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EFSA FoodEx2 Smart Coding Application User Guide (version 1.0)

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Abstract

The FoodEx2 Smart Coding Application is a new tool, developed at the European Food Safety Authority, that aims to help data providers to faster codify their data according to the FoodEx2 classification and description system. It adopts several techniques of artificial intelligence like machine learning and text mining. The application provides a set of suggested codes based on the free text describing a particular food given as input by the user. This guide aims at introducing the latest version of the tool, describing how it can be used and set up to achieve the desired results.

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Key words: EFSA, FoodEx2 Smart Coding Application, software, artificial intelligence, machine learning, text mining

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Summary

The EFSA FoodEx2 Smart Coding Application is a new tool, developed in EFSA through a cross collaboration between the Evidence Management (DATA) Unit and the Assessment and Methodological Support (AMU) Unit. It is a platform that allows faster coding according to the FoodEx2 classification and description system. More precisely, it aims to simplify the coding process by making use of artificial intelligence techniques capable of suggesting a series of complex FoodEx2 terms (combination of base term and facets) starting from the food description given as input by the user. The function of suggesting FoodEx2 terms, is achieved through various machine learning models which have been trained using historical data collected by EFSA in recent years. The historical data are the food consumption data now populating the EFSA Comprehensive European Food Consumption Database, they were submitted by data providers, coming from different Member States and were reviewed and validated by EFSA prior to the model training phase. In addition, in order to improve the overall user experience of the application and to better balance the training data used, EFSA has, prior to its official launching, conducted a test phase of the application involving mainly internal staff and a number of FoodEx2 expert users among its data providers.

The official version of the application is hosted in the [R4EU platform](#). To access it, a user must use a valid EFSA account or register directly on the platform. Once accessed, the application can be customised in terms of language input and accuracy of proposed terms. The FoodEx2 code selected from the suggestions provided can be copied and pasted in any other working document.



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1. Introduction

This document is a guidance for the use of the latest version of the EFSA FoodEx2 Smart Coding Application (FoodEx2 SCA) software, a new tool, developed in EFSA through a cross collaboration between the Evidence Management (DATA) Unit and the Assessment and Methodological Support (AMU) Unit. The EFSA FoodEx2 SCA aims at facilitating the encoding according to the FoodEx2 system either during EFSA's data reporting or during the sampling phase by making use of artificial intelligence techniques capable of suggesting a series of complex FoodEx2 terms (combination of base term and facets) starting from the food description given as input by the user. The function of suggesting FoodEx2 terms, is achieved through various machine learning models which have been trained using historical data collected by EFSA in recent years. The historical data are the food consumption data now populating the EFSA Comprehensive European Food Consumption Database, they were submitted by data providers, coming from different Member States and were reviewed and validated by EFSA prior to the model training phase. In addition, in order to improve the overall user experience of the application and to better balance the training data used, EFSA has, prior to its official launching, conducted a test phase of the application involving mainly internal staff and a number of FoodEx2 expert users among its data providers.

All FoodEx2 terms proposed by the web application are related to food only and are taken from the official version of the MTX (FoodEx2 Matrix) catalogue published in the EFSA Data Collection Framework (DCF), which is used as a library for retrieving the term's information. For additional details on the MTX catalogue users can consult the EFSA Standard Sample Description ver. 2.0 (SSD2) (EFSA, 2013). The MTX catalogue is based on the FoodEx2 system (EFSA 2011a, 2011b, 2015) that aims to describe food and feed matrices in the most detail and harmonise way within different food safety domains.

This guide is available for free download via the [EFSA website](#) or directly from [EFSA Knowledge Junction Community on Zenodo](#). It introduces the new application and its functions, describes how it can be used and customised and suggests ways of getting the desired results. Since the FoodEx2 SCA aims to simplify the encoding to FoodEx2, only a minimum knowledge of the FoodEx2 system is required. For expert users it is suggested the use of FoodEx2 SCA in combination with the EFSA Catalogue browser (EFSA and Ioannidou, 2019a) and the EFSA Interpreting and checking tool (EFSA and Ioannidou, 2019b) for the code validation.

2. Data and Methodologies

This guide presents to the user different functions available in the application providing screenshots of the different menus, windows and descriptions to drive the user through the available functions and the way they work.

3. Requirements

- **Smart device:** a computer, tablet or smartphone
- **Compatible browser:** full compatibility is ensured with Chrome and Firefox browsers
- **R4EU Account:** an existing EFSA/Google account or a new one on R4EU
- **Internet connection:** required to access the platform.

3.1. General Tips

- Ensure that your computer meets the FoodEx2 SCA's requirements (mentioned above)
- Make sure that the internet connection is stable



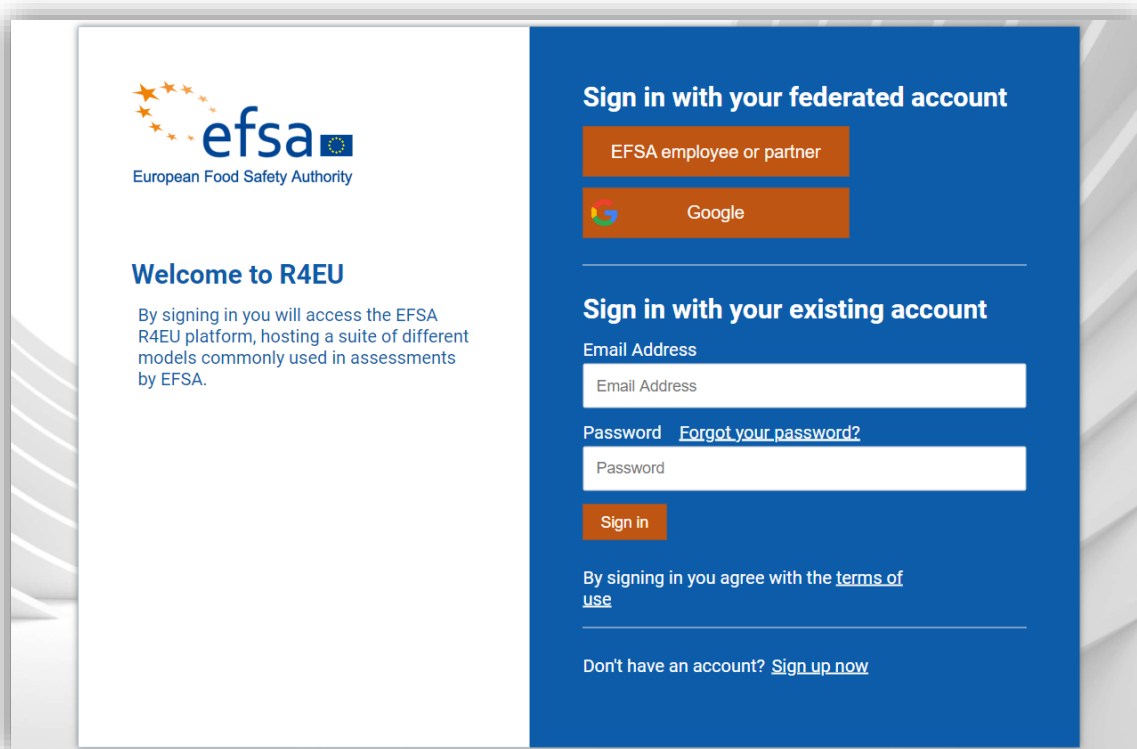
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- If the platform is unreachable, ensure with your organisation's IT department that the firewall is not blocking the connection to the site before contacting EFSA for [support](#)
- If problems occur while using the application, make sure you see the latest version of the application by clearing your cache memory (press control and F5 keys simultaneously)

4. Login/Sign up on R4EU

The FoodEx2 SCA is hosted on the R4EU platform. This platform, provided by EFSA in collaboration with external stakeholders, allows access to officially published EFSA web app components. Therefore, to access the list of applications available on R4EU, the user must use a valid EFSA account or register directly on the platform.

