
GEMS/Food Programme

**INSTRUCTIONS FOR ELECTRONIC SUBMISSION OF DATA ON
CHEMICAL CONTAMINANTS IN FOOD AND THE DIET**

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**World Health
Organization**

DEPARTMENT OF FOOD SAFETY AND ZOOONOSIS

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NOTE TO USERS

In the past, contaminant data had been submitted to WHO by the GEMS/Food Participating Institution or Collaborating Centre via written forms transcribed from laboratory reports. In 1996, WHO started the development of a new data structure for food contaminant data and protocols for the electronic submission of such data using a computer program (Operating Program for Analytical Laboratories or OPAL) to facilitate the entry, retrieval and submission of national food contamination monitoring to WHO. In 2011, WHO implemented web-based system for data submission (OPAL-web). This manual presents protocols for submitting individual and aggregate data on contaminant levels in foods through OPAL-web.

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1 PREAMBLE: Access to OPAL web

1. To create a WHO account, please complete the following online registration form:

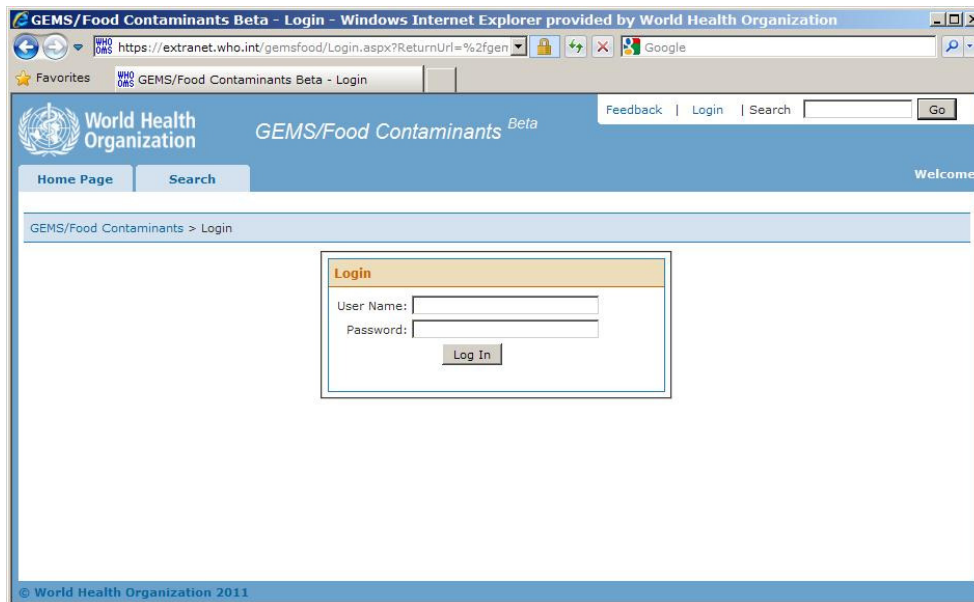
<https://extranet.who.int/ads/adswebinterface/create.aspx>

2. Once you have successfully registered and activated your account please send your new username by e.mail to vergerp@who.int in order to complete the creation of your new GEMS/Food database account.

3. Once you registered you can access the GEMS/Food website:

<https://extranet.who.int/gemsfood/>

and you should log in to the database using your new WHO account created in step 1 by clicking the **Login** link in the top right of the home page.



4. Once you have logged in to the database, you will have access to the Excel templates for contributing data.

2 INTRODUCTION

2.1 GEMS/Food Programme

Established in 1976, the Global Environment Monitoring System / Food Contamination Monitoring and Assessment Programme, commonly known as GEMS/Food, began as a joint project between the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) with WHO serving as the implementing agency. Although the project came to an end in 1994, WHO has continued to implement GEMS/Food for the benefit of its contributing institutions.

The purpose of GEMS/Food is to compile data on food contamination and human exposure from different countries for global synthesis, evaluation and presentation. GEMS/Food informs governments, international and intergovernmental institutions, such as the Codex Alimentarius Commission, and its scientific advisory bodies, such as the Joint FAO/WHO Meeting on Pesticide Residues (JMPR) and the Joint FAO/WHO Expert Committee on Food Additives (JECFA) on the levels and trends of contaminants in food, their contribution to the total human exposure and their significance with regard to public health and trade.

