FEDA USER GUIDE

1. General information

1.1. WHAT IS FEDA

Food Enzyme Database (**FEDA**) is a web-application database hosting and structuring publically available information related to food enzymes in one location. Data is collected from the public parts of the submitted FE dossiers, the EFSA portals, published scientific opinions, the NCBI databases (genomes and taxonomy), EC inventory and IUBMB (International Union of Biochemistry and Molecular Biology) nomenclature. It involves a browser integrated user graphical interface that allows the user to access, manage and search the data in a friendly way.

While every effort was made to provide accurate information, Sciensano does not guarantee the accuracy of the information provided, and disclaims any responsibility for any inaccuracies of information or for any claim that may arise from the use of the information in the database.
FEDA does not hold any legal value, please access the appropriate EFSA (European Food Safety Agency) and EC (European Commission) regulations or statements.

1.2. SYSTEM REQUIREMENTS

FEDA is compatible with both Chrome or Firefox (with both cookies and JavaScript enabled) inside a Windows or Linux operating system. However, the web application isn't rendered properly when using Internet Explorer, due to its lack of support for standardised CSS format.

1.3. ACCESSIBILITY

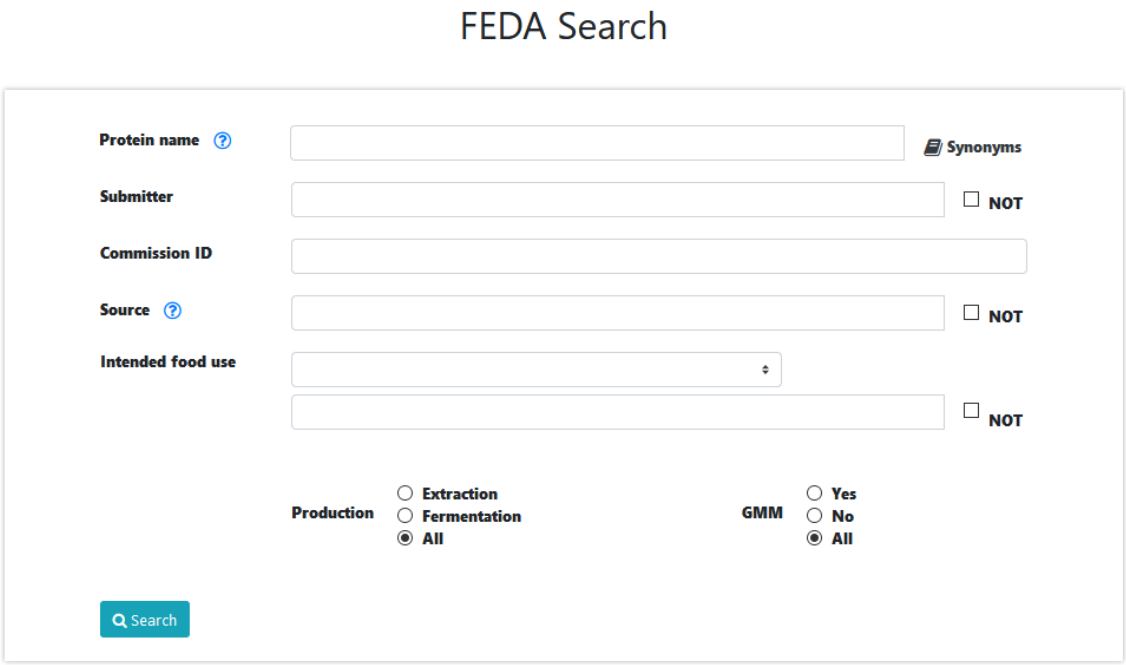
The web interface is accessible by using the shortcut : https://feda.sciensano.be or the full address: https://bioit-webapp-prod.sciensano.be/Specenzyme/. All data are available to all users without authentication. However, updates are restricted to authenticated administrators.