Click [here](#) in order to access the R4EU platform. When the page is fully loaded it looks as follows:

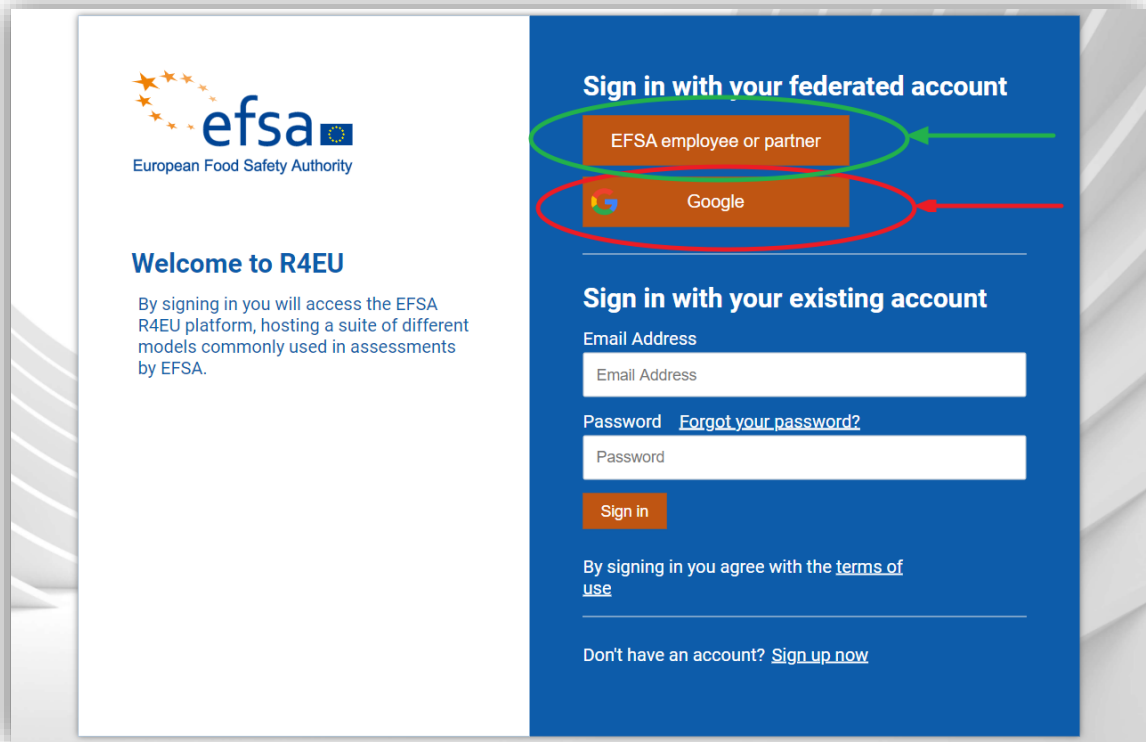



The screenshot shows the R4EU login interface. On the left, the EFSA logo and the text 'Welcome to R4EU' are displayed, along with a brief description of the platform. On the right, there are two main sections: 'Sign in with your federated account' and 'Sign in with your existing account'. The federated account section includes buttons for 'EFSA employee or partner' and 'Google'. The existing account section includes input fields for 'Email Address' and 'Password', a 'Forgot your password?' link, and a 'Sign in' button. At the bottom, there is a 'Sign up now' link for users who do not have an account.



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If you already have a valid EFSA or Google account, click on the "EFSA employee or partner" or "Google" respectively as shown below.




European Food Safety Authority

Welcome to R4EU

By signing in you will access the EFSA R4EU platform, hosting a suite of different models commonly used in assessments by EFSA.

Sign in with your federated account

[EFSA employee or partner](#)

[Google](#)

Sign in with your existing account

Email Address

Password [Forgot your password?](#)

[Sign in](#)

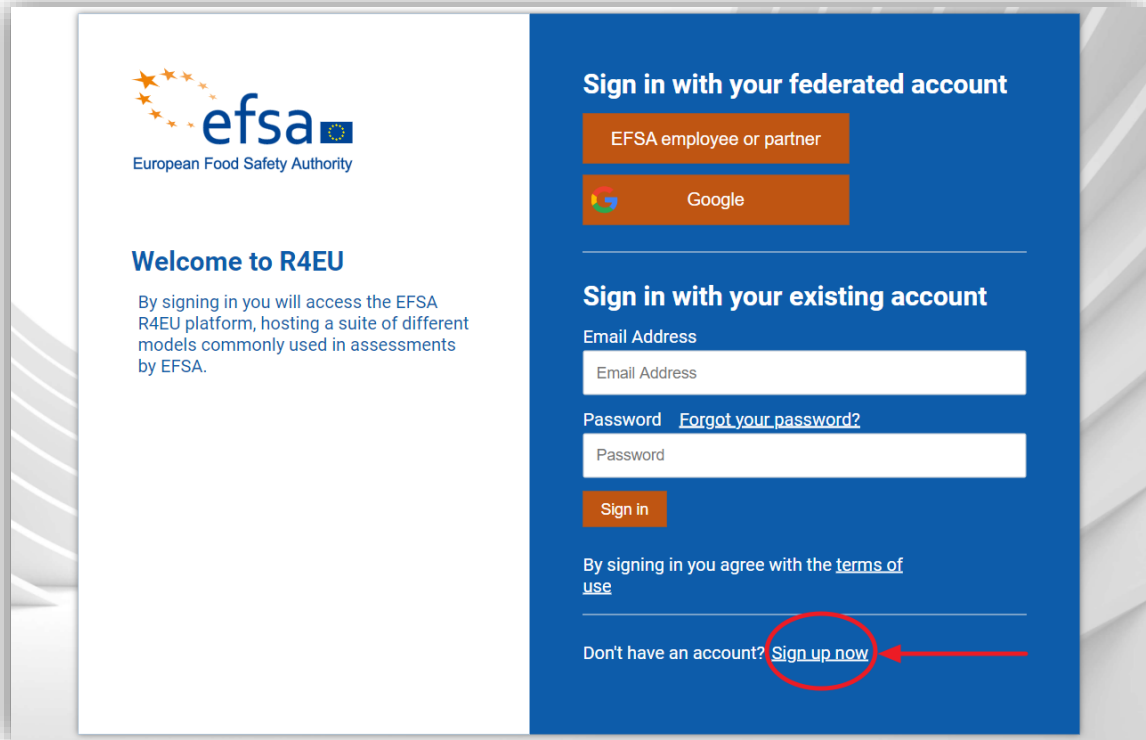
By signing in you agree with the [terms of use](#)

Don't have an account? [Sign up now](#)



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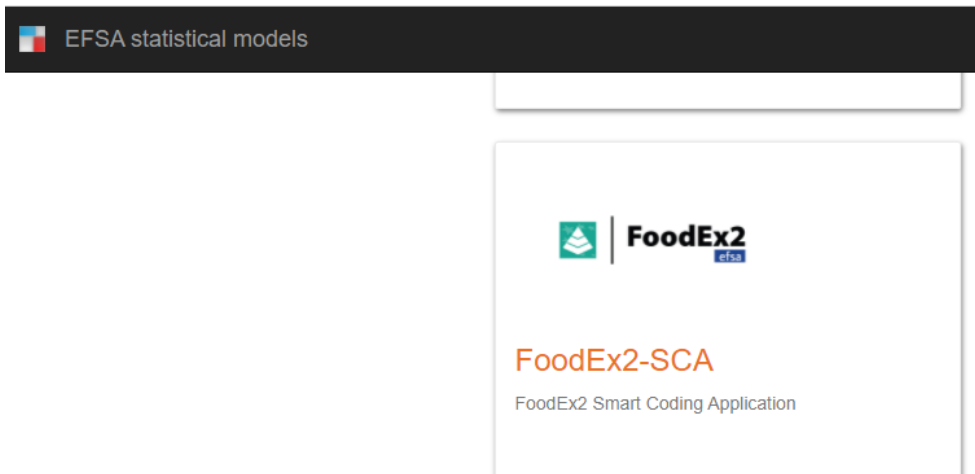
If you do not have a valid EFSA account, just click on the "Sign up now" link and fill in the form as described in the external scientific report of Verbeke (Verbeke, 2017).