2.2 Submission of Data to the GEMS/Food Database

GEMS/Food participating institutions have historically submitted data to GEMS/Food on standardized data forms. In 1996, GEMS/Food started the development of a new data structure and protocols for the electronic submission of such data. In 2011, the WHO GEMS/Food programme implemented web-based protocols to replace and improve the computer program OPAL.

The protocols outlined below should be followed by GEMS/Food participating institutions (WHO collaborating Centres for food contamination monitoring and National GEMS/Food Centres) when submitting data. The protocols require a mapping between the national food classification and the GEMS/Food coding system (Refer to the worksheet *2: Food Mapping* in the GEMS/Food template files.). This mapping should be done once if the national classification is stable. When new items are added at national level they should be linked with the corresponding GEMS/Food code.

The GEMS/Food code is based on a hierarchical classification with 2 levels (Refer to the worksheet *Food Classification* in the GEMS/Good template files). The first level (WHO Food Group) corresponds to broad categories usually reported in food consumption surveys. These categories are expected to be valid for all types of diets around the world and should allow for an international dietary exposure assessment. The second level (WHO Food Identifier) corresponds to the detailed food descriptors used in the *Codex Alimentarius* Committees and to particular foods, processed or not, and analysed as purchased or as consumed.

The relative rigidity of having only 2 levels of classification is balanced by the possibility to add easily detailed food descriptor at level 2 and to remain able to assess the dietary exposure internationally in a consistent way at level 1.

3 PROTOCOLS FOR ELECTRONIC SUBMISSION OF CONTAMINANT CONCENTRATION DATA

It is requested that data submitted to the GEMS/Food database conform to the format defined in this section. Collaborating Institutions should access the OPAL website <https://extranet.who.int/gemsfood/> and login using the user name and password provided by the WHO GEMS/Food manager.

The home page of the GEMS/Food website provides useful information about the programme as well as an access to published reports.

Data can be submitted by:

- Downloading the latest templates for individual and/or aggregated results, filling the relevant template and uploading it on the website;
- Directly uploading the templates previously downloaded and filled. In that case, the system will ensure that the template corresponds to the last version available and if not will provide the user with an updated version.

Template management: IMPORTANT NOTICE

1. The templates and their updates are specific to the Institution login to the system.
2. In case of update of the templates by WHO when you have already enter your data in an older version:
 - Open your old template, go to sheet number 2 "mapping" and select all your data in columns A, B and C from row 2 and below.
Do not select the row 1 nor the grey column (E) containing the WHO Food Code
 - Copy your selection
 - Go to the mapping sheet of your new template
 - Go to "edit" menu and choose "paste special" then select "values only".
Do not paste using Ctrl V because formulas should not be copied in new template.
 - Go to the sheet number 3 "results" in your old template, select and copy your data.
Do not select the row 1 nor the grey columns (A, B and C).
 - Copy your selection
 - Go to the sheet number 3 "results" in your new template
 - Go to "edit" menu and choose "paste special" then select "values only".

The grey columns in the mapping and in the results should fill automatically. Check the errors in column A in sheet "results" and correct them if any occurs and then you can save and upload the new template.

3.1 Individual Contaminant Concentration Data

When uploading the template for the submission of individual data, the user get access to an excel file containing 5 worksheets:

- The worksheet 1 (**Start**) contains a check list for Institution preparing a data submission. When all the data submitted are for a single chemical you should select it in worksheet 1. In the case of submission for a chemical not listed in the worksheet, the data provider could enter the chemical name as free text. This name will be included in the next update of the templates. If you wish to submit data for more than 1 chemical then select "Multiple". Then double-click on line 2 (Enter local food identifier...." or go to worksheet 2.
- The worksheet 2 (**Food Mapping**) contains the tool to be used for mapping the local food identifier with the 2 WHO levels of classification: level 1 called WHO Food Group (Column B) and level 2 called WHO Food Identifier (Column C). The WHO Food Code (Column E) is generated automatically as a function of the previous choices for levels 1 and 2.
- The worksheet 3 (**Individual Analysis Results**) should be filled with individual data to be submitted. When a local food identifier (column D) has been mapped using worksheet 2 or during a previous submission of data, it will be recognized by the system and the column B and C will be filled automatically with the WHO Food identifier and WHO code. The other columns should be filled following the instructions below. The blue columns are mandatory, the white columns can be left blank if the information is not available. The column A will be filled automatically when an error will be detected or on the contrary when all the fields will be correctly informed.
- The worksheet 4 reminds the WHO food classification.
- The worksheet 5 reminds the list of chemicals considered for submission.

