Scientific Colloquium Series

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SUMMARY REPORT

EFSA SCIENTIFIC COLLOQUIUM No. 14

Scientific Colloquium on Food Classification: Unambiguous ambiguity – the challenge of describing food

Parma, Italy
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I. INTRODUCTION

The European Food Safety Authority (EFSA) has a role in promoting and co-ordinating the development of harmonized risk assessment methodologies. Exposure assessment is a crucial and integral part of risk assessment and the quality of available data both on food consumption and on occurrence levels may have a major impact on the outcome of risk assessment.

It is therefore important to harmonise the collection and collation of food consumption data across EU Member States and similarly to harmonise the collection of occurrence data in food, covering contaminants, zoonoses, pesticides, nutrients and others. The harmonisation of these various data collections also involves procedures to clearly identify and describe foods in a uniform way, so that the information held in datasets can be interrelated and possibly integrated into an EU-wide database.

Implementation of a common food description and classification system would improve the consistency and reliability of exposure assessment carried out by EFSA and its various panels and by other experts in Europe.

To support the development of a harmonised food description and classification system, EFSA organised a scientific colloquium in Parma, Italy on the 23rd and 24th of June 2010.

The objective of the colloquium was to have an open scientific debate on the requirements of such a system and to build on experiences gained from the development of existing systems. Consideration was given to different approaches to classify foods and the diversity of needs for the various areas of food safety.

Format of the colloquium

About 90 participants from 33 countries, including the USA and Australia, representing relevant expertise in the area of food classification, food consumption, exposure assessment and others participated in an active discussion, under the chairmanship of Pagona Lagiou and Anders Møller. Participants were drawn from EFSA, the European Commission, EU Member States, third countries and industry.

The format of the colloquium included an introductory plenary session with presentations, following which participants were split into discussion groups to address specific aspects in more detail. Participants were provided with guidance on the remit of the discussion groups.

The outcome of the debate from each group was presented back to the plenary. The final session was dedicated to discussion on the final outcomes of the discussion groups and focused on arriving at the conclusions and recommendations of the colloquium.

II. SUMMARY OF PRESENTATIONS

In order to focus the colloquium on the requirements of a harmonised food classification system, a number of brief presentations were provided during the opening session by those with expertise and experiences in the area. The presentations highlighted the current situation (including limitations and potential) in relation to:

- Use of existing classification systems
- Different end user needs and perspectives
- Challenges in describing and classifying foods

These presentations served to generate much debate and information for the discussion groups that followed. The main points of each presentation are summarised below.

2.1. EuroFIR's experiences to date

Paul Finglas, EuroFIR

Paul Finglas provided an overview of EuroFIR (European Food Information Resource), which, since 2005 has worked on the development of a food description and classification system, standards for food database compilation, nutrient definitions and calculation methods and a collection of a series of nutrient retention factors. EuroFIR has established a common standard for the identification and description of foods in European Food Composition Databases that allows for application of concepts in database linking and management and their comparability as well as the comparison and interchange of food composition data. The food description system chosen was LanguaL (Langua aLimentaria or language of food), an international controlled vocabulary for systematic food description, which is now available in 10 languages.

Over 29 European databases have been indexed, covering over 29,000 foods. A number of specialised datasets, including EuroFIR eBASIS, and other datasets, such as the USDA dataset and GEMS Food, have also been indexed. Indexing has been subject to quality assessment, taking account of both reproducibility and correctness. An important development was also the establishment of recommendations that form the basis of a European standard for food composition data, adopted within the European Committee for Standardisation (CEN) framework.

He concluded that EuroFIR underwent a considerable learning curve over the years, which continuously involved the revision and improvement of codes and, looking to the future, there are plans to further develop, implement and refine the European Food Platform to support research into food, diet and health.

2.2. Objectives of the Colloquium

Stefan Fabiansson, European Food Safety Authority

In outlining the objectives for the Colloquium, Stefan Fabiansson stressed the need for a food description system capable of clearly identifying food items analysed for the presence of contaminants, zoonotic agents, pesticides, nutrients and other compounds on the one hand and food items nominated in food consumption surveys on the other hand so that they can be unambiguously matched in order to perform exposure assessments.

Whilst the needs of such a system would often be driven by legal requirements, the aim is to find a reasonable and flexible solution which will cater for the different degree of details or data aggregation required in the diverse areas of food safety.
Whilst many different approaches already exist and many are very elaborate, most vary in many aspects, depending on different objectives and different needs. The challenge is to identify a mechanism that incorporates the most applicable aspects of these for the specific needs of EFSA in a way which is feasible to implement in Member States.
Different options for the development of a system exist – including adoption, adaption or combination of existing systems or development of a completely new system. This system, however, also needs to take into consideration the harmonisation of data formatting and transmission and how to reach agreement on international level.
Faced with considerable challenges in achieving these goals, he expressed his hope that the Colloquium would provide guidance for the development of such a system.

2.3. EU Legislative data needs and consequences for the Member States

Frans Verstraete, European Commission

Frans Verstraete provided an overview of legislative data needs. He highlighted that exposure assessment is an important key element in scientific risk assessment, in particular when vulnerable sub groups or specific food items are of interest. Exposure assessment forms the basis for legislative measures to be taken and so requires information on contamination levels in food and consumption for the population of interest. He further explained that the degree of severity of measures to be taken depends on the reported exposure in relation to tolerable intake levels, taking into account the "as low as reasonably achievable" (ALARA) principle. Measures taken should also be proportional to the risk and uncertainty should not lead to regulatory excess. Hence the need to have detailed information on the major contributors to exposure was stressed. This often creates many challenges for the exposure expert, as often the substance of interest can be very specific to certain food types, for example heavy metals in fish, where different species display different contaminant occurrence patterns. Specific needs are also difficult to foresee (for example, nicotine in boletus edulis) and cannot always be anticipated, so the system needs to be flexible and serve multiple purposes in different sectors.