2. Home page

On the home page some meaningful information about the database is displayed, as illustrated below, such as the latest database update time and a resume of the latest changes (within the last 30 days) with direct links to the corresponding entries.

3. Database Search

This powerful search form allows you to build search queries by specifying values for several pre-defined criteria : the search filters.



3.1. SEARCH FILTERS

Two types of search filters are available : multiple or single search fields, they take the form of dropdown lists, radio buttons or free text fields. For instance, “Protein name”, “Submitter”, “Commission ID”, “Source” and “Intended food use” are multiple search filters, meaning you can provide several search values per field separated with a ‘;’ (column) separator. Terms must be separated exclusively with separators: **any additional white space used will be considered as part of the search query**. Additionally, the searches are case sensitive. By default, no filter is applied and all existing database entries are returned.

3.1.1. Protein name

For the protein name , the dedicated ‘search name’ should be used, which corresponds to the terminology used in the food enzyme dossiers, submitted for safety evaluation.
In case of doubt, to know which terminology should be used, the ‘Synonyms’ option provides a table (in a separate tab) containing all the search names of the enzyme protein names, their systematic name and it’s synonyms. Additionally, the blue quotation mark provides a drop-down list of all available proteins names in the database.
The corresponding enzyme concentrates are then returned in the results grid.

3.1.2. Submitter

A search can be performed based on the submitting company of the food enzyme dossiers. A submitter can either be one company or an association.

The search is partial case insensitive lookup, meaning that the search returns a list of all submitters containing the search term as a part of his name. The 'NOT' option will negate the condition and return submitter names that do not contain any of the given terms.

3.1.3. Commission ID

The commission ID is the number allocated to a food enzyme dossier by the European commission. The search is partial case insensitive comparison against the EFSA reference number from the enzyme concentrate.

3.1.4. Source

The source search is also partial case insensitive lookup against the producing organism's name. The 'NOT' reverses the organism filtering, keeping only the ones that do not match any of the search terms. The blue question mark lists all available organism names present in the database.

3.1.5. Intended food use

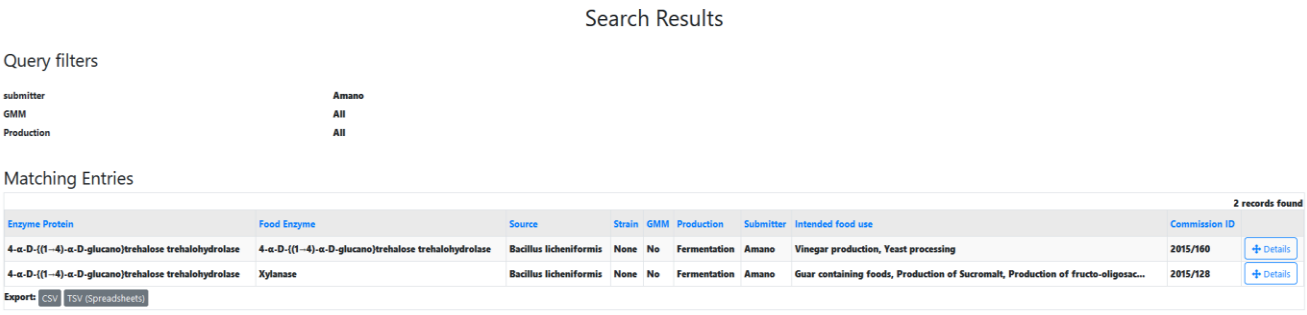
This involves a full match with a predefined set of intended food use. Use the dropdown list to make your choice(s), the field is automatically filled with your selected values. The 'NOT' will negate the condition, returning the food enzymes that do not mention any of the defined food uses.

3.1.6. Production – GM Food – Evaluation

These criteria only allow one option to be chosen from two available possibilities. In addition to this binary choice, the third value allows to ignore the corresponding criteria in the search query, returning all food enzymes independently of this value.