The following sections describe each of the data fields in the GEMS/Food template for Individual Analysis Results and the way in which the data must be reported.

3.1.1 Description of the fields in worksheet 2 (Food Mapping)

The **column A** (Local food identifier) consists in the name given to the food in the national database. It could be written preferably in the original language or translated precisely in English. When a local food identifier is entered for the first time by a considered institution into OPAL-web it should be mapped with the WHO food grouping system. The local food identifiers can be copied and paste from national databases. Each local food identifier should firstly be linked with a WHO food group in **column B** corresponding to a broad food category or **level 1 of the classification**. These 21 broad food categories appear in a drop down menu.

After the identification of the food group, the local food identifier should be mapped with the closer WHO food identifier, or **level 2 of the classification**, listed in **column C**. The WHO food identifiers appear in a drop down menu. If the precise food name is not listed, the more generic sub-group listed in CAPITALS should be chosen. The generic food names (e.g. CITRUS FRUIT) appear after the corresponding list of detailed names. **IMPORTANT:** If you

do not have the information on the detailed food category (e.g. "fruit") you should select a WHO Food Identifier similar to the WHO Food Group (e.g. Fruit and fruit product NES). NES means "Not Elsewhere Specified" and is listed in alphabetic order in the dropdown menu of WHO Food Identifier.

The level 2 of the classification is mainly based on the commodity categories developed by the Codex Committee on Pesticide Residues with the addition of some categories from the General Standard for Food Additives (GSFA) developed by the Codex Committee on Food Additives for processed food. When selected, the WHO Food Identifier is automatically generating the corresponding WHO Food Code (or Codex code) in field E.

The number of food names to be entered in worksheet 2 is limited to 5,000 lines.

3.1.2 Description of the fields in worksheet 3 (Individual Analysis Results)

Field D: Local food identifier

Field characteristic: Mandatory

Field size: Free text (alphanumeric characters)

Field contents: The local food identifier consists of the name given to the food in the national database. It could be written preferably in the original language or translated precisely in English. When a local food identifier is entered for the first time into OPAL-web it should be mapped with the WHO food grouping system using the "food mapping" sheet of the template (worksheet 2). When a local food identifier has been mapped, the fields B and C are filled automatically when pressing enter after typing field D.

Notes: The number of food names to be entered in worksheet 3 is limited to 5,000 lines.

Field E: Serial number of the record

Field characteristic: Optional

Field size: Free text (alphanumeric characters)

Field contents: The serial number of the record consists of the code given to the record in the national database. It can help avoiding the duplicate submission of records when the code is unique for a considered sample. In case of submission of data for more than 1 chemical or for several congeners, the serial number is essential to identify the different analysis done on the same samples.

Field F: Contaminant

Field characteristic: Optional if the template is for a single chemical and that its name is mentioned in worksheet 1

Field size: Rolling menu or Free text (alphanumeric characters) if the chemical is not listed.

Field contents: This is the name of the chemical analysed. Several chemicals can be submitted in the same template

Field G: Food Origin

Field characteristic: Optional

Field size: Rolling menu

Field contents: This is identifying if the Country of Origin of Food is the same as Country Providing Record. Four options are possible:

- domestic,
- imported,
- mixed origin
- or unknown.

Field H: Sampling Date

Field characteristic: Mandatory

Field size: Date

Field contents: The date when the sample was collected, expressed in the form of year (YYYY) or year and month (YYYY-MM) or year and month and day (YYYY-MM-DD). A dash (-) must separate day, month and year.

Field I: Representativeness/reliability of the Samples

Field characteristic: Mandatory

Field size: Rolling menu

Field contents: This field may contain only one of the following statistical descriptor:

- Random sampling
- Targeted sampling

Notes: It is unlikely that sample results reported to GEMS/Food would be based on a statistical sampling method but the data could still be the result of random rather than targeted sampling.