2.4. Strengths and weaknesses of existing food classification systems

Jayne Ireland, Danish Food Information

Jayne Ireland explained that many systems exist internationally and nationally. Generally, classification systems are reporting-level and purpose specific, and many exist in parallel, but are rarely compatible. Different survey types/methodologies will achieve different levels of detail, for example individual surveys, household budget surveys and food balance sheets all record to varying detail food as eaten/prepared to raw commodities. As foods exist on all reporting levels but characteristics of the food change from level to level, systems capturing this information are food level specific and cannot cover several groups at the same time. For example, at the intake/consumption level, a host of national and international systems exist, such as EPIC-Soft and EuroFIR. At the ingredient level, a host of systems, such as Eurocode2, GSFA, GS1, GPC, GSDN, etc also exist. Systems at commodity level include, WTO-codes, CCPR, GSC, EC classification for plants, FAO Food Balance Sheets, Prodcom, etc. To overcome the incompatibility of these systems, linking or mapping of systems either

cross-sectionally or centre-based is needed. LanguaL was presented as a good potential choice for such a central mapping master code structure.

2.5. A food-retail view on classification

Loek Boortman, GS1

Loek Boortman provided an overview of the GS1 organisation and system, which is the most widely used supply chain standards system in the world. GS1 is a non-profit organisation. Its system is built on collaboration that seeks to overcome divergences and to improve the efficiency and visibility of supply and demand chains globally and across sectors. GS1 was designed for a specific purpose and needed to map all existing classifications developed by manufacturers and retailers, sometimes several per organisation. The basis for GS1 is a non-hierarchical system, with the addition of higher hierarchies provided for information purposes.

2.6. Challenges in food classification: an industry perspective

Richard Stadler, Nestec Ltd.

Richard Stadler outlined some of the problems faced by industry when providing data to the European institutions, using acrylamide concentration and additive usage data as examples. The latter showed that very often food categories used were either incompatible or too broad, which could result in unrealistic scenarios. Sharing of data and provision of tailor-made information could contribute to better exposure assessment and the food industry is open to partnering with EFSA to achieve a harmonized categorisation system.

2.7. The challenge of matching food consumption data with hazard occurrence data

Judy Cunningham, Food Standards Australia New Zealand, Australia

Judy Cunningham outlined the challenges that are faced by risk assessors due to lack of information on both consumption and hazard occurrence. Depending on the unique properties of the substance of interest, different types of information are required and flexibility in data systems is needed to cater for these specifics. Lack of detail or varying reporting levels of foods consumed or analysed requires the use of assumptions and extrapolations. This often requires the use of a number of correction factors, such as ingredient fractions and processing factors, and questions, such as what type of recipes are appropriate (standard versus custom), need to be addressed. Also the rapid change in the global food market needs to be taken into consideration, and hence standard formulations/recipes need to be reviewed regularly in line with new product developments. In an effort to meet the various data demands by different end users, Australia has developed a 3-tiered classification system, which covers foods from as consumed to the raw agricultural commodity using recipes and facilitates exposure assessments of different classes of food chemicals.

2.8. Challenges and approaches in food classification in the US

Joanne Holden, USDA/ARS/BHNRC, United States

Joanne Holden provided an overview of the current United States Department of Agriculture (USDA) food description system and outlined how different agencies, including Food and

Drug Administration (FDA) and Environmental Protection Agency (EPA) are working towards a common system to exchange food information, based on LanguaL. The latter aims to link the areas of food safety and traceability, nutrient content and exposure studies and trade and food regulation and provide a food information system suitable and accessible to a variety of USDA customers, including industry and trade, regulators, agencies and consumers.

III. SUMMARY OF DISCUSSION GROUP RESULTS

Following the introductory presentations, participants split into discussion groups to debate specific issues in more detail. Participants were provided with guidance on the remit of the discussion groups by means of briefing notes and via a presentation by Stef Bronzwaer. Participants were divided into four groups to allow parallel discussion groups of which a summary is presented here below. The final session was dedicated to discuss the outcomes of the discussion groups and to reach conclusions and recommendations of the colloquium, as presented in the final chapter of this report.

