST)
- GLYCTEIN: glycitein (EuroFIR will replace GLYCIT)
- ISOFLVND (wrongly stated as ISOFLAVT in EuroFIR thesaurus): isoflavonoids, total (EuroFIR will replace ISOFLAVT)
- LACTL: lactitol. (EuroFIR will replace LACTTL)
- LUTN: lutein (EuroFIR will replace LUTE)
- LUTNZEA: lutein plus zeaxanthine (EuroFIR will replace LUTEZEAX)
- LYCPN: lycopene (EuroFIR will replace LYCO)
- FIBTG:.total dietary fibre – AOAC Prosky and similar methods (Eurofir will replace FIBT)
- NSP: non-starch polysaccharides (INFOODS will replace PSACNS)
- POLYL: polyols, total. Use for total sugar alcohols (EuroFIR will replace POLY)
- PROT: protein, total. Protein calculated from a nitrogen value (INFOODS will replace PROCNT)
- PROTAN: animal (INFOODS will replace PROANI)
- PROTPL: protein, plant (INFOODS to replace PROPLA)
- RETOL: all-trans retinol (EuroFIR will replace RETOLAT)
- RETOLSUM: all-trans retinol equivalents (EuroFIR will replace RETOLATE)
- TAN: tannin (EuroFIR will replace TANNIN)
- ZEA: zeaxanthin (EuroFIR will replace ZEAXN)
- SPHLIP: sphingolipid (EuroFIR will add)
- PLSGN: plasmalogen (EuroFIR will add)
- MANS: mannose (EuroFIR will add)
- STARES1: resistant starch (RS1) (EuroFIR will add)
- STARES2: resistant starch (RS2) (EuroFIR will add)
- STARES3: resistant starch (RS3) (EuroFIR will add)
- STARES4: resistant starch (RS4) (EuroFIR will add)
- CTX: canthaxanthin (EuroFIR will add)
- ASTAX: astaxanthin (EuroFIR will add)

Unresolved
- for unknown or mixed method, in INFOODS – and in EuroFIR U (not UNK); e.g. CHOU: carbohydrates, unspecified vs. INFOODS: CHO-. BUT EuroFIR has AAE- and AAT-(INFOODS: not possible for EuroFIR to always change to - ?)
- in fatty acids in INFOODS D and in EuroFIR :
- FACT: fatty acid conversion factor; INFOODS: XFA (INFOODS: should in EuroFIR conversion factor be always CF – or is there room for negotiation to adapt to XFA?)
- NCF: nitrogen conversion factor; INFOODS: XN
- PROTU: protein, unknown origin. (EuroFIR will replace PROTUNK –same for FATUNK?)
- WASTE: waste; INFOODS: REFUSE (as waste has also other meanings, INFOODS wants to keep REFUSE)

EuroFIR component with mentioned INFOODS tagnames which does not exist yet (but being added to tagnames)
ACESK: acesulfam-K
APIGEN: apigenin
ASPM: aspartam
BIOCHA: biochanin A
CADAVT: cadaverine
CAMT: campesterol, total
CANTHAX: canthaxanthine
CAPSA (capsanthine) vs INFOODS proposition CAPSCIN
CATEC: catechin
CO2F: carbon dioxide, free
COUMEST: coumestrol
CYCL: cyclamate
EPICATEC: epicatechin
ERGSTR: ergosterol
FORMO: formononetin
GULDKAC: di-keto-cholanic acid
KAEMF: kaempferol
LACACL: L-lactic acid
LUTEOL: luteolin
MYRIC: myricetin
PHENTN: phenylethylamine
PIPN: piperine
PUTRSC: putrescine
QUERCE: quercetin
SPERDN: spermindine
SPERN: spermine
STID7911: delta 7,9,11-stigmastadienol
SUGAN: sugar, natural
TYRA: tyramine

Questions on the EuroFIR component identifiers:
- why is iso sometimes I and sometimes ISO, e.g. F17:0I and F18:2ISO