Field J: Identification Number of Laboratory Performing Sample Analyses

Field characteristic: Optional

Field size: Free text (alphanumeric characters)

Field contents: This indicates the laboratory submitting results in this set of records. Sequential numbers should be used e.g. Lab A = 1, Lab B = 2... etc...

Field K: Indicator of Analytical Quality Assurance

Field characteristic: *Optional*

Field size: Rolling menu

Field contents: This field may contain only one of the following options to indicate the level of laboratory proficiency:

- The laboratory (or the majority of the contributing laboratories) used only internal quality assurance and reference standards.
- The laboratory (or majority of the contributing laboratories) had successfully participated in relevant proficiency tests during the sampling and analysis period.
- The laboratory (or majority of the contributing laboratories) had been officially accredited for the relevant methods during the sampling and analysis period.
- Or unknown.

Note: Relevant means similar or identical food matrices and identical contaminants. In general, official accreditation is considered a higher criterion than successful participation in proficiency testing, followed by internal quality assurance and control only.

Field L: Measurement units for Contaminant Levels

Field characteristic: *Mandatory*

Field size: Rolling menu

Field contents: This field should contain one of the following options to indicate the unit of reporting for the contaminant concentration:

- mg/kg (milligram per kilogram or parts per million - 10^6)
- μ g/kg (microgram per kilogram or parts per billion - 10^9)
- ng/kg (nanogram per kilogram or parts per trillion- 10^{12})
- pg/kg (picogram per kilogram or parts per quadrillion- 10^{15})
- Bq/kg (Becquerels per kilogram)

Note: In the case of data submission based on not listed measurement units, the data provider could enter the unit as free text which will be included in the next update of the templates.

Fields M and N: IMPORTANT NOTICE

Regarding the LODs and LOQs for individual data and described below, automatic rules have been implemented into the system to ensure the consistency of data submitted. If these rules are not fulfilled the dataset will be automatically rejected.

'LOD' must be greater than 0
'LOQ' must be greater than 0
'LOD' must be less 'LOQ'

Field M: Limit of detection

Field characteristic: Mandatory for results below the LOD or below the LOQ

Field size: Free text (alphanumeric characters)

Field contents: The limit of detection (LOD) is the minimum concentration of a contaminant that can be qualitatively measured in the specific food. This field contains the limit of detection reported by the laboratory.

Field N: Limit of quantification

Field characteristic: Mandatory for results below the LOD or below the LOQ

Field size: Free text (alphanumeric characters)

Field contents: The limit of quantification (LOQ) is the minimum concentration of a contaminant that can be quantitatively measured in the specific food with an acceptable level of accuracy and precision. This field contains the limit of quantification reported by a laboratory.

Field O: Basis for the Analytical Results

Field characteristic: Mandatory

Field size: Rolling menu

Field contents: This field may contain only one of the following options to indicate the basis upon which the analytical values were determined:

- Fat content
- Dry weight
- As is (raw, fresh)
- As consumed

Field P: Portion analysed

Field characteristic: Mandatory

Field size: Rolling menu

Field contents: This field may contain only one of the following options to indicate if the analytical values were determined on:

- edible only
- or total food i.e. edible + inedible portion of food.

Field Q: State of food analysed

Field characteristic: Optional

Field size: Rolling menu

Field contents: This field may contain only one of the following options to indicate if the analytical values were determined on:

- cooked
- raw food
- or unknown

Field R: Results

Field characteristic: Mandatory

Field size: Free text (alphanumeric characters)

Field contents: This is the result of an individual measurement for the contaminant in question.

Notes: Results below the LOD or for which quantified results are not reported should be entered as 0 (zero). When integrated in the database they will be converted in "Non detected". In that case reporting LOD and LOQ in columns M and N is mandatory.

Field S: Confidentiality of Data

Field characteristic: Optional

Field size: Rolling menu

Field contents: By default data are not confidential and may be used for the purposes of the GEMS/Food Programme. This field could be filled by "Yes" only if submitted data are confidential and if specific permission should be obtained before using the data.

Field T: Remarks/References

Field characteristic: Optional

Field size: Free text (alphanumeric characters)

Field contents: This field is used for noting remarks and/or references relevant to the data represented.