3.1. Discussion Group 1 - Minimum food description requirements for different end-users

Rapporteur: Gerald Moy
Chair: Matthias Frost

1. Who are the end users of food classification and description systems?

1. Given its primary role in co-ordinating and conducting risk assessments for foodborne hazards across the EU, EFSA is one of the most important primary users of a harmonised food classification system. Obviously exposure assessment is a major application of a food classification system, and a consistent and coherent food classification system is essential for collecting food consumption data in a harmonised manner. Such a system will also allow the mapping of food consumption data and concentration levels to the same food item, whether that is raw agricultural commodity, processed food, or ready to eat food.
2. In this regard, the European Commission also has great need for a consistent and reliable classification and description system since it is responsible for formulating legislation relating to food and feed. Ambiguity in terminology could have significant consequences for food safety regulations and their enforcement. Similarly, ambiguity in non-mandatory guidance and other advisory texts could reduce their effectiveness.
3. Control authorities in Member States need to have such a system to conduct their tasks and to ensure harmonised enforcement. Risk assessors and monitoring personnel need such a system to ensure that the correct foods are being assessed and monitored.
4. Such a system is critical for clear and consistent communication between EFSA, the European Commission and national governments, as well as with consumer organisations, industry and other interested parties
5. Databases on food composition, consumption, and contamination need such a system for the controlled naming of foods (official thesaurus). A harmonised system would enable the managers of databases to combine and use data from the different sources. In this regard, databases maintained by agriculture and fishery departments are important sources, but those maintained by industry are also potentially important.
6. Industry is also a potential user of the system for both compliance and voluntary purposes. For example, the submission of data on acrylamide in heat-treated processed foods was hampered because no system was available for the standardised and unambiguous description of such foods. However, such a system would need to be flexible enough to be

used at any point in the food supply network from production to consumption and would facilitate food traceability and recall.

7. International organisations like the Codex Alimentarius Commission (CAC) were identified as additional potential users of the system. CAC plays an important role in setting standards for the global trade in food. Classifications are needed here as can be seen by the fact that CAC has built up several different systems and a harmonisation of EFSA's and CAC's systems would be helpful.
8. Researchers in government, academia and industry, including nutritionists, dietary surveyors, epidemiologists, and outbreak investigators, would benefit from a harmonised system, which would improve access to relevant data, provide more varied research options, contribute to better quality data and broaden the applicability of and support for research results. This holds true for researchers at the national, EU and international levels.
9. Software developers in various fields, such as risk assessment and nutrition policy development, could use the system with several advantages. In this regard, those directly responsible for data entry (generation), data cleaning, data retrieval, and data assessment and aggregation, as well as statisticians and reporters would also benefit.

The identification of current and potential users of a harmonised food classification and description system also has the possibility of mobilising resources to support the collection of food consumption data relevant to such users. However, this requires early engagement concerning their needs and evaluation of whether collecting the information is already included or would require the development of new facets or descriptors.

2. Which are the most demanding areas in terms of food classification detail?

The risk assessment and nutrition areas that require a food classification and description system are listed as follows:

- Nutrient composition
- Food additives
- Processing contaminants
- Environmental contaminants
- Pesticide residues
- Veterinary drug residues
- Microbiological agents
- Parasites
- Labelling

In regard to food consumption, the most accurate exposure/intake assessments will be based on foods "as consumed". For nutrients, especially those that are subject to significant degradation and loss during processing and cooking, information on foods "as consumed" is essential, including all of the details that are required to describe such foods. For food chemicals, the point of occurrence of the contaminants in the food chain and/or where controls are applied largely defines the foods that are of interest to these areas. In regard to zoonotic agents, microbiological agents and parasites have different requirements because the latter group are largely controlled in live animals through vaccination and eradication

programs. In regard to labelling, various economic fraud and regulatory issues, such as organic food and genetically modified foods, can be included in food descriptions and are included here for completeness. In this regard, labelling is not just packaging, it may also include signs on shelves displaying the food.

In general, the more processed a food becomes, the more details are required to adequately describe it. In addition, a composite food inherently requires more detail than a single food. In some cases like a "simple" pizza, the composite food is itself made of composite foods, like the crust, the sauce and the sausage. Therefore, a basic hierarchy of foods requiring decreasing levels of details can be constructed as:

- Processed composite foods
- Processed single foods
- Composite unprocessed foods
- Unprocessed single foods

To the bottom may be added raw agricultural commodities, which differ from unprocessed single foods in that they are "as harvested", and are important for regulatory and statistics purposes. Often they include inedible portions, such as the husk or peel, which are of interest for pesticide monitoring. These are often described by their scientific names and may include different species and cultivars. In some cases, the geographic area of production is included as a facet. These considerations have to be taken into account when the food classification and a sample description model will be combined.

Food-producing animals have also been included because they will appear on a list of primary food descriptors and are the source of many pathogenic agents. Furthermore, administration of veterinary drugs may result in residues persisting in corresponding animal-derived food items. Food-producing animals have also been associated with the transmission of certain zoonotic diseases, some with pandemic potential.

Finally, animal feed has been included because it has been the source of several food safety problems. In many cases, animal feeds are derived from agricultural by-products, such as wheat and maize fodder, which may contain pesticide residues as well as waste products of both plant and animal origin.

Table 1 provides an overview of the areas and their levels of description that are required to either estimate exposure or to effectively regulate their presence in food. Clearly nutrient composition is the most demanding followed closely by food additives because these two areas need details on foods "as consumed" and particularly, in processed composite foods. Processing contaminants also require extensive details not only on the food, but also on the processing methods and conditions. The next most demanding area is microbiological hazards, which need information on the processing method and conditions at each stage of the food production system to conduct an overall risk assessment. For veterinary drug residues, pesticide residues and most environmental contaminants, regulatory controls are applied at the raw agricultural level (including animal-derived foods). However, the mapping of foods "as consumed" to this level is important in validating the model diets used to estimate exposure to these chemicals, especially in relation to high consumers. Note that certain environmental contaminants, such as aflatoxins, are also controlled at the processing stage as well as at the animal feed stage.

Raw agricultural commodities, food-producing animals and animal feed areas are part of primary production classification systems and although not foods themselves, such systems need to be harmonised with any food classification system to ensure transparency and consistency.

Table 1: Overview of the areas and their required levels of description that are required to either estimate exposure or to effectively regulate their presence in food.