Once signed up, the application will automatically redirect you to the login page where you can sign in using the newly created account.

5. Access FoodEx2 SCA

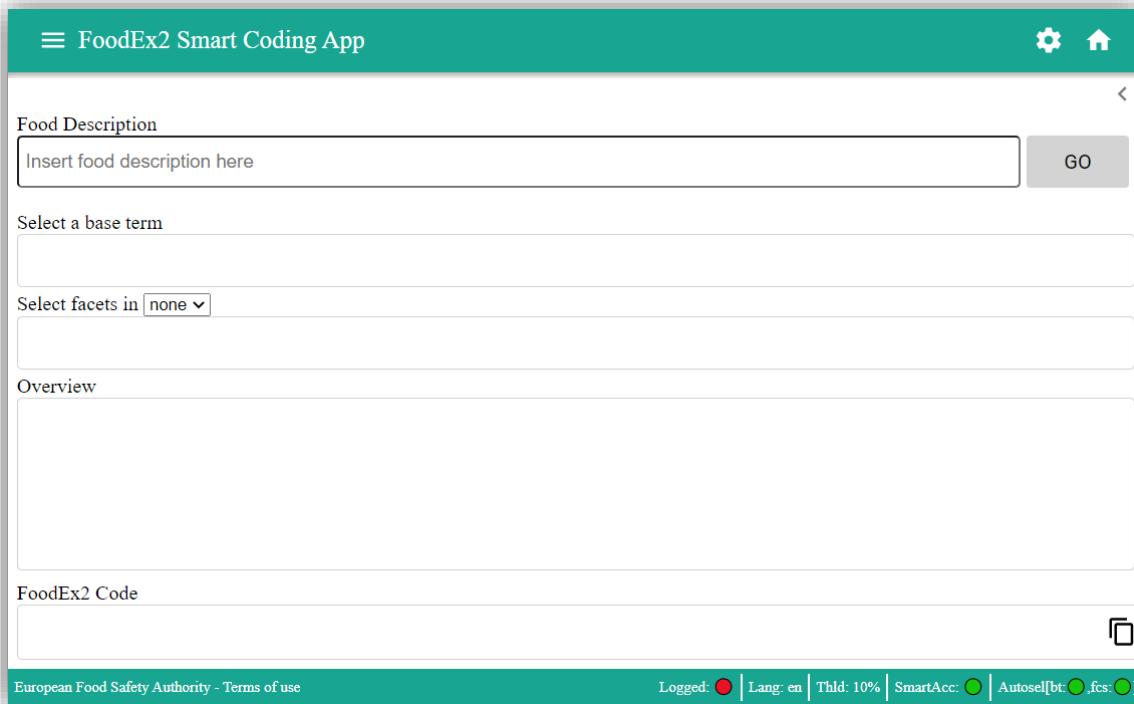
After signing into the R4EU platform, in the main page, you will find a list of available applications. Scroll down until you find the **FoodEx2-SCA** card and click on it to access the application.





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Then the loading of the user interface will start. Once all the resources are loaded the main page will look as follows:



The screenshot shows the 'FoodEx2 Smart Coding App' interface. At the top, there is a green header with a hamburger menu icon, the text 'FoodEx2 Smart Coding App', a gear icon for settings, and a home icon. Below the header, the main content area is white and contains several sections: 'Food Description' with a text input field containing 'Insert food description here' and a 'GO' button; 'Select a base term' with a large empty text area; 'Select facets in' with a dropdown menu currently set to 'none'; 'Overview' with a large empty text area; and 'FoodEx2 Code' with a text input field and a copy icon. At the bottom, there is a green footer bar containing the text 'European Food Safety Authority - Terms of use' on the left and a status bar on the right with indicators for 'Logged: [red dot]', 'Lang: en', 'Thld: 10%', 'SmartAcc: [green dot]', 'Autose[bt: [green dot]', and 'fcs: [green dot]'.

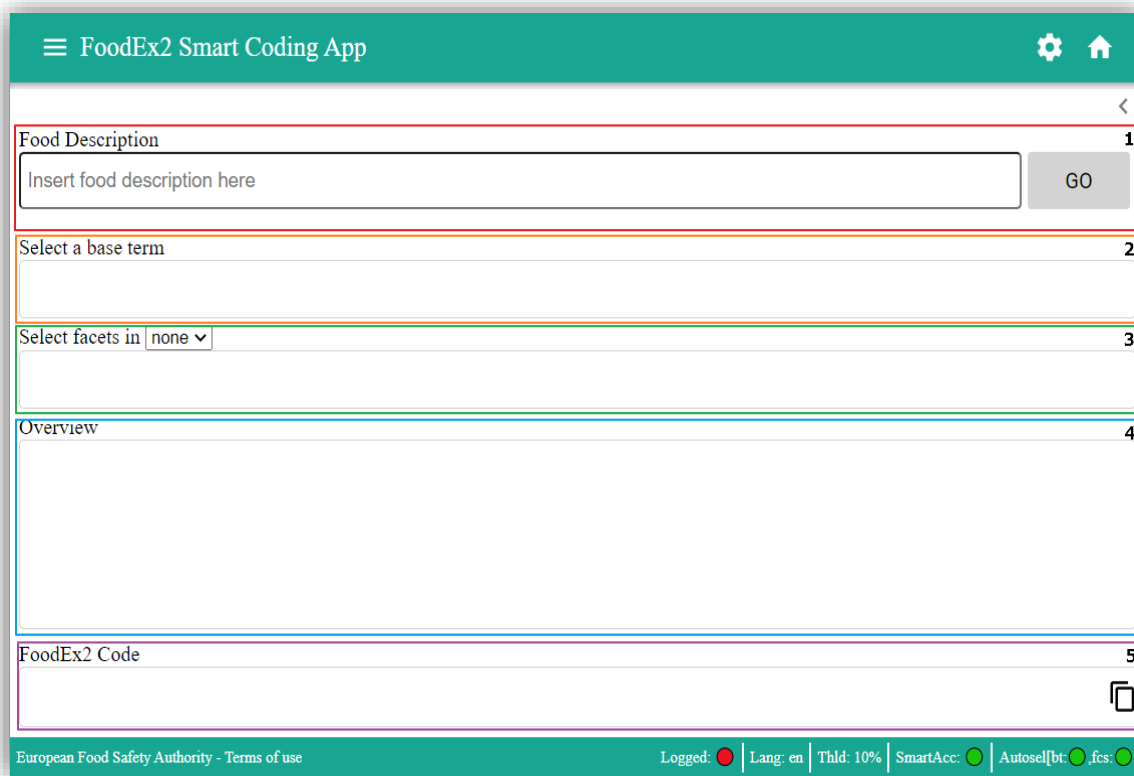
6. Home

The FoodEx2 SCA's home page is made of several, so called, web components. In this section an introduction of the main functions provided by each component will be presented. The web components found in the home page are the following:

1. Input-component
2. baseterm-component
3. facets-component
4. overview-component
5. code-component



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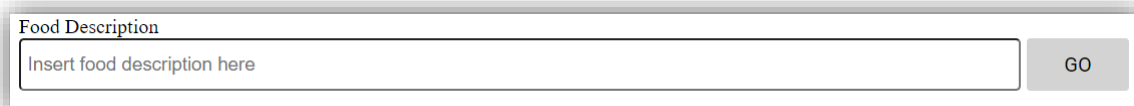
The screenshot shows the 'FoodEx2 Smart Coding App' interface. It features a teal header with a menu icon, the app name, and settings/home icons. Below the header are five numbered sections:

- Food Description**: A text input field with the placeholder 'Insert food description here' and a 'GO' button.
- Select a base term**: An empty text input field.
- Select facets in**: A dropdown menu currently set to 'none'.
- Overview**: An empty text area.
- FoodEx2 Code**: An empty text input field with a copy icon.

At the bottom, there is a footer with 'European Food Safety Authority - Terms of use' and a status bar showing 'Logged: [red dot]', 'Lang: en', 'Thld: 10%', 'SmartAcc: [green dot]', 'Autose[bt: [green dot], fcs: [green dot]]'.