3.2 Aggregated Contaminant Concentration Data

When uploading the template for the submission of individual data, the user get access to an excel file containing 5 worksheets:

- The worksheet 1 (**Start**) contains a check list for Institution preparing a data submission. When all the data submitted are for a single chemical you should select it in worksheet 1. In the case of submission for a chemical not listed in the worksheet, the data provider could enter the chemical name as free text. This name will be included in the next update of the templates. If you wish to submit data for more than 1 chemical then select "Multiple". Then double-click on line 2 (Enter local food identifier...." or go to worksheet 2.
- The worksheet 2 (**Food Mapping**) contains the tool to be used for mapping the local food identifier with the 2 WHO levels of classification: level 1 called WHO Food Group (Column B) and level 2 called WHO Food Identifier (Column C). The WHO Food Code (Column E) is generated automatically as a function of the previous choices for levels 1 and 2.
- The worksheet 3 (**Aggregated Analysis Results**) should be filled with aggregated data to be submitted. When a local food identifier (column D) has been mapped using worksheet 2 or during a previous submission of data, it will be recognized by the system and the column B and C will be filled automatically with the WHO Food identifier and WHO code. The other columns should be filled following the instructions below. The blue columns are mandatory, the white columns can be left blank if the information is not available. The column A will be filled automatically when an error will be detected or on the contrary when all the fields will be correctly informed.
- The worksheet 4 reminds the WHO food classification.
- The worksheet 5 reminds the list of chemicals considered for submission.

The following sections describe each of the data fields in the GEMS/Food template for Aggregated Analysis results and the way in which the data must be reported.

3.2.1 Description of the fields in worksheet 2 (Food Mapping)

The **column A** (Local food identifier) consists in the name given to the food in the national database. It could be written preferably in the original language or translated precisely in English. When a local food identifier is entered for the first time by a considered institution into OPAL-web it should be mapped with the WHO food grouping system. The local food

identifiers can be copied and paste from national databases. Each local food identifier should firstly be linked with a WHO food group in **column B** corresponding to a broad food category or **level 1 of the classification**. These 21 broad food categories appear in a drop down menu.

After the identification of the food group, the local food identifier should be mapped with the closer WHO food identifier, or **level 2 of the classification**, listed in **column C**. The WHO food identifiers appear in a drop down menu. If the precise food name is not listed, the more generic sub-group listed in CAPITALS should be chosen. The generic food names (e.g. CITRUS FRUIT) appear after the corresponding list of detailed names. IMPORTANT: If you do not have the information on the detailed food category or if your aggregated sample is made of different food (e.g. "fruit") you should select a WHO Food Identifier similar to the WHO Food Group (e.g. Fruit and fruit product NES). NES means "Not Elsewhere Specified" and is listed in alphabetic order in the dropdown menu of WHO Food Identifier.

The level 2 of the classification is mainly based on the commodity categories developed by the Codex Committee on Pesticide Residues with the addition of some categories from the General Standard for Food Additives (GSFA) developed by the Codex Committee on Food Additives for processed food. When selected, the WHO Food Identifier is automatically generating the corresponding WHO Food Code (or Codex code) in field E.

The number of food names to be entered in worksheet 2 is limited to 5,000 lines.

3.2.2 Description of the fields in worksheet 3 (Aggregated Analysis Results)

Field D: Local food identifier

Field characteristic: Mandatory

Field size: Free text (alphanumeric characters)

Field contents: The local food identifier consists of the name given to the food in the national database. It could be written preferably in the original language or translated precisely in English. When a local food identifier is entered for the first time into OPAL-web it should be mapped with the WHO food grouping system using the "food mapping" sheet of the template (worksheet 2). When a local food identifier has been mapped, the fields B and C are filled automatically when pressing enter after typing field D.

Notes: The number of food names to be entered in worksheet 3 is limited to 5,000 lines.

Field E: Serial number of the record

Field characteristic: Optional

Field size: Free text (alphanumeric characters)

Field contents: The serial number of the record consists of the code given to the record in the national database. It can help avoiding the duplicate submission of records when the code is unique for a considered sample. In case of

submission of data for more than 1 chemical or for several congeners, the serial number is essential to identify the different analysis done on the same samples.

Field F: Contaminant

Field characteristic: Optional if the template is for a single chemical and that its name is mentioned in worksheet 1

Field size: Rolling menu or Free text (alphanumeric characters) if the chemical is not listed.