Food Consumption	Processed composite food	Processed single food	Unprocessed composite food	Unprocessed single food	Raw agricultural commodity	Food producing animal	Animal Feed
Nutrient composition	XX	XX	X	X			
Food Additives	X	X					
Processing contaminants	XX	XX					
Environmental contaminants		X		X	XX	XX	XX
Pesticide residues				X	XX		X
Veterinary drug residues				X	XX		X
Microbiological agents	X	X	X	X	X	X	X
Parasites				X	X	X	X
Labelling	X	X	X	X	X	X	X

Legend: X = important; XX = very important.

3. What would be the effect of reducing and increasing the level of detail?

In general, the highest level of detail is recommended, but it is recognised that such detail can be expensive and time demanding. In food consumption data, for example, a low level of detail, consisting in defining broad categories of the consumed foods, is necessary in order to obtain robust food consumption estimates. With a lower level of detail, however, the exposure assessment may not be adequate to answer the questions posed by the risk manager. In some cases, extrapolations from available data will require expert judgement, but will incur greater uncertainty. For example, a high level of detail on methods of production and processing are needed for microbiological assessment.

4. Which degree of flexibility in the use of the food description system is necessary and how can it be realised?

In general, a multi-faceted description system (multi-criteria description) allows for flexibility, because new facets, as well as new descriptors per facet, can be added any time. Flexibility in regard to description of mandatory components in different areas or in different data collections will depend on the purpose of the data. For screening purposes, which intentionally overestimate exposure to potentially toxic chemicals (or in the case of nutrients, underestimate intake), the estimate can use conservative default assumptions to fill gaps in the database.

Area specific descriptors can reduce collection burden and complexity of the database. For example, certain description facets may be generated and used as options since they only pertain to one area.

Pre-combined descriptors can improve accuracy and efficiency of data entry. In such cases, assumptions about that limit the variability in the food consumed and consumption patterns can allow more details to be collected on other facets.

Future unanticipated hazards may require a flexible classification system to address necessary food consumption and occurrence data needs. A review of past incidents may provide insights into how these needs may be met during a future food safety emergency.

3.2. Discussion Group 2 - EFSA's Food Classification WG proposals for a food classification system

Rapporteur: Eileen O'Dea
Chair: Leif Busk

EFSA is seeking to harmonise the collection and collation of food consumption data across EU Member States and similarly to harmonise the collection of occurrence data, covering contaminants, zoonoses, pesticides, nutrients and others. A working group (WG) on a uniform Food Classification and Description System for EFSA was established in 2009. The proposals of the WG developed so far were presented and discussed.

The interim proposal of the WG is that the system is primarily for the exchange of data with EFSA rather than a replacement for national systems of classification but that, for Member States not already using a system, the EFSA system may be a pragmatic option. The WG intends to develop its proposals, based on existing systems adapted to the specific needs of EFSA and the EU for known and anticipated legislative requirements. In addition, the proposal will aim to ensure sufficient flexibility to cater for 'unknown unknowns' that are anticipated to emerge over its lifetime of use and to provide a practical system for the purposes of EFSA and the EU.

The approach proposed by the WG is that the system should consist of a basic food list with facets included to allow definition of additional properties, which can be aggregated or disaggregated in a hierarchical system. FoodEx1 is proposed as the starting point for the food list, to be complemented with the Global Environment Monitoring System - Food Contamination Monitoring and Assessment Programme (GEMS/Food) and EU Pesticide and Zoonoses legislation and defined facets.

1. Does the presented concept of the system meet the needs of all areas to be covered?

The concept of a basic hierarchical food list with a system of facets to define additional properties was endorsed by the discussion group. There was discussion regarding whether LanguaL, a pure facets-only system, would be a good potential basis, with modifications, and a study within the Food Classification WG was proposed to investigate the use of LanguaL as a master code for food classification in the different areas of EFSA's work (e.g. pesticides, zoonoses).

It was noted that the food list and the facets would potentially contain the same information in a different form and that pre-coding of facet combinations into food list items would be beneficial in terms of control by reducing ambiguity and speeding up data capture. However a

limited food list with potential to refine the classification through use of facets would provide a higher degree of flexibility in describing a food.

The balance between flexibility and control was highlighted as key to successful implementation. Flexibility is needed for EFSA, locally in Member States and for other reporting needs but control is needed to ensure comparability across Member States and data collections. The discussion group noted the key requirement that the system should avoid multiple valid classifications of the same food, which would reduce the desired comparability across Member States and data collections.

2. What are the major challenges/obstacles for using the presented concept at EFSA as well as in the Member States?

The discussion group identified several significant challenges in implementing a food classification system.

It will be necessary to avoid the possibility of ambiguous classifications, which would reduce comparability across data from different Member States and different data collections. The definition of the bifurcation between the food list items and the facets will be important in ensuring the balance between flexibility and control.

The information available at the point of data capture may not be sufficient to fully classify the food. For example, in the case of consumption data, respondents may not distinguish accurately between soft and semi-soft cheese. Further, the time available for the classifier to complete the classification may be limited. There was discussion regarding the importance of the food classification to analysts and risk assessors and the view was put forward that it was important for sampling officers to take time to fully classify a food.

The availability of a data capture system (preferably hand-held) to facilitate accurate and complete classification was discussed and with the possibility that such a system would prompt the user for compulsory or advisable facets based on other information recorded. Training on the classification system was identified as important.