3.2. SEARCH RESULTS

The food enzymes returned by the search query are displayed in a grid together with the used query filters. The 'Details' button per entry allows to open a separate tab, containing more information about the selected food enzyme.
The obtained results overview table can be exported in two formats, either as TSV (Tab-Separated Values) or as CSF (Comma-Separated Values) format. Furthermore, sorting can be performed using the table headers.


Search Results

Query filters

submitter	Amano
GMM	All
Production	All

Matching Entries

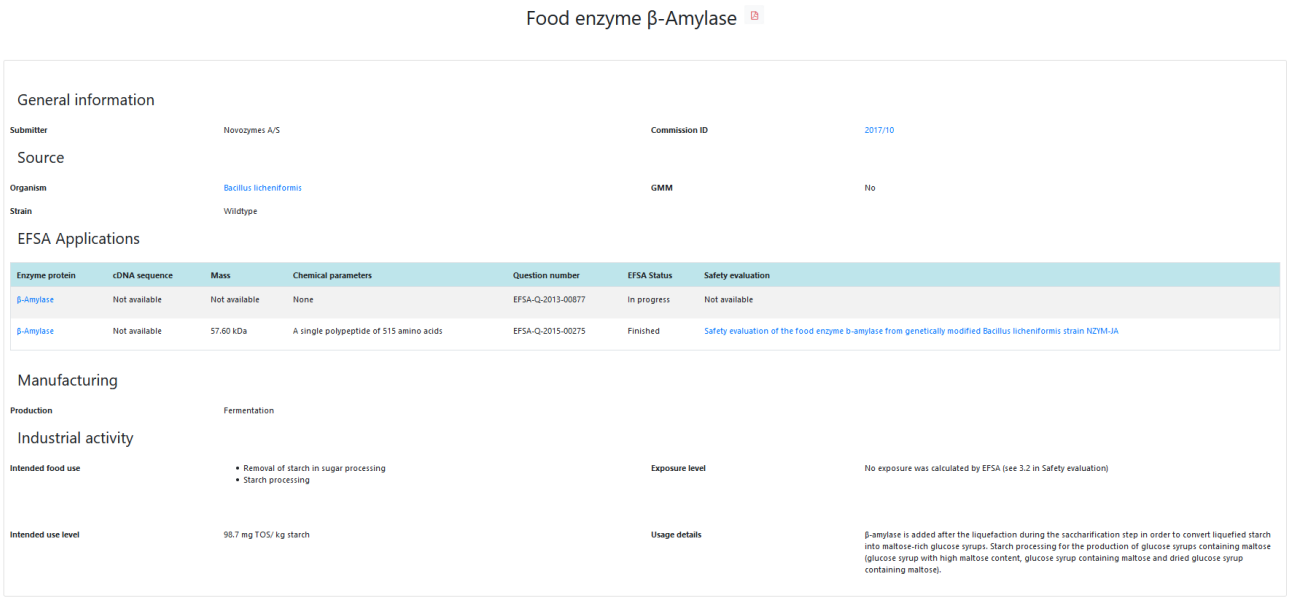
2 records found

Enzyme Protein	Food Enzyme	Source	Strain	GMM	Production	Submitter	Intended food use	Commission ID	
4-α-D-{(1→4)-α-D-glucano}trehalose trehalohydrolase	4-α-D-{(1→4)-α-D-glucano}trehalose trehalohydrolase	Bacillus licheniformis	None	No	Fermentation	Amano	Vinegar production, Yeast processing	2015/160	Details
4-α-D-{(1→4)-α-D-glucano}trehalose trehalohydrolase	Xylanase	Bacillus licheniformis	None	No	Fermentation	Amano	Guar containing foods, Production of Sucromalt, Production of fructo-oligosac...	2015/128	Details

Export: CSV TSV (Spreadsheets)