Field contents: This is the name of the chemical analysed. Several chemicals can be submitted in the same template

Field G: Food Origin

Field characteristic: Optional

Field size: Rolling menu

Field contents: This is identifying if the Country of Origin of Food is the same as Country Providing Record. Four options are possible:

- domestic,
- imported,
- mixed origin
- or unknown.

Field H: Sampling Period (Start)

Field characteristic: Mandatory

Field size: Date

Field contents: The start date from which the samples of the submitted batch of analytical results started to be collected, expressed in the form of year (**YYYY**) or year and month (**YYYY-MM**) or year and month and day (**YYYY-MM-DD**). A dash (-) must separate day, month and year.

Field I: Sampling Period (End)

Field characteristic: Mandatory

Field size: Date

Field contents: The end date of sampling for the submitted batch of analytical results, expressed in the form of year (**YYYY**) or year and month (**YYYY-MM**) or year and month and day (**YYYY-MM-DD**). A dash (-) must separate day, month and year.

Field J: Representativeness/reliability of the Samples

Field characteristic: Mandatory

Field size: Rolling menu

Field contents: This field may contain only one of the following statistical descriptor:

- Random sampling
- Targeted sampling

Notes: It is unlikely that sample results reported to GEMS/Food would be based on a statistical sampling method but the data could still be the result of random rather than targeted sampling.

Field K: Number of Contributing Laboratories

Field characteristic: Optional

Field size: Free text (alphanumeric characters)

Field contents: This indicates the number of laboratories for which data have been aggregated for this record.

Notes: In general, data will usually be from a single laboratory. For large countries, data from different laboratories could be considered as sufficiently homogeneous for aggregation.

Field L: Indicator of Analytical Quality Assurance

Field characteristic: Optional

Field size: Rolling menu

Field contents: This field may contain only one of the following options to indicate the level of laboratory proficiency:

- The laboratory (or the majority of the contributing laboratories) used only internal quality assurance and reference standards.
- The laboratory (or majority of the contributing laboratories) had successfully participated in relevant proficiency tests during the sampling and analysis period.
- The laboratory (or majority of the contributing laboratories) had been officially accredited for the relevant methods during the sampling and analysis period.
- Or unknown.

Note: Relevant means similar or identical food matrices and identical contaminants. In general, official accreditation is considered a higher criterion than successful participation in proficiency testing, followed by internal quality assurance and control only.

Field M: Measurement units for Contaminant Levels

Field characteristic: Mandatory

Field size: Rolling menu

Field contents: This field should contain one of the following options to indicate the unit of reporting for the contaminant concentration:

- mg/kg (milligram per kilogram or parts per million - 10⁶)
- µg/kg (microgram per kilogram or parts per billion - 10⁹)
- ng/kg (nanogram per kilogram or parts per trillion- 10¹²)
- pg/kg (picogram per kilogram or parts per quadrillion- 10¹⁵)
- Bq/kg (Becquerels per kilogram)

Note: In the case of data submission based on not listed measurement units, the data provider could enter the unit as free text which will be included in the next update of the templates.

Fields N to Q: IMPORTANT NOTICE

Regarding the LODs and LOQs for aggregated data and described below, automatic rules have been implemented into the system to ensure the consistency of data submitted. If these rules are not fulfilled the dataset will be automatically rejected.

- 'LOD min' must be greater than 0
- 'LOD max' must be greater than 0
- 'LOQ min' must be greater than 0
- 'LOQ max' must be greater than 0
- 'LOD min' must be less or equal to 'LOD max'
- 'LOQ min' must be less or equal to 'LOQ max'
- 'LOD min' must be less 'LOQ min'
- 'LOD max' must be less 'LOQ max'

Field N: Limit of detection – minimum

Field characteristic: Mandatory for results not quantified in column Y

Field size: Free text (alphanumeric characters)

Field contents: The limit of detection (LOD) is the minimum concentration of a contaminant that can be qualitatively measured in the specific food. This field contains the lowest limit of detection reported by a laboratory, if data have been aggregated from a number of laboratories. If all data were from the same laboratory, fields M and N will be the same numbers.