In order to overcome some of these challenges, the WG might consider the potential of building hierarchies so that data can be recorded at different levels without ambiguity, designing hierarchies to assist coding data collection-specifically, implementing compulsory levels of reporting per data collection and defining the level of disaggregation needed, especially for food consumption data.

3. Which additional features would improve the system and make it better suitable to operational use in the Member States?

The discussion group agreed that it was difficult to be specific regarding potential improvements to the proposed system until the proposal was further defined particularly with respect to the size of the food list, the number of facets and the controlled values proposed for the facets.

In general terms, the group suggested that additional aspects of the sampling process may influence facets needed. The ability of the system to prompt classifiers to record appropriate

facets based on data capture (e.g. if the test parameter is acrylamide, a 'processing' facet would be required; if the test parameter is semicarbazide, a 'packaging' facet would be required) and the ability to limit facet values based on data capture (e.g. if the food is egg, 'dried' would be a valid facet but 'concentrated' would not) would help to limit the potential for ambiguous classification by users.

4. How should the system be offered to users? Which formats? As web application or service?

The discussion group's view was that the system would need to work in conjunction with the Standard Sample Description Guidance recently published by EFSA; some of the potential facets being discussed are already defined in that guidance and rationalisation would be needed to avoid duplication.

Implementation of the system would vary depending on whether a Member State opted to use the EFSA system directly or map to it from their National system. Assistance in mapping from some commonly used systems would be useful e.g. EPIC-Soft. Support for each Member State in using the new system could be assessed based on their systems, approaches and the data collection processes.

On the topic of languages, the group referred to the approach of the Standard Sample Description Guidance which provides codes and English descriptions and definitions, leaving translations as a local responsibility and suggest that this may be a pragmatic approach.

5. How could the updating of the system be organised? Who should have which role?

Maintenance was discussed as an important task and an EFSA group was proposed to review and maintain the system regularly. It was suggested that a network of co-ordinating contact points in each member state could work in conjunction with a central EFSA-led steering group for maintenance of both the Food Classification and the Standard Sample Description systems with specialist sub-groups as necessary. It was suggested that new terms and amendments would be requested through this mechanism and that documentation of the rationale for choices and decisions be made within the system design. The need for a timely response to amendment requests was recognised and could be included in the operational design of the system maintenance group.

3.3. Discussion Group 3 - Composite foods in food classification – a permanent challenge

Rapporteur: Simone Bell
Chair: Tue Christensen

The need of defining the term "Composite foods" arose among the participants. The opinion of the participants varied and a main discussion point was the fact, that a composite food itself can be used again as ingredient of another composite food (e.g. tomato sauce already consists of more than one ingredient and is used as ingredient for a pizza).

Various topics and questions were discussed by the participants:

- Do manufactured foods count as composite foods?
- Definition of one ingredient? One ingredient can be everything, e.g. milk, flour, egg.

- Whole milk is a single ingredient. It can be heated and after adding a nutrient retention factor for calculation purposes it becomes a prepared food
- Are composite foods different than home-made dishes? Home-made dishes are also composite foods
- An ingredient list is not a recipe as one does not know the single amounts, the method of preparation and the cooking parameters

Due to the short time for discussions, the discussion group agreed on a pragmatic definition, which states: A composite food is a food item, which consists of more than one ingredient. It can be either homemade or manufactured and either raw (e.g. salad) or prepared (e.g. lasagne).

1. Are there different needs with respect to composite foods in the different areas (consumption, composition, contaminants, zoonoses, pesticides, ...)?

Yes, there are different needs with respect to composite foods in the different areas, although these domains do not totally differ from each other!

It became clear that for the areas mentioned above, more detail has to be provided, e.g. for food consumption it is necessary to have information on portion/serving sizes. Furthermore, the discussion group highlighted, that despite the approach of collecting all the information (as described below), the group is aware that it will not always be possible to implement this approach. Examples of information needed in each area follow:

1. Consumption and composition:
    a. List of ingredients
    b. Amounts of ingredients
    c. Degree of heat treatment
    d. Portion/serving sizes
2. Contaminants:
    a. List of ingredients
    b. Amount of ingredients
    c. Preparation parameters, degree of heat treatment
    d. Geographical origin
3. Zoonoses:
    a. Degree of heat treatment, preservation methods
    b. Species
    c. Geographical origin
    d. List of ingredients
    e. Packaging
4. Pesticides:
    a. Regulation relies on RAC (raw agricultural commodities)
    b. Regulation considers the products unprocessed; edible + inedible part
    c. Geographical origin per ingredient (if possible)
    d. List of ingredients

2. Contamination of food may be related to the preparation and processing of a composite food or may be attributable to a single ingredient of the composite food. Is there a suitable system to capture information, both on the composite food as well as on ingredient level, and how should these foods be classified in a Food Classification and Description System?

There is no available system that covers both the composite foods and the single foods. However, there are efforts available in Europe, such as the approach on recipe calculation, which is used in food composition databases worldwide and the method on full ingredient indexing, which is used by LanguaL.

Currently composite foods have to be broken down to single ingredients (e.g. for risk assessment, for the evaluation of food consumption surveys and for the detailed description and provision of food composition data).