6.1. Input-component

The input component (Food Description) allows the user to simply insert a free text in the available editable field. The user needs to insert the free text that describes the food to code. The free text can be inserted in any of the languages available in the Settings page (please, see section 8.1).



A close-up of the 'Food Description' input field. It shows a text box with the placeholder 'Insert food description here' and a 'GO' button to its right.

Since the training dataset used for training the machine learning models is in English, the tool uses a translation method for other than English language. Therefore, the tool will first translate the description into English (see the translation generated just below the food description input field) to query the machine learning models to get a related list of FoodEx2 terms.



A close-up of the 'Food Description' input field. The text box contains 'cioccolato bianco con nocciole'. Below the text box, the English translation is displayed: 'English translation: white chocolate with hazelnuts'. A 'GO' button is visible to the right.

Tip: the tool is able to understand misspelled descriptions, signs used usually on the food domain (e.g. %) and plural or non-plural forms. Nevertheless, it is suggested to try different combinations of the food description in case the suggested terms are not the expected ones.

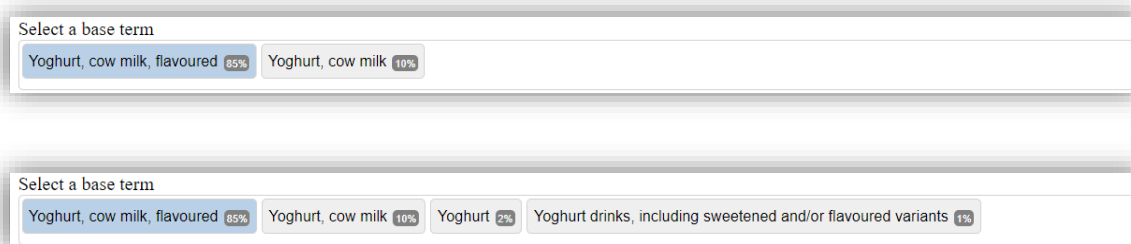


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6.2. Baseterm-component

The baseterm-component (Select a base term) is a simple non-editable field. After clicking on the **GO** button, located on the right-hand side of the input component, the tool generates a JavaScript Object Notation (JSON) request which is sent to the back-end. The latter analyses the request and queries the machine learning models that have the role of predicting the list of FoodEx2 terms. Once the process is concluded, the back-end generates a response containing various information within which it is possible to find the list of suggested base terms. When the response is sent, the front-end analyses it and extracts the properties found for each suggested term. These are then used to create the so-called *tags*, which populate the baseterm-component field. Please, note that the tool is set by default to auto-select the first tag (as these are sorted in descending order by percentage of accuracy); however, this parameter can be disabled from the settings page (section 0). In addition, the list of terms can be scrolled horizontally, and a different selection can be made manually by clicking on another tag. Before making a selection, the user can hover the mouse on a tag to see additional information of the term. The final generated FoodEx2 code, shown in the **Error! Reference source not found.** (section **Error! Reference source not found.**), is automatically updated each time the selection of base terms is changed.

If the suggested terms are not appropriate for the given description, it is suggested to lower the accuracy threshold (see section 8.2). Please, note that it is necessary to repeat the search action each time the threshold parameter is changed. In the following screenshots the list of suggested base terms with a threshold percentage set to 10% and 1% respectively is shown.



The machine learning models, responsible for suggesting terms related to the description provided, are updated from time to time based on feedback received and data collected. Therefore, EFSA cannot guarantee that using the latest version of the model will produce the same results. Nevertheless, the models will be updated following the versioning used for the MTX (FoodEx2 Matrix) catalogue, i.e. a major release once a year and minor releases up to three times per year.

More information about the latest model used by FoodEx2 SCA can be found on the dedicated GitHub page (see section 9).

6.3. Facets-component

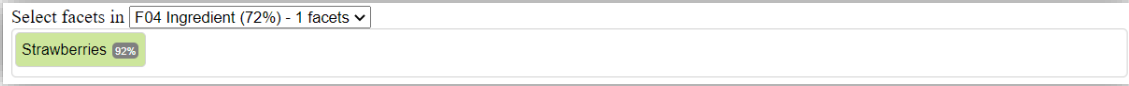
The facets component allows the selection of facets. It consists of:

- a drop-down list populated with the *facet categories*,
- a field populated with the *facets* found under the selected category.

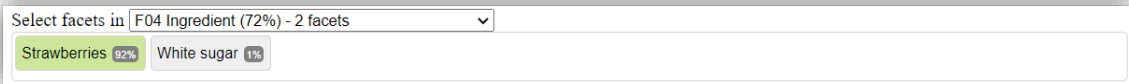
As for the baseterm-component, also the facets-component has several properties for each term or tag shown. More precisely, in the facet categories drop-down list and the facets tags field, the code, name and percentage of accuracy attributed by the models are shown. The facet categories are dynamically sorted by percentage of accuracy (descending order). Each time a category is selected, the tool automatically updates the list of facet tags found in that category.



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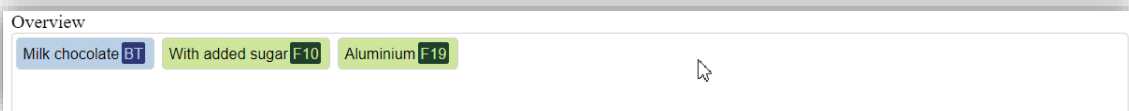
As explained for the baseterm-component, the facets shown depend on the value set for the accuracy threshold parameter (see section 8.2).



FoodEx2 SCA, by default, has the *automatic facet selection* function enabled. This uses a simple algorithm that calculates the average percentage of accuracy between the category and each facet within it. More precisely, if the average accuracy is higher than 50%, the facet tag is automatically selected by the tool and the final FoodEx2 code is updated. This function can be disabled directly from the Settings page.

6.4. Overview-component

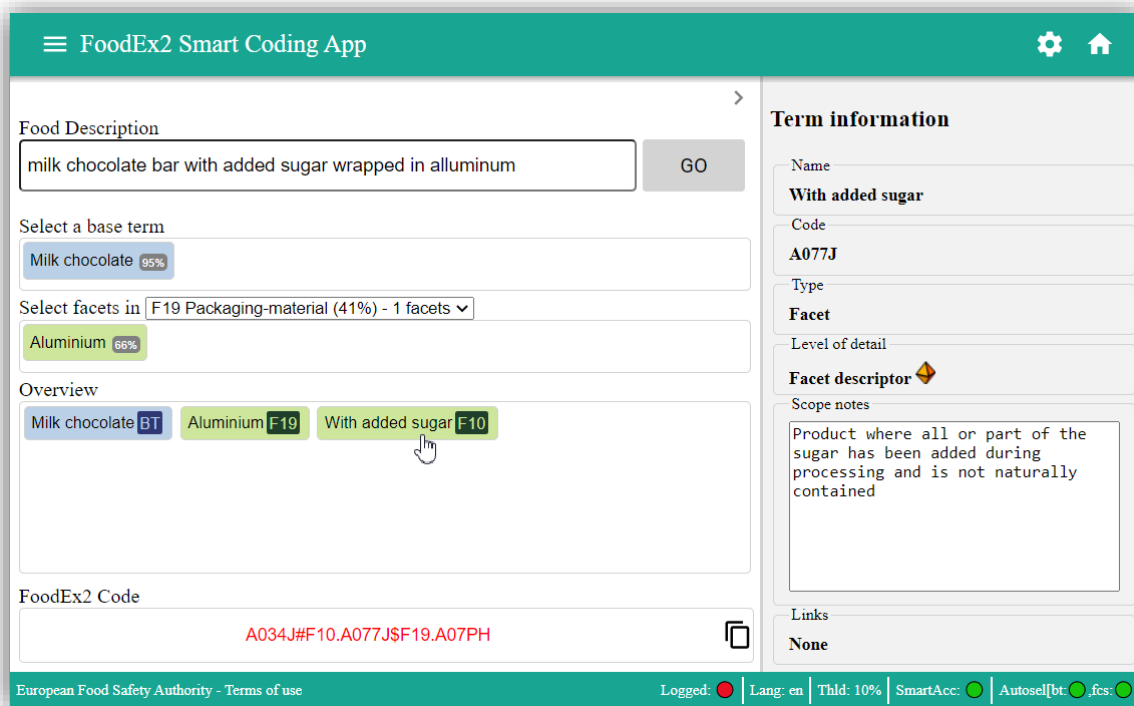
This component presents a summary of the selections made in the baseterm- and facets-components.