Some links with INFOODS tagnames are wrong:
- CHO = CHOAVL, CHOAVLDF, CHOAVLM (and not CHOAVL alone) – *now EuroFIR to have same component names as INFOODS: CHOAVL, CHOAVLDF, CHOAVLM*
- CHOT = CHOCDF (and not CHO-) – *now INFOODS to have CHOT*
- FIBT - FIBTG (and not FIB-) – *now EuroFIR to have FIBTG*

- GENIST = GNSTEIN (not GENIST) – *now EuroFIR to have GNSTEIN*
- RETOLAT = RETOL - *now EuroFIR to have RETOL*
- RETOLATE = RETOLSUM (not published yet) - *now EuroFIR to have RETOLSUM*
- NIA = NIA (not NIA-)

Match with existing tagnames forgotten to indicate
- CHOU = CHO-
- FOLACID = FOLAC– *now EuroFIR to have FOLAC*
- FACIDCTG: fatty acids, total, calculated as triacylglycerol equivalents; INFOODS: FATNLEA (INFOODS: can EuroFIR change to FATNLEA?)
- CRYPX
- CRYPXB
- ALC
- FAN3
- FAN6
- HEMCEL
- ISOMALT (new)
- MALTL
- FOLH4

INFOODS to add from component thesaurus 1.1
1. CARTBCIS: Use for the total of beta-carotene cis isomers. The main cis isomers detected in foods are the 13-cis and 9-cis forms, although other forms have also been found (mainly 15-cis and various di-cis isomers) Ruth: could be added if CARTC
2. CARTBTRS: Use for all-trans beta-carotene. Ruth: no, it is the same as CARTB – so no need
3. CAPSA: capsanthine. ok
4. CHOLN: Choline (Ruth: is it total choline from all sources or free choline?)
5. CYSTE: L-cysteine. ok
6. FAMSCIS: Use for total cis monounsaturated fatty acids. Ruth: could be added if FAMSC
7. FAMSTRN: fatty acids, monounsaturated, total trans. Ruth: could be added if FAMST
8. FAPULC: Use for total polyunsaturated long-chain fatty acids with a chain length greater than C18. Ruth: could be added if FAPUL
9. FAPUN3FI: fatty acids, polyunsaturated, total n-3 fish. ok
10. FAPUN3VE: fatty acids, polyunsaturated, total n-3 vegetable. ok
11. FAPUN9: Use for total cis n-9 polyunsaturated fatty acids, including F18:2CN9 and F20:3CN9. ok
12. FACIS: fatty acids, total cis. Ruth: could be added if FAC
13. FACN3: fatty acids, total cis n-3. Use for total cis n-3 mono- and polyunsaturated fatty acids, including the FAPUN3 isomers plus F18:1CN3. ok
14. FACN6: Use for total cis n-6 mono- and polyunsaturated fatty acids, including the FAPUN6 isomers plus F18:1CN6. ok
15. FACN9: Use for total cis n-9 mono- and polyunsaturated fatty acids, including the FAPUN9 isomers plus F18:1CN9, F20:1CN9, F22:1CN9 and F24:1CN9. ok
16. FAN9: Use for total n-9 fatty acids, including both mono- and polyunsaturated n-9 fatty acids. ok
17. FATN3: fatty acids, total trans n-3. Ruth: could be added if FAN3T
18. FATN6: fatty acids, total trans n-6. Ruth: could be added if FAN6T
19. FATN9: fatty acids, total trans n-9. Ruth: could be added if FAN9T
20. FASATR: fatty acids, trans saturated, remainder. Ruth: more info needed – why trans?
21. LYSAVL: Use only for available L-lysine. Ruth: more info needed
22. FATMU: monounsaturated fat, total. Ruth: more info needed. Difference to FAMU?
23. FATPU: polyunsaturated fat, total. Ruth: more info needed. Difference to FAPU?

24. FATSAT: saturated fat, total. Ruth: more info needed. Difference to FASAT?
25. FATTRN: trans fat, total. Ruth: more info needed. Difference to FATRN?
26. SACCNA: sodium-saccharin. ok
27. SORAC: sorbic acid. Antimicrobial preservative, also used as sodium sorbate (E201), potassium sorbate (E202) and calcium sorbate (E203). It has 4 geometric isomers, cis or trans at either double bond. ok
28. STEROTH: sterols, other. ok