4. Data visualisation pages

4.1. FOOD ENZYME


Food enzyme β-Amylase

General information

Submitter	Novozymes A/S	Commission ID	2017/10

Source

Organism	Bacillus licheniformis	GMM	No
Strain	Wildtype		

EFSA Applications

Enzyme protein	cDNA sequence	Mass	Chemical parameters	Question number	EFSA Status	Safety evaluation
β-Amylase	Not available	Not available	None	EFSA-Q-2013-00877	In progress	Not available
β-Amylase	Not available	57.60 kDa	A single polypeptide of 515 amino acids	EFSA-Q-2015-00275	Finished	Safety evaluation of the food enzyme b-amylase from genetically modified Bacillus licheniformis strain NZYM-JA

Manufacturing

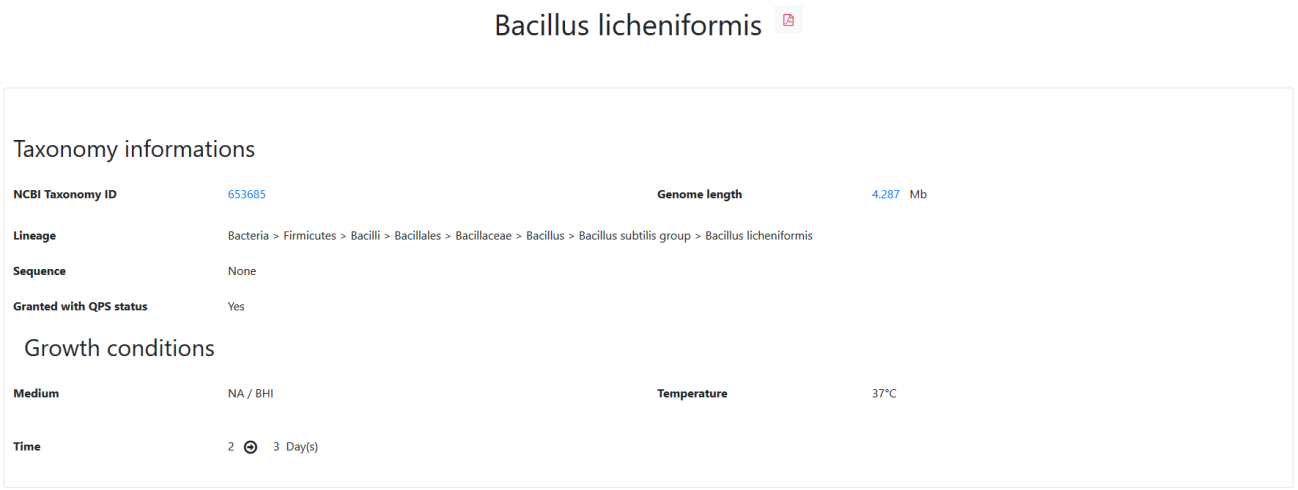
Production	Fermentation

Industrial activity

Intended food use	• Removal of starch in sugar processing • Starch processing	Exposure level	No exposure was calculated by EFSA (see 3.2 in Safety evaluation)
Intended use level	98.7 mg TOS/ kg starch	Usage details	β-amylase is added after the liquefaction during the saccharification step in order to convert liquefied starch into maltose-rich glucose syrups. Starch processing for the production of glucose syrups containing maltose (glucose syrup with high maltose content, glucose syrup containing maltose and dried glucose syrup containing maltose).

The food enzyme page is the central point of the database. This page contains general information about the dossier related to the food enzyme, the EFSA evaluation(s), the manufacturing and the use of the food enzyme. Several links are available, allowing to access additional information about the producing organism (section 4.2), the enzyme protein (section 4.3) and, in case published, to the scientific opinion (section 4.4). When an information could not be collected from the publically available sources, “not available” is indicated in the corresponding field. Every data visualisation page has a pdf button (next to the title) allowing the export of the current displayed information as a PDF file. Under ‘General information’ the ‘commission ID’ provides a link to the public section of the submitted FE dossier.