As seen in the screenshot above, the base term selected, which is always one, has a blue background colour. Instead, the facets selected, which can be more than one, have a green background colour. The list of tags can be scrolled vertically and, in addition, each of them can be selected. In fact, selecting a tag activates a side panel, which appears on the right-hand side of the home page as shown below.



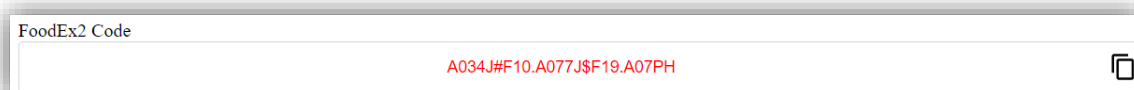
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This panel shows various properties of the selected term. This information can also be retrieved from the latest version of the MTX (FoodEx2 Matrix) catalogue available on the FoodEx2 SCA back-end.

6.5. Code-component

The code-component is where the final generated FoodEx2 code is displayed. It is automatically updated whenever an interaction is made with the baseterm- and facets-components.



Clicking on the *copy* option, located on the right-hand side, allows the entire code to be copied directly to the operating system's clipboard (letting the user to paste it into external applications, e.g. Microsoft Excel).

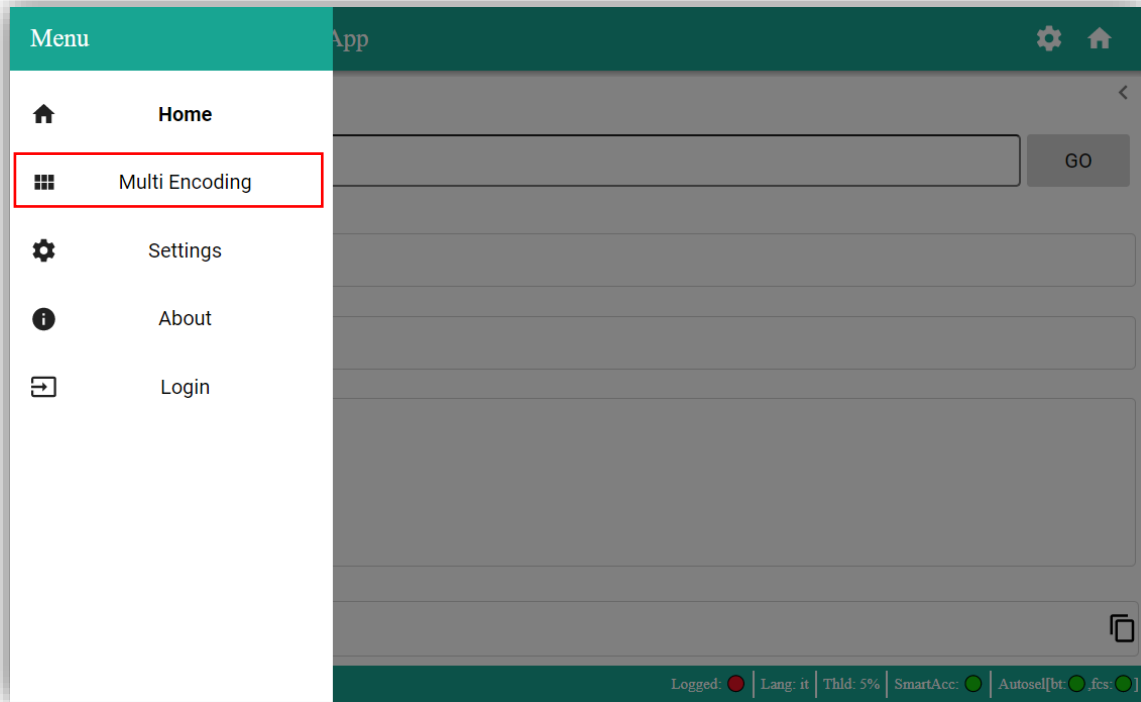
Please, note that the FoodEx2 SCA does not replace the EFSA Catalogue Browser (CB) and/or the EFSA Interpreting and Checking Tool (ICT). In fact, it is recommended to always check the code in the ICT and, in case of warnings or errors, to encode it again using the CB.

7. Multi Encoding

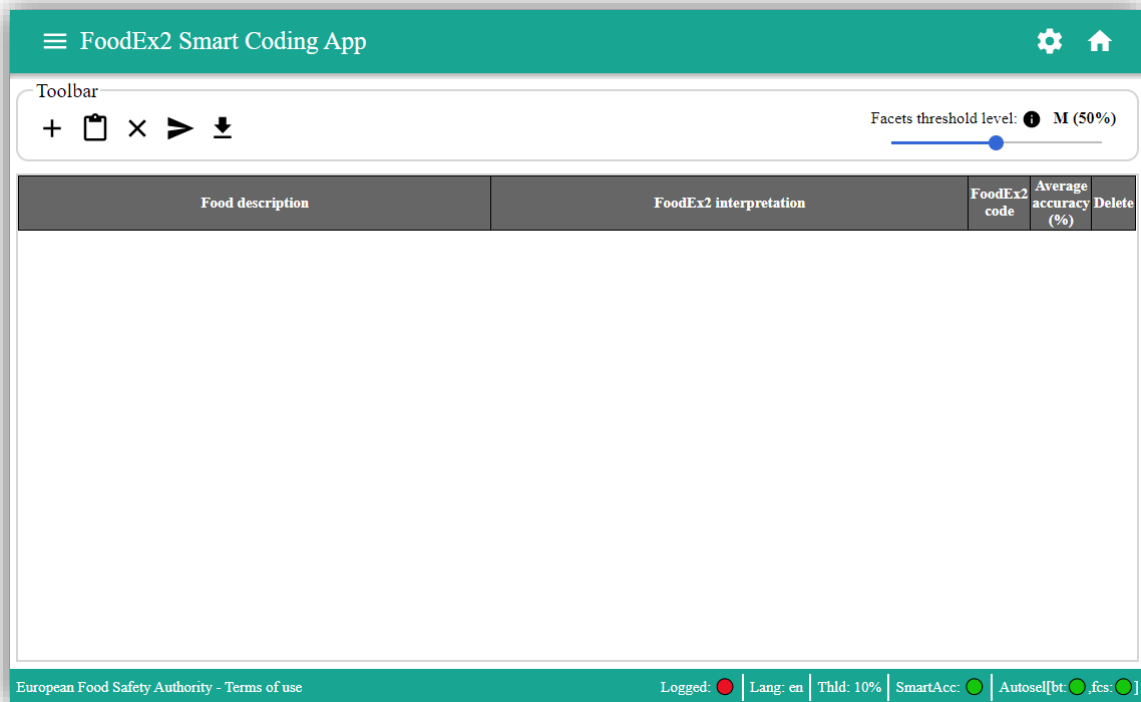
FoodEx2 SCA version 1.6 or above, introduces a new function that allows to encode various food descriptions with a single click. To access this function, click on the hamburger menu and select the *Multi Encoding* option as shown below:



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This will redirect you to the dedicated page where you can find the toolbar that allows you to interact with the table located below it.










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7.1. Toolbar

In the toolbar it is possible to find the following buttons:

-  **Add**: adds a new record to the top of the table
-  **Paste**: used to paste a list of descriptions copied from an external source (e.g. Microsoft Excel)
-  **Clean**: used to clean all records in the table
-  **Run**: when clicked, it calls the back-end to which it sends all descriptions of the foods present in the table and then populates it with the information reported by the FoodEx2 machine learning models
-  **Export**: used to export the table in *.tsv* format¹.
- **Facets threshold level**: allows to select only those facets for which the average accuracy (between the facet itself and the category it belongs to) is greater or equal to the selected level (Low, Medium, High).