The discussion group agrees that it should be possible to look at a food item at the single ingredient level and at the composite level as well. Composite foods have to be handled as whole for special cases of risk assessment, as contamination of food may be related to the preparation and processing of a composite food or may be attributable to a single ingredient of the composite food. Therefore, it is advisable to:

- Validate the use of the available efforts/methods for the use in the area of risk assessment, as they have been used only in the area of food composition data so far
- Explore the application of ontology further as a solution for this challenge
- Try to link the information originating from external databases and benefit from existing resources, e.g. GS1 (barcode), as lots of information related to the food items is already stored there

In order to apply the full ingredient indexing for a classification system, a parallel system is needed, which handles the ingredient list and recipes. No food classification system is able to manage it alone so far.

During the discussion the question on "what does the EFSA food classification system looks like?" arose. For some participants it is difficult to provide their opinion without having a prototype/draft of the system.

Participants mentioned that EFSA has already data from 27 food consumption surveys included in the Concise Database. The question arose whether this database will use the same classification system, or a new one, or only a link between the Concise Database and the classification system.

One participant provided an introduction in the structure of the Concise Database and mentioned that EFSA asks member states to provide all information, which they have on food consumption. The current planned EFSA food classification system should be flexible and should map one or more systems, which uses other classifications.

Another participant highlighted, that until the European project EFCOSUM (European Food Consumption Survey Method), no consumption survey in any Member State had reported on composite foods. The need of recording composite foods came up after this project. One participant mentioned that it would be useful to provide EFSA with more suggestions on how to proceed on the handling of composite foods and that involved participants should start preparing suggestions on that.

There is still a different perception of what is a composite food. There is also a different perception of food groups, e.g. pizza is considered/classified as bread or sometimes even as cheese product. It might be a challenge, when one tries to fit composite foods into existing

groups based on the principal ingredient. With the development of a proper classification system, this challenge might be met.

3. How to fit simple food ingredients and complex composite foods in a unique view, suitable for exposure analysis?

The discussion group suggests including a separate group for composite foods and possibly subgroups, e.g. soups, pasta dishes, sandwiches in the classification system. Prepared foods like "carrot, cooked" should remain in the original group, most likely, "vegetables", as this is only a simple preparation method and only one ingredient (carrot) is included.
However it does not totally eliminate the need to look into the foods at ingredient level, if required. The user of the classification system should be able to look into the information about each single ingredient of a composite food.

4. What type of information (such as yield, retention, weight loss factors, and standard recipes) is required to adequately use the food classification system to describe and quantify ingredients of composite foods?

In terms of description of ingredients, a classification is needed, which is able to describe foods at the ingredient level and which includes information on cooking parameters (e.g. temperature, pressure, time, etc.).

In terms of quantification of ingredients the following information is required: yield and nutrient retention factors, processing factors, amount of ingredients and the ranking in the ingredients list.

In order to assess the risk posed by pesticides, the user might need to break down to ingredients as well.
One participant suggested the inclusion of a sort of "time-stamp" to the information collected, which documents and reflects the actuality of the available data.

One point mentioned was that the main objective of EFSA's food classification system is to improve the risk assessment workflow. However, there is still no common system available.
A representative of GS1 suggested including the barcode in the EFSA's food classification system. The atmosphere for the willingness of food industry to provide the information on the barcodes to authorities like EFSA or institutions carrying out food consumption surveys is improving and the information from the food industry is getting more and more available and transparent (e.g. ingredients, nutrient facts on the website or in the supermarkets). Therefore, the discussion group suggests trying to link the information originating from external databases and benefit from existing resources, e.g. GS1 (barcode), as lots of information is already stored there; as mentioned above. The GEPIR (Global GS1 Electronic Party Information Registry) is a distributed database that contains basic information on over 1,000,000 companies in over 100 countries, and can be found under the national GS1 website.

The technology, which enables the access to food information stored behind the barcode via mobile phones and other electronic devices, is already available. The discussion group suggested that one of the colloquium's outcomes should be to push the EC and the food industry towards making this kind of information available for users.

3.4. Discussion Group 4 - How feasible is collection of detailed food consumption data for risk assessment purposes?

Rapporteur: Steve Crossley
Chair: Polly Boon

Discussion group 4 considered the topic of "How feasible is collection of detailed food consumption data for risk assessment purposes?" Within this broad topic, four individual questions were considered by the group, namely:

1. What is the optimal amount of detail to be collected within food consumption surveys to meet the risk assessment needs of EFSA and EU Member States?
In considering this question, the discussion group started by considering what sort of questions might be asked of EFSA in the future. The group agreed that this was difficult to predict given the ever-changing nature of food regulation and emerging risks.

The discussion group agreed that, in principle, it is desirable to collect as much detail as possible during dietary surveys. However, it was also recognised that there is a trade-off with costs and practicality. In particular, if too many questions are incorporated into a survey, then participation rates will very likely be negatively affected. Typically the questioning of participants within dietary surveys should not take more than 30-40 minutes per respondent. Because of these factors the group was not able to give a clear answer on the optimal amount of detail to be collected within food surveys.

In deciding on which facets to request information in dietary survey interviews, it was agreed that the reliability of the information that would be gained should be taken into account. Some information that is desirable for risk assessments may not be able to be provided by participants in surveys.

The discussion group agreed that a pan-European dietary survey for each population sub-group is required to facilitate EFSA's risk assessment work. Consideration should be given to the possibility of performing a more in-depth survey of a sub-set of the survey population in order to capture important information at a higher level of detail. This could entail more in-depth questions regarding certain foods, or additional collection of exposure or dietary biomarkers from the same subjects, etc. It was also considered important to allow for the inclusion of some nationally-specific questions, for example regarding foods that are important at national level.

2. Which other data sources are available to fill possible gaps in detail as obtained from food consumption surveys for risk assessment purposes?