4.2. ORGANISM


Bacillus licheniformis

Taxonomy informations

NCBI Taxonomy ID	653685	Genome length	4.287 Mb
Lineage	Bacteria > Firmicutes > Bacilli > Bacillales > Bacillaceae > Bacillus > Bacillus subtilis group > Bacillus licheniformis		
Sequence	None		
Granted with QPS status	Yes		

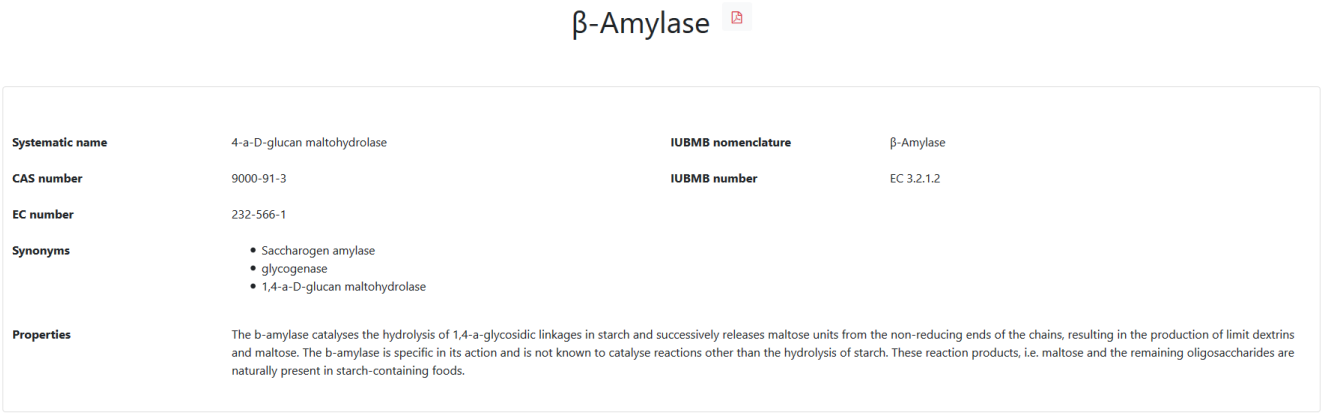
Growth conditions

Medium	NA / BHI	Temperature	37°C
Time	2 3 Day(s)		

The taxonomy section contains links to two of the NCBI’s databases: ‘Taxonomy’ and ‘Genome’ and in case of micro-organisms, a FASTA sequence file of the 16S (for bacteria) or ITS (for fungi) region of the

organism, generated during the SPECENZYM project The page ends with more information about recommended growth conditions.