7.2. Table

The table shows the following information:

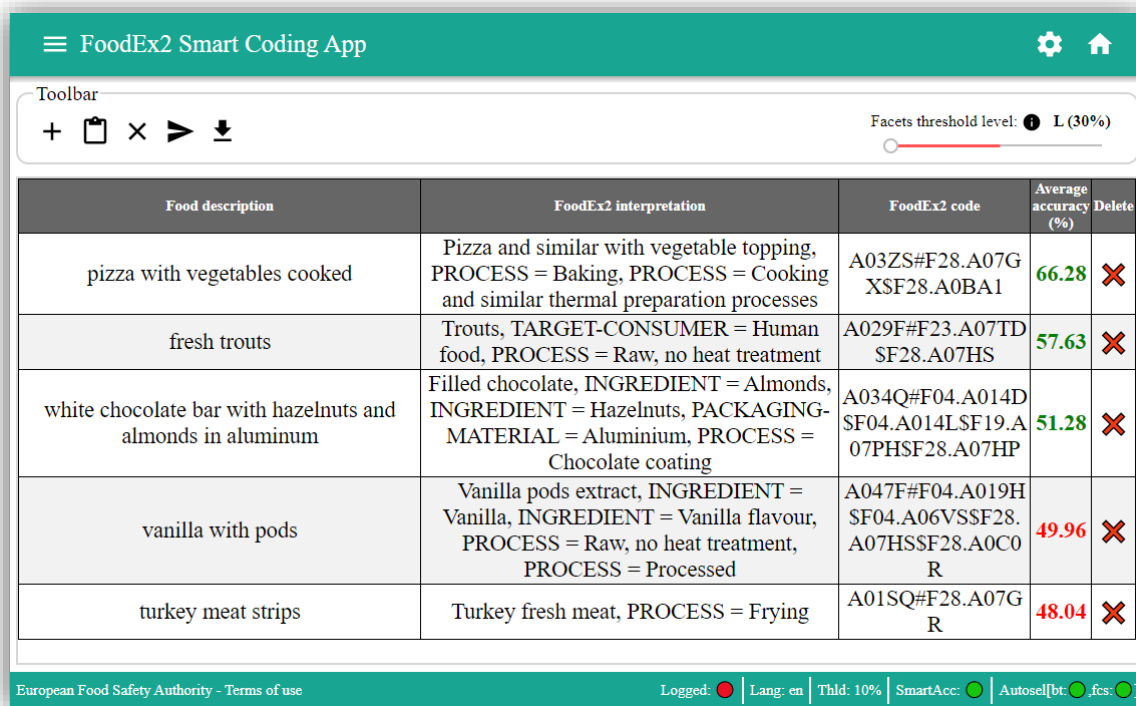
- **FoodEx2 description**: editable column populated with the food descriptions
- **FoodEx2 interpretation**: non-editable column providing the interpretation of the generated FoodEx2 code
- **FoodEx2 code**: non-editable column populated with the automatically generated FoodEx2 code. The logic used for selecting the codes is as follows:
 - **Base term**: the one with higher threshold²,
 - **Facets (if any)**: those having an average accuracy, between the facet category and the facet itself, higher than the set *facets threshold level* (check previous section for additional details).
- **Average accuracy**: non-editable column showing the average accuracy between the base term and the various facets (if any). Please, note that the values are coloured in green if the average accuracy is higher than 50%, otherwise red colour is applied.
- **Delete**: this non-editable column is populated with the  button and, if clicked, it allows to remove a record from the table.

¹ For opening a *.tsv* file with Microsoft Excel, drag and drop it on a blank workbook. To associate this extension with Microsoft Excel, use the "open with" option (available when right-clicking on the file) and select "Excel" (it can be found at C:\ProgramData\Microsoft\Windows\Start Menu\Programs).

² Note that, the base term suggested depends on the *Threshold results (in %)* set in the *settings* page.



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FoodEx2 Smart Coding App

Facets threshold level: **L (30%)**

Food description	FoodEx2 interpretation	FoodEx2 code	Average accuracy (%)	Delete
pizza with vegetables cooked	Pizza and similar with vegetable topping, PROCESS = Baking, PROCESS = Cooking and similar thermal preparation processes	A03ZS#F28.A07G XSF28.A0BA1	66.28	✗
fresh trouts	Trouts, TARGET-CONSUMER = Human food, PROCESS = Raw, no heat treatment	A029F#F23.A07TD SF28.A07HS	57.63	✗
white chocolate bar with hazelnuts and almonds in aluminum	Filled chocolate, INGREDIENT = Almonds, INGREDIENT = Hazelnuts, PACKAGING-MATERIAL = Aluminium, PROCESS = Chocolate coating	A034Q#F04.A014D SF04.A014L\$F19.A 07PHSF28.A07HP	51.28	✗
vanilla with pods	Vanilla pods extract, INGREDIENT = Vanilla, INGREDIENT = Vanilla flavour, PROCESS = Raw, no heat treatment, PROCESS = Processed	A047F#F04.A019H SF04.A06VSSF28. A07HSSF28.A0C0 R	49.96	✗
turkey meat strips	Turkey fresh meat, PROCESS = Frying	A01SQ#F28.A07G R	48.04	✗

European Food Safety Authority - Terms of use | Logged: | Lang: en | Thld: 10% | SmartAcc: | Autosel[bt: fcs:]

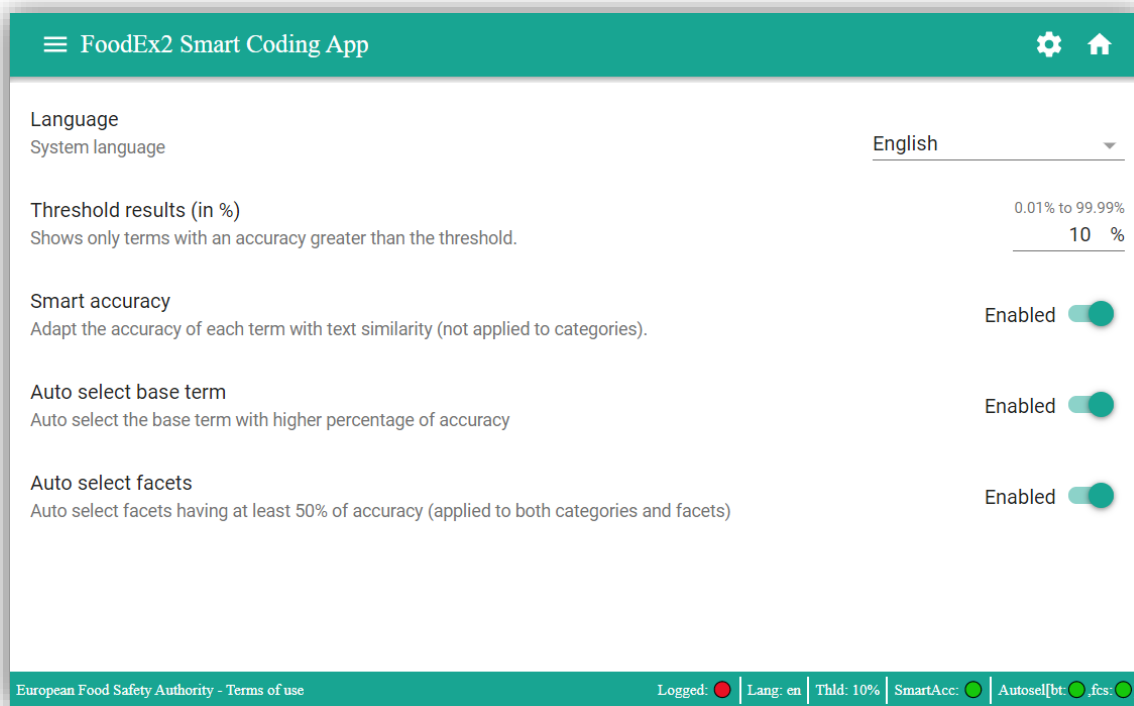
As the multi encoding function requires several resources, delays can occur when coding a long list of food descriptions.