Field O: Limit of detection– maximum

Field characteristic: Mandatory for results not quantified in column Y

Field size: Free text (alphanumeric characters)

Field contents: The limit of detection (LOD) is the minimum concentration of a contaminant that can be qualitatively measured in the specific food. This field contains the highest limit of detection reported by a laboratory, if data have been aggregated from a number of laboratories. If all data are from the same laboratory, fields M and N will be the same numbers.

Field P: Limit of quantification – minimum

Field characteristic: *Mandatory for results not quantified in column Y*

Field size: Free text (alphanumeric characters)

Field contents: The limit of quantification (LOQ) is the minimum concentration of a contaminant that can be quantitatively measured in the specific food with an acceptable level of accuracy and precision. This field contains the lowest limit of quantification reported by a laboratory, if data have been aggregated from a number of laboratories. If all data are from the same laboratory, fields O and P will be the same number.

Field Q: Limit of quantification – maximum

Field characteristic: *Mandatory for results not quantified in column Y*

Field size: Free text (alphanumeric characters)

Field contents: The limit of quantification (LOQ) is the minimum concentration of a contaminant that can be quantitatively measured in the specific food with an acceptable level of accuracy and precision. This field contains the highest limit of quantification reported by a laboratory, if data have been aggregated for a number of laboratories. If all data are from the same laboratory, fields O and P will be the same number.

Field R: Basis for the Analytical Results

Field characteristic: *Mandatory*

Field size: Rolling menu

Field contents: This field may contain only one of the following options to indicate the basis upon which the analytical values were determined:

- Fat content
- Dry weight
- As is (raw, fresh)
- As consumed

Note: If data from different laboratories are derived from different bases (e.g., one laboratory reported results on an “as received” basis and another reported results on a “dry weight” basis), the analytical data should be converted to a common basis (if moisture content/fat content data are available). Otherwise, they should be submitted as separate data sets.

Field S: Portion analysed

Field characteristic: Mandatory

Field size: Rolling menu

Field contents: This field may contain only one of the following options to indicate if the analytical values were determined on :

- edible only
- or total food i.e. edible + inedible portion of food.

Field T: State of food analysed

Field characteristic: Optional

Field size: Rolling menu

Field contents: This field may contain only one of the following options to indicate if the analytical values were determined on:

- cooked
- raw food
- or unknown.

Field U: Number of Samples with quantified results

Field characteristic: Mandatory

Field size: Free text (alphanumeric characters)

Field contents: This is the number of sample analyses for which results were above the limit of quantification (LOQ).

Notes: The results from each individual laboratory should be compared with the LOQ reported for that laboratory.

Field V: Number of Samples with Concentrations below the Limit of Detection or the Limit of Quantification

Field characteristic: Mandatory

Field size: Free text (alphanumeric characters)

Field contents: This is the number of sample analyses for which results were below the Limit of Detection (LOD) or the limit of quantification (LOQ).

Notes: The results from each individual laboratory should be compared with the LOD and LOQ reported for that laboratory. If all analytical results are quantified, then “0” should be entered in this field.

Fields W to AA: IMPORTANT NOTICE

Regarding the results for aggregated data described below, automatic rules have been implemented into the system to ensure the consistency of data submitted. If these rules are not fulfilled the dataset will be automatically rejected.

- 'Range - min' is required if 'Range - max' is specified
- 'Range - max' is required if 'Range - min' is specified
- 'Range - min' must be greater than or equal to 0
- 'Range - max' must be greater than 0
- 'Range - max' must be greater than 'Range - min'
- 'Mean - lower bound' must be greater than or equal to 0
- 'Mean - upper bound' must be greater than 0
- 'Mean - upper bound' must be greater than 'Mean - lower bound'
- 'Mean or best estimate' must be greater than 0
- 'Mean or best estimate' must be greater than or equal to 'Range - min'
- 'Mean or best estimate' must be less than or equal to 'Range - max'
- 'Mean or best estimate' must be greater than or equal to 'Mean - lower bound'
- 'Mean or best estimate' must be less than or equal to 'Mean - upper bound'

Field W: Range of Quantified Analytical Concentrations: Minimum concentration

Field characteristic: *Optional*

Field size: Free text (alphanumeric characters)

Field contents: This is the minimum **quantified** concentration value reported by all laboratories for this contaminant in this food. (Leading zeros may or may not be included.)