The discussion group identified a number of other data sources that can be useful to obtain dietary information. However, the group emphasised that these data sources are supplementary to the dietary survey data, and can never replace them. Detailed exposure assessments involving for example population sub-groups or high percentile consumers cannot be undertaken without individual food consumption data obtained from dietary surveys. The data sources identified were:

1. Market research data, retail sales data (including loyalty cards information) and market share information (these sources may provide information on, for example, the proportion of people consuming a certain type, brand or cultivar of food).
2. Ongoing industry information on changes to product formulation.

3. GS1 has significant potential, but participation into it is voluntary and there may be limitations on the supply of information.
4. Data from the kitchen menus from caterers, schools, elderly homes and hospitals.
5. Food frequency questionnaires.
6. FAO statistics on production (food balance sheet data).
7. Household budget data and national statistical data on food buying behaviour of consumers.

With respect to occurrence data, the group agreed that the food industry was also an important information source, although industry commonly has concerns about confidentiality and potential brand impact. It was agreed that these concerns can be alleviated by using trade associations to coordinate and make the occurrence data anonymous. In providing such data, it was stressed that the limitations and nature of the data need to be clearly described. For example, is targeted versus representative monitoring, is the data collected on the food in the form in which it is consumed (e.g. after cooking). However, this is true for all occurrence data, independent of the source of the data.

3. What are the benefits and drawbacks of food consumption data, where foods consumed are identified via a food list, and facets and descriptors (and possibly including recipe information)?

The discussion group considered the advantages and disadvantages of having a comprehensive basic food list versus a shorter basic food list in which facets and descriptors are used to capture more details about the foods consumed (e.g. cooking method, brand, cultivar, country of origin, etc).

It was agreed that ease of identification of the detailed food type can be an advantage when using comprehensive basic food lists, since there is no need to utilise the facets and descriptors information. It was also recognised that such an approach can save time in undertaking the dietary survey by reducing the number of questions asked.

However, there are also disadvantages in having all the details of a food in the food name, rather than utilising facets/descriptors. In particular, it may not be practical to have one comprehensive food list when coding the foods. A further disadvantage is that having long food names has the potential to introduce error and bias from both the interviewer and the respondent.

The alternative approach of using a short basic food list and asking a number of questions about more details of the foods consumed (facets and descriptors) that would make it possible to add useful additional information and can thus be more flexible in the information gathered.

Overall, the view of the discussion group was that a balance needs to be found between the size of the basic food list (not too small but also not too big) and the number of additional questions (facets and descriptors) that can be asked during a dietary survey.

A further issue considered by the discussion group, was whether respondents should be asked for information on the specific recipes used in home-cooking of consumed foods, as opposed to the use of standardised recipes to disintegrate complex dishes into their (raw) ingredients. The group agreed that standardised recipes are easier to apply. However, country or regional

recipes may be required for some foods due to differences in certain foods between countries or regions, such as pizza.

4. Which facets/descriptors would need to be included in the food classification system to better meet risk assessment needs? Which of these facets/descriptors can realistically be obtained through an interview (or through food records)?

The discussion group first identified 23 facets/descriptors that might be included as part of a dietary consumption survey. The discussions were mainly focused on dietary recall method, where the interviewer is responsible of asking questions concerning the descriptors and where the burden to subjects studied remains low. These facets/ descriptors were identified without the help of a list of facets / descriptors that are presently considered in national dietary surveys (e.g. when using EPIC-Soft to record food consumption data). The discussion group therefore feels that the list it prepared is only indicative of the facets/descriptors that may be addressed in a dietary survey, and recognises that this list may miss some facets/descriptors that may be important for risk assessment purposes and may include certain facets that could be combined into one.

It was agreed that there were two key criteria for whether a facet/descriptor should be included in the food classification system. The first criterion was the desirability, or usefulness, of collecting the data from the perspective of EFSA's dietary risk assessments. The second criterion was how realistic is it is to obtain reliable information as part of a food consumption survey interview on the facet/descriptor.

The discussion group agreed to prioritise each of the facets based on a score of 1-5 for each of the criterion (one = low; five = high). To qualify as a high priority the group considered that the facet needed to be both desirable and realistic. The group therefore identified nine high priority facets which scored three or above for both of the criteria. The facets and scores are summarised in a tabular overview (Table 2) with the high priority facets in yellow. It was emphasised that the scoring for each facet/descriptor was only based on a short discussion within the group and it should therefore be considered as indicative only.

Table 2: List of possible facets and scores regarding their desirability and how realistic they are to be included in a dietary recall interview (scoring indicative only).

Facets	Desirability	Realistic in interview	Comments
Industrial processing and preservation method, e.g. canning, drying, pasteurisation, sterilisation	4	2	Desirable. Consumer may not know this information. 2 out of 5.
Home food preparation, e.g. cooking (label instruction), peeling, food storage conditions etc.	5	3.5	Very desirable. Separate questions for cooking and peeling.
Part of the food consumed, e.g. apple fruit peel, animal fat	3	2	
Restaurant food preparation, e.g. cooking (label instruction), peeling, food storage conditions etc.	5	1	Not practical to obtain the information.
Grown at home or not	4	3	Fruit, vegetables, meat and egg etc.
Species, e.g. fish and animals	5	2-4	Some consumers would not know. Easier for meat than for fish.
Origin from another country	4	2	Many consumers are not aware of country of origin.
Type of meat cut, e.g. chicken wing, chicken breast etc.	2	3-4	
Packaging type	5	1-4	
Processing medium	3	1-3	
Fortified with nutrients	5	1-3	
Location of purchase i.e. retail details	2	4	