4.3. ENZYME PROTEIN

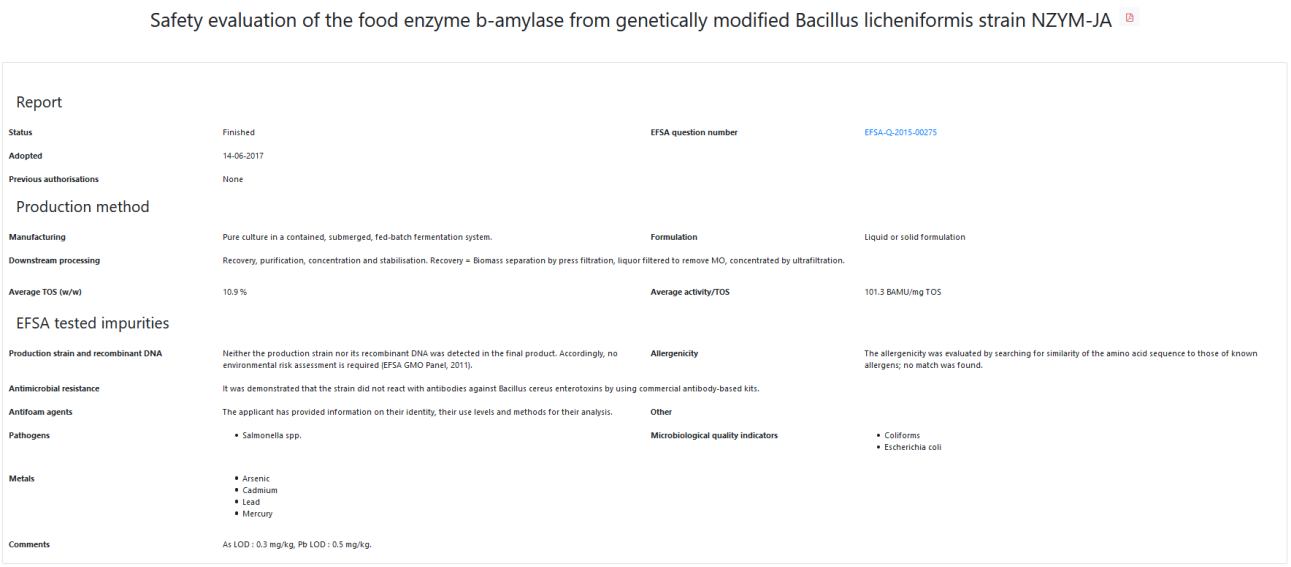


β-Amylase

Systematic name	4-a-D-glucan maltohydrolase	**IUBMB nomenclature**	β-Amylase
CAS number	9000-91-3	**IUBMB number**	EC 3.2.1.2
EC number	232-566-1		
Synonyms	• Saccharogen amylase • glycogenase • 1,4-a-D-glucan maltohydrolase		
Properties	The b-amylase catalyses the hydrolysis of 1,4-a-glycosidic linkages in starch and successively releases maltose units from the non-reducing ends of the chains, resulting in the production of limit dextrins and maltose. The b-amylase is specific in its action and is not known to catalyse reactions other than the hydrolysis of starch. These reaction products, i.e. maltose and the remaining oligosaccharides are naturally present in starch-containing foods.		

The additional page on the enzyme protein displays identification characteristics of the enzyme protein, including several classification numbers such as the IUBMB, CAS and EINECS nomenclature; synonyms and the properties of the enzyme.

4.4. SAFETY EVALUATION



Safety evaluation of the food enzyme b-amylase from genetically modified Bacillus licheniformis strain NZYM-JA

Report

Status	Finished	**EFSA question number**	EFSA-Q-2015-00275
Adopted	14-06-2017		
Previous authorisations	None		

Production method

Manufacturing	Pure culture in a contained, submerged, fed-batch fermentation system.	**Formulation**	Liquid or solid formulation
Downstream processing	Recovery, purification, concentration and stabilisation. Recovery = Biomass separation by press filtration, liquor filtered to remove MO, concentrated by ultrafiltration.		
Average TOS (w/w)	10.9 %	**Average activity/TOS**	101.3 BAMU/mg TOS

EFSA tested impurities

Production strain and recombinant DNA	Neither the production strain nor its recombinant DNA was detected in the final product. Accordingly, no environmental risk assessment is required (EFSA GMO Panel, 2011).	**Allergenicity**	The allergenicity was evaluated by searching for similarity of the amino acid sequence to those of known allergens; no match was found.
Antimicrobial resistance	It was demonstrated that the strain did not react with antibodies against Bacillus cereus enterotoxins by using commercial antibody-based kits.		
Antifoam agents	The applicant has provided information on their identity, their use levels and methods for their analysis.	**Other**	
Pathogens	• Salmonella spp.	**Microbiological quality indicators**	• Coliforms • Escherichia coli
Metals	• Arsenic • Cadmium • Lead • Mercury		
Comments	As LOD : 0.3 mg/kg, Pb LOD : 0.5 mg/kg.		

Lastly, in case a scientific evaluation has been performed on a food enzyme, related information is available on this page. The first section contains general information on the evaluation process, providing a link to the Scientific evaluation document and several metadata such as the question number or the adoption status.

The second section centralises all information related to the production of the food enzyme.

The latest section details information related to the impurities investigated during the EFSA safety evaluation. Eventually, if the food enzymes is also tested by a reference laboratory, the additional testing results are shown after the EFSA ones.