Notes: Note that the minimum refers to the minimum **quantified** analytical value. In other words, the lowest value at or above the limit of quantification (LOQ). In general, this will be at or very close to the LOQ.

Field X: Range of Quantified Analytical Concentrations: Maximum concentration

Field characteristic: *Optional*

Field size: Free text (alphanumeric characters)

Field contents: This is the maximum **quantified** concentration value reported by all laboratories for this contaminant in this food. (Leading zeros may or may not be included.)

Field Y: Mean Concentrations or best estimates

Field characteristic: *Mandatory*

Field size: Free text (alphanumeric characters)

Field contents: When all values are quantified, the true mean should be calculated. When some of the data are not quantified, the technique for calculating the best statistical estimate value will depend on the analyte and the percentage of samples for which the analyte is not quantified. When a significant proportion of the results are not quantified, the mean should be calculated for the lower and upper bounds and reported in Fields Y and Z. It is recognized various methods are used for estimating the mean when not all of the data are quantified and no clear consensus on the appropriate method(s) has emerged. Contributing institutions should, therefore, provide a short description of the method used in Field AE: Remarks/References if this is important for interpreting the data.

Notes: Results below the LOD or for which quantified results are not reported should be entered as 0 (zero). When integrated in the database they will be converted in "Non detected". In that case reporting LOD and LOQ in columns N to Q is mandatory.

Field Z: Mean – lower bound

Field characteristic: *Optional*

Field size: Free text (alphanumeric characters)

Field contents: The lower bound mean is obtained by setting all results below the limit of quantification equal to zero. The lower bound mean is calculated by dividing the sum of the values by the number of values.

Notes: Results below the LOD should be entered as 0 (zero). When integrated in the database they will be converted in "Non detected"

Field AA: Mean – upper bound

Field characteristic: *Optional*

Field size: Free text (alphanumeric characters)

Field contents: The upper bound mean is obtained by setting all results below the limit of detection equal to the limit of quantification. The upper bound mean is calculated by dividing the sum of the values by the number of values.

Notes: Results below the LOD should be entered as 0 (zero). When integrated in the database they will be converted in "Non detected"

Field AB: Median Concentration

Field characteristic: Optional

Field size: Free text (alphanumeric characters)

Field contents: True median or the best statistical estimate of the median. The true median should be determined when the number of quantified results is greater than 50%. For n analytical values arranged in increasing order of magnitude and numbered 1 to n , the median of these n values is the $(n + 1)/2$ th value if n is odd. If n is even, the median lies between the $n/2$ th and the $(n + 1)/2$ th values and is not defined uniquely. Unless otherwise specified it may be taken to be the arithmetic mean of these two values. In general, when greater than 50% of the results are not quantified, Field AA should be left blank. However, in some cases, statistical methods may be used to determine a best estimate of the median.

Notes: Results below the LOD should be entered as 0 (zero). When integrated in the database they will be converted in "Non detected"

Field AC: 90th Percentile Concentration

Field characteristic: Optional

Field size: Free text (alphanumeric characters)

Field contents: The 90th percentile is defined as the value below which 90% of the distribution of values will fall and is derived from the sequentially arranged data, when there are ten or more values available.

Note: If more than 90 percent of the analytical values are not quantified, then this field should be left blank.

Field AD: Standard Deviation

Field characteristic: Optional

Field size: Free text (alphanumeric characters)

Field contents: For n analytical values, the standard deviation of these n values is given by: standard deviation = $\sqrt{\frac{\sum (\hat{x} - x_i)^2}{n - 1}}$
where x_i is the value of each analytical result and \hat{x} is the mean concentration.

Note: This field is considered optional and should be completed **only if** the data distribution can be described by the standard deviation. If more than half of the analytical values are not quantified, then this field should be left blank.

Field AE: Confidentiality of Data

Field characteristic: Optional

Field size: Rolling menu

Field contents: By default data are not confidential and may be used for the purposes of the GEMS/Food Programme. This field could be filled by "Yes" only if submitted data are confidential and if specific permission should be obtained before using the data.

Field AF: Remarks/References

Field characteristic: Optional

Field size: Free text (alphanumeric characters)

Field contents: This field is used for noting remarks and/or references relevant to the data represented.