8. Settings

Through the FoodEx2 SCA settings page the user can customise several parameters used by the tool. These include language, threshold percentage and some other functions that can be used to speed up the coding process.

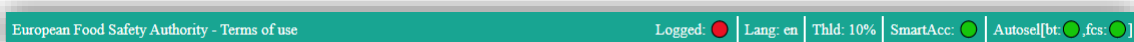


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Please, make sure to set these parameters before you start coding in the Application. In addition, every time the page is refreshed the last set value is restored from the local browser memory (Web Storage API).

The values set for these parameters are always available and can be found in the bottom bar of each page, which is called status bar.



8.1. Language

The default language in FoodEx2 SCA is English. However, the application implements a function that allows the insertion of food descriptions in languages other than English. To use the application in other languages, it is necessary to set the language from the settings page. Select one of the available languages from the drop-down list, which are:

- Croatian
- Czech
- Danish
- Dutch
- English
- Finnish
- French



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- German
- Greek
- Hungarian
- Italian
- Norwegian
- Portuguese
- Spanish
- Swedish

Once the language has been selected, the user can proceed with the encoding in the chosen language from the home or the multi encoding page. The status bar will be updated with the new values once the page has been changed. As this functionality is under improvement, changes may be applied in future versions.

Please, note that the translation of food descriptions in languages other than English might introduce a bias in the accuracy of the proposed FoodEx2 codes.

8.2. Threshold results (in %)

This parameter allows to filter the results based on the percentage of accuracy attributed (by the models) to each term proposed. The default threshold is set to 5%, which means that only terms with an equal or higher percentage of accuracy will be shown in the baseterm- and facets-component. In the facets-component, more specifically, the threshold is applied to both the categories and the facets.

The value set for the threshold can vary between 0.01% and 99.99%. The suggested range, however, is between 5% and 50%. For example, it is suggested to use a lower threshold when it is needed to obtain additional terms for the description of the food given as input (this may lead to a list of terms that are not related to the context of the description given and therefore would require an additional manual check and selection). Alternatively, a higher threshold can be used to obtain only terms for which the models are sure (this will result in fewer terms being shown which are more likely to be context-related). An example of the same search made using 5% and 50% threshold is presented in the screenshot below.

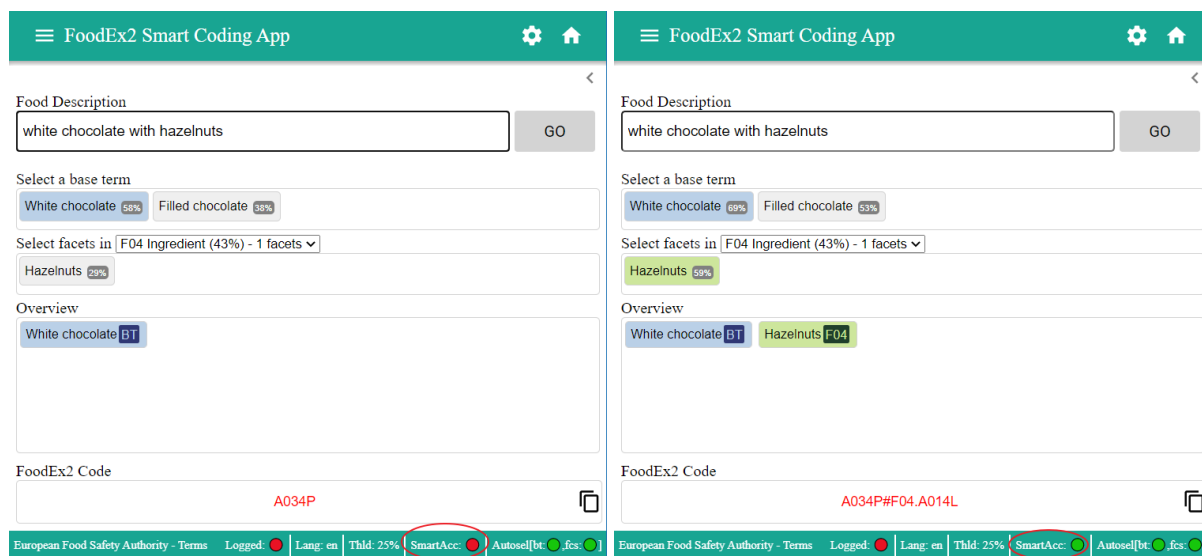


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The threshold value is shown in the status bar at each page and, if changed, it is refreshed when browsing among them.

8.3. Smart Accuracy

This function either strengthens or weakens the percentage of accuracy of each term suggested by the models. More precisely, the final result is obtained by calculating the average between the percentage of accuracy attributed by the model and the percentage that defines the distance between the description of the food given as input and that of the suggested term name. Please note that this function is enabled by default.



As shown in the screenshots above, by enabling the smart accuracy function, the terms suggested, when using "white chocolate with hazelnuts" as food description, present a different percentage of accuracy. Indeed, it is possible to ascertain that the first base term proposed, "White chocolate" with "A034P" as FoodEx2 code, has a higher percentage of accuracy when the smart accuracy function is turned on. The same is verified for the facet "Hazelnuts" with code "A014L". These two terms in fact, have increased their percentage of accuracy because both of the names can be found in the food description provided in input. In a different scenario, where the term name proposed is not included or differs drastically from the given food description, a lower accuracy would have been assigned.

8.4. Auto select base term

This function allows the automatic selection of the first base term found in the list of results returned. The list of suggested base terms is sorted in descending order by percentage of accuracy and, therefore, the first term (or tag) selected is the one with the highest accuracy value. This function can be switched on and off as required. It is always possible to check if this function is enabled or disabled by directly checking the *Autoselect* voice in the status bar; represented next to the *bt* label with a green bullet when activated and with a red one when disabled.

8.5. Auto select facets

This function allows the automatic selection of the facets found for each facet category. Differently, from the automatic selection of the base term, the auto select facets uses the average accuracy for each category and each facet found within it. If the result is greater than or equal to the static threshold set (always at 50%), the facet within that specific category is automatically selected. As this function is under improvement, changes to the algorithm may be applied.



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It is always possible to check if this function is enabled or disabled by directly checking the *Autose*/voice in the status bar; represented next to the *fcs* label with a green bullet when activated and with a red one when disabled.

9. About

The FoodEx2 SCA includes an About page that gives access to:

- The official guideline: available directly from the app, by clicking on *Manual* link, or on Zenodo by clicking on the DOI number.
- Version number: situated on the top right-side of the screen.
- The GitHub repositories: link to the open-source front and back-end repositories available on the official [EFSA GitHub page \(called "openefsa"\)](#).
- EFSA Data Standardisation: link to the EFSA website that hosts the FoodEx2 system and its tools.
- EFSA website: link to the official EFSA web page.



10. Login

The login page allows access to the feedback engine. This function allows EFSA to collect feedback for terms which the machine learning models have not been able to predict context-related results. More specifically, if the expert data providers have not received a useful list of suggested terms, they can access the feedback engine function where the FoodEx2 code combined with its description can be submitted to an external online database. This feedback will, periodically, be included in the training dataset, which, in the long run, should better balance the dataset and thus, possibly increase the accuracy rate of the models in their predictions. This function is only accessible to previously nominated



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FoodEx2 expert users. For any additional information on the feedback engine, please contact data-collection@efsa.europa.eu.



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Abbreviations

AMU Unit	Assessment and Methodological support Unit
API	Application Programming Interface
DATA Unit	Evidence Management Unit
DCF	Data Collection Framework
EFSA	European Food Safety Authority
EUPL	European Union Public Licence
db	Database
DCF	Data Collection Framework
DC	Data collection
DOI	Digital object Identifier
JSON	JavaScript Object Notation
ICT	Interpreting and checking tool
IT	Information technology
MTX	Matrix
NLP	Natural Language Processing
OS	Operating system
URL	Uniform resource locator
SCA	Smart Coding Application
SSD	Standard Sample description
SQL	Structured query language
DCC	Data collection configuration
RAM	Random access memory
GB	Gigabyte
ID	Identity
EU	European Union



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Appendix A - Terms of use of the EFSA FoodEx2 Smart Coding Application

The present Terms and Conditions of Use (hereinafter "Terms of Use") apply to the FoodEx2 Smart Coding application (hereinafter "FoodEx2 SCA") website located at <https://r4eu.efsa.europa.eu/app/FoodEx2-SCA>.