Facets	Desirability	Realistic in interview	Comments
Variety of fruit and vegetables	2	2	
Nutritional claim for the product, e.g. low fat	2	3	
Production method, e.g. organic and free-range	4	3-4	
Sustainability labelling, e.g. food miles, carbon footprint	1	2	
Beverages. Consumed 'as is' or diluted	5	5	
Sugar/sweetener content	5	4	
Fat content	5	3-4	Depends on the food. For milk normally the consumer would know.
Table salt added by the consumer?	2	4	Separate question in some food consumption surveys. Minor part of total salt intake.
Physical characteristics, e.g. sauce puree grated etc.	3.5	5	
Brand names	3	2	
Colour, e.g. processed drink or confectionary	2	3.5	

With regard to dietary surveys which are based on food records (rather than interviews), it is possible to collect additional facet/descriptor information, but with limitations of increasing subject burden and possibly also due to difficulty to compile user friendly food record forms to be filled in. Some of the additional information (e.g. labelling information) would be more realistic to obtain with a food record method, because the information may be filled in at home, where the food packaging materials are available. However, conducting dietary surveys using food records are considered more cumbersome (higher subject burden and more data handling after the collection phase) and are commonly associated with a lower response rate. Furthermore, respondents are known to adjust their eating behaviour when filling in food records. Therefore EFCOSUM and EFSA have recommended the use of interviews (24-h recall) in the adult population that are not announced beforehand to obtain dietary information.

IV. CONCLUSIONS & RECOMMENDATIONS

During the final plenary session, the scientists discussed the outcomes of the different discussion groups acknowledging that there are different food classification systems in use for different purposes. The discussions of the participants led to the agreement that no single system currently exists that meets the demands of all potential end users defined by the participants. Furthermore, the participants agreed that development of a unique system that would meet all requirements would be equally impossible. However, it was recognised that, despite the considerable challenges to be faced, it was still appropriate to develop a multi-faceted system that should enable end-users to analyse the data from different perspectives. In developing its classification system, it will be important for EFSA to have clear objectives to make the system fit for purpose, and to work closely with the Member States to meet the greatest needs and ensure the most flexibility. It was emphasised that EFSA's food classification system should be able to provide a central linking system that can serve as a translational function between current disparate systems to promote more accurate exposure calculations. This would include foods at raw agricultural commodity level (e.g. grains), at ingredient level (e.g. flour) and foods as consumed (e.g. bread) ideally connected by mapping rules and conversion factors.

Recurrent issues addressed in the discussion were the need for flexibility in the system to be able to meet future and unanticipated demands for risk assessment as well as innovation in food products. Whilst such a system should retain a high degree of flexibility, it needs to be balanced against the need for controlled use. Other issues discussed were: the importance of detail versus feasibility of data collection, the need for the system to deal with composite foods, the challenge to meet needs of the different sectors stemming from different legislative contexts. It was also suggested that the food industry could make food information stored behind the barcode via mobile phones and other electronic devices available for other users.

Participants welcomed the first outline of EFSA's working group for a food classification system for risk assessment purposes. There was general support for the system to include a food list with the possibility of adding facets and descriptors. The ideal length of the food list and number of facets/descriptors will need to be determined and it will be important to consult with Member States and possible stakeholders. In building user-friendly coding software, it will be advisable to build on useful experiences and existing systems. Finally, it was acknowledged that EFSA should foresee the need to update and maintain the system and provide clear guidance on its use and possibly training in these efforts.

A number of specific recommendations were made to EFSA's Working Group on Food Classification in moving towards this ultimate goal:

1. The creation of a basic food list complemented by a number of facets/descriptors was supported, but the right balance between information held in the food list versus the information captured in facets/descriptors needs to be further explored.
2. The use of pre-combined terms to facilitate data entry should be explored, and for such a system to remain pragmatic, the list should aim not to exceed ~1,000 foods.
3. A tiered system linking foods at different reporting levels (raw ingredient, ingredient, food) should be further explored.
4. The mapping/linking of this system with existing databases, e.g. WHO/GEMS foods, CODEX food classification, EuroFIR etc. should be considered. For this purpose, the

use, or partial use of comprehensive systems, such as LanguaL as a bridging classification system should be further explored.

5. The system should facilitate the addition of quantitative information (i.e. recipes, conversion factors, etc). The internal or external facilitation of such data needs to be further discussed. Incorporation of additional information into the system would be beneficial and could aid harmonisation on a broader level.
6. Comprehensive guidelines and/or training need to be provided to support end users in the implementation of the system to be developed. The question of ease and speed of classifying foods should be considered.
7. The system should be compatible with the recently developed guidelines on the Standard Sample Description system[1].
8. Administration and management of the system should be centralised. Maintenance of the food classification system should be centrally controlled to ensure ongoing consistency across Member States.
9. Within the classification system, composite foods should be grouped in a separate hierarchy (or group) and not together with single ingredient foods.
10. The use of ontology as an alternative to a hierarchical system should be further explored, looking for example at the Australian experience with this as it develops.
11. The system needs to be flexible enough to address continuing changes in food products and emerging and unanticipated hazards.

[1] EFSA (European Food Safety Authority), 2010. Standard Sample Description for Food and Feed. EFSA Journal, 8(1):1457, 54 pp. Available from: www.efsa.europa.eu