FoodEx2 SCA is the property of the European Food Safety Authority (EFSA).

BY USING FoodEx2 SCA, YOU AGREE TO THESE TERMS OF USE; IF YOU DO NOT AGREE, DO NOT USE FoodEx2 SCA.

EFSA reserves the right, at its sole discretion, to change, modify, add or remove portions of these Terms of Use, at any time. It is your responsibility to check these Terms of Use periodically for changes. Your continued use of FoodEx2 SCA following the posting of changes will mean that you accept and agree to the changes. As long as you comply with these Terms of Use, EFSA grants you a personal, non-exclusive, non-transferable, limited privilege to enter and use FoodEx2 SCA.

FoodEx2 SCA is accessible from the R4EU platform. By registering in the R4EU platform and accessing FoodEx2 SCA, users accept the [Terms of use and data protection notice](#) of R4EU platform.

The [legal notice](#) on EFSA's website applies to the use of EFSA's logo.

1. General information and purpose of the FoodEx2 SCA

It is EFSA's goal to simplify the process of coding food items. The FoodEx2 Smart Coding Application is a platform developed in EFSA which aims to help data providers speed up the coding in accordance with the FoodEx2 classification and description system.

The EFSA FoodEx2 SCA makes use of Natural Language Processing (NLP) techniques, starting from the EFSA Comprehensive European Food Consumption Database and is able to suggest FoodEx2 codes based on a given free text inserted by the user. These techniques are based on artificial intelligence models trained with historical data collected in EFSA and can be updated both for the graphic interface (front-end) and for the logic running behind it (back-end). The FoodEx2 SCA allows feedback to be sent, which will be used to improve the models' prediction.

The **FoodEx2 codes** provided by the FoodEx2 SCA should be treated as **suggestions**. Those are strictly dependent on the **free text input by the user**. Therefore, it is for the user to provide a correct description of the food. Each term suggested by the models is provided with a percentage of accuracy. This percentage is shown next to the name of the term and therefore, allows to help the user during the selection of the code. It is for the user to select the most appropriate FoodEx2 code that fits the description provided and to use the percentage of accuracy as a simple guide.

The **percentage of accuracy** is a value attributed by the various models to each term. This value indicates how certain the model is on suggesting a specific term among all terms available in the database.

All the terms suggested by the FoodEx2 SCA system are terms present in the MTX catalogue (FoodEx2 Matrix) which can be browsed with the use of the specific software developed by EFSA (the [EFSA Catalogue browser](#)).

FoodEx2 SCA is also equipped with a function able to **send feedbacks**. This will allow EFSA to retrain the models and eventually increase the accuracy of the code proposed. That said, the models will be subject to new training periodically, which could alter the proposed suggestions and the percentage of accuracy attributed to each term. EFSA will take technical details related to the models in use respecting privacy rules in place between EFSA and the data providers. This feature is only accessible to previously nominated FoodEx2 expert users.

2. Scope



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These Terms of Use apply between the user and the European Food Safety Authority (EFSA) and they set out the conditions applicable to the use of the FoodEx2 SCA.

The “user” means the natural or legal person (e.g. the individual, company, organisation) subject to the terms and conditions of these terms, who has created a user account to use the Tool.

By the acceptance of these terms by the user, EFSA grants the user a revocable, non-exclusive, non-transferable and limited license to use the FoodEx2 SCA solely for personal purposes strictly in accordance with the present Terms of Use.

3. Intellectual Property Rights & Conditions for Re-use

EFSA owns the FoodEx2 SCA. **Copyright** (©) is asserted by EFSA for the FoodEx2 SCA, unless otherwise stated. By providing access to the EFSA FoodEx2 SCA to users, EFSA does not waive ownership on the FoodEx2 SCA and reserves all rights to maintain it, update it, or improve it as it sees it fit.

The FoodEx2 SCA does not disclose any commercially sensitive or otherwise confidential information.

EFSA is the owner of the data used by the FoodEx2 SCA which is data mapped according to the EFSA format and which is an emanation of the coding system created by EFSA for ensuring an harmonised way of collecting food consumption data from national competent authorities of the European Union Member States.

The FoodEx2 SCA application is provided by EFSA under the conditions of the European Union Public Licence (EUPL) v. 1.2 as set out by the [Commission Implementing Decision \(EU\) 2017/863 of 18 May 2017](#). The Terms of Use outlined below shall not be interpreted as limiting or substituting in any way the EUPL v.1.2 as defined by the above-mentioned Decision. **You can copy, modify, distribute, reproduce and reuse the data produced by means of the FoodEx2 SCA, even for commercial purposes, without asking permission, provided that you comply with the obligations set out in Article 5 of the EUPL v. 1.2 and that:**

- EFSA is properly acknowledged as source and you provide a link to the license. As an example of citation: “Data provided by the European Food Safety Authority – (<https://r4eu.efsa.europa.eu>)”.
- You do not distort the original meaning of the tools and data provided through the R4EU platform and you indicate when any modification is made;

4. Liability

EFSA’s goal is to keep this information timely and accurate. FoodEx2 SCA is therefore meant as a living software working as a web application, to be **regularly updated and maintained by EFSA** to the best of its knowledge and available resources in connection to the data collected. FoodEx2 SCA will not store any sensitive information other than those already stored by other EFSA systems, or other data resulting from its use. If factual errors are brought to EFSA’s attention, EFSA intends doing its utmost to correct them as soon as possible. The EFSA FoodEx2 SCA may also be updated to incorporate new information, codes or data resulting from EFSA’s scientific activities and data collections. EFSA does not provide any reassurance on the accuracy or suitability of any document, information, data provided as a result of the use of the FoodEx2 SCA by the user and is without prejudice to the outcome of EFSA’s evaluation processes.

Obtaining access to the FoodEx2 SCA does not establish any contractual relationship between the user and EFSA. By acceding the FoodEx2 SCA, the user also acknowledges that the documents, data or information made available by EFSA may contain inaccuracies or errors. The content of the information provided as a result of the use of the FoodEx2 SCA is for information only.

There are inherent dangers in the use of any web applications/software, and users are exclusively responsible for the use of the EFSA FoodEx2 SCA and its compatibility with their equipment or other



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software installed. EFSA makes no representations or warranties of any kind including in relation to the safety, suitability, viruses, or other harmful components which may arise during the use of the EFSA FoodEx2 SCA.

EFSA reserves itself the right to **modify, suspend or discontinue, temporarily or permanently, the FoodEx2 SCA** or any service to which it connects, with or without prior notice. All this shall not in any case hold EFSA liable towards the user.

EFSA accepts **no responsibility or liability** (including, but not limited to, any direct or consequential loss or damage that might occur to the user and/or any other third party) **arising out of, or in connection with, the information provided by FoodEx2 SCA and its use**. EFSA cannot be held liable for errors, inaccuracies or inconsistencies with regard to texts available on its FoodEx2 SCA being different from the scientific and administrative documents officially adopted, issued or endorsed by its responsible bodies. It is EFSA's goal to minimise disruption caused by technical errors. It is EFSA's goal to minimise disruption caused by technical errors. However, some data or information on EFSA's website or FoodEx2 SCA may have been created or structured in files or formats that are not error-free and EFSA cannot guarantee that its service will not be interrupted or otherwise affected by such problems. **EFSA accepts no responsibility with regard to such problems incurred as a result of using this FoodEx2 SCA, website or any linked external sites.**

This disclaimer is not intended to limit EFSA's liability in contravention of any requirements laid down in applicable national or EU law nor to exclude its liability for matters which may not be excluded under such laws.

5. Restrictions

The user agrees not to license, sell, rent, lease, assign, distribute, transmit, host, outsource, disclose or otherwise exploit the FoodEx2 SCA as well as to make the use of the FoodEx2 SCA available to any third party provided with the user's account. The same rules apply to any others who have in any case access to the user account.