Agribalyse 3.2 in openLCA

Software version:	openLCA 2.4.1
Report version:	1.0
Date:	May 4 2024

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GreenDelta

Content

1 Agribalyse 3.2 for openLCA

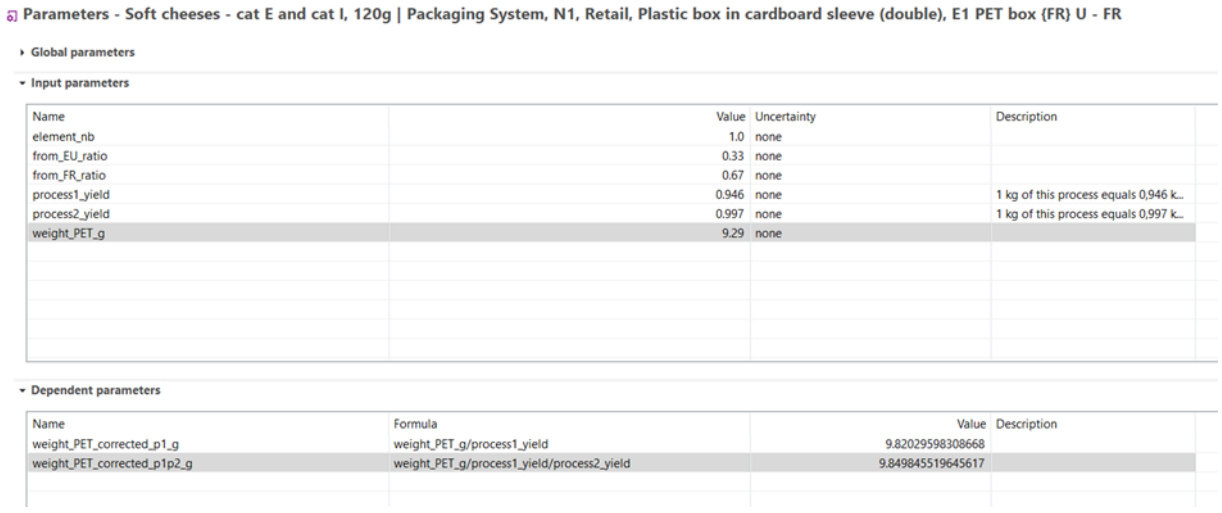
Agribalyse is a French database with a focus on food products, developed and provided by ADEME, since 2010. Agribalyse contains datasets from ADEME projects about food, but also datasets from the Quantis World Food database, and from ecoinvent. This can be seen from the different product name patterns in the database. It is available from https://doc.agribalyse.fr/documentation-en/agribalyse-data/data-access.

The database is developed with SimaPro and therefore available in SimaPro csv format. This file is shared by ADEME and the GreenDelta team makes a series of mappings and checks in order to make the database available for openLCA and compatible with the openLCA LCIA Method package.

The database is widely available for free and to work with it in openLCA the user shall have a valid ecoinvent licence.

The conversion of Agribalyse 3.2 was smooth in the sense that no metadata was lost, and information such as process location and parameters were imported well. Only one parameter was spotted to have been imported with an error original form the SimaPro csv, see Figure 1. This was spotted during results comparison check. The database passes the openLCA validation check.

Figure 1. One parameter had to be corrected after the import



2 Results comparison against SimaPro

Always when migrating a database from one reference system like SimaPro to another one, it remains a task and challenge to fully reflect the same results.

Climate Change, Ecotoxicity freshwater, Land use and Water used were cross checked with the Agribalyse 3.2 results from SimaPro.

2.1 Climate Change

Result differences are between -0.5% and 0.5%.

2.2 Ecotoxicity Freshwater

Differences below 4.5%. This is usually coming from a flow that is taken into account by SimaPro but not by openLCA.

However, 1138 processes have a higher impact in openLCA than in SimaPro, resulting of negative differences of up to -34%:

LCI Name OPEN LCA	Ecotoxicity OPEN LCA	8_verif.Ecotoxicity freshw	8_bulccalc.Ecotoxicity freshw	Ecotoxicity SIMAPF	%difference	Wat use OPE LCA
Soup, tomatoes, dehydrated and reconstituted, processed in FR | Ambie	2.955718	3.00861	3.008782	1.96E+00	-34.86%	(
Soup, gazpacho, cold, processed in FR | Ambient (long) | Pack proxy | Mi	3.378113	3.440062	3.440233	2.45E+00	-28.78%	0.
Soup, tomatoes, prepacked, to be reheated, processed in FR | Ambient (	3.378113	3.440062	3.440233	2.45E+00	-28.78%	0.
Soup, leek and potato, dehydrated and reconstituted, processed in FR | /	4.583797	4.756771	4.756772	3.54E+00	-25.58%	0.
Aromatic stock cube, for fish, dehydrated, processed in FR | Ambient (lo	90.98863	92.72527	92.72528	7.02E+01	-24.29%	4.0
Soup, leek and potato, prepacked, to be reheated, processed in FR | Amb	5.006554	5.188611	5.188612	4.03E+00	-22.33%	0.
Soup for baby, with vegetables and potatoes, processed in FR | Ambient	5.243884	5.42958	5.429581	4.26E+00	-21.54%	0.2
Millet, whole, processed in FR | Ambient (long) | Pack | No preparation	10.27971	10.72084	10.72084	8.43E+00	-21.37%	1.0
Millet, cooked, unsalted, processed in FR | Ambient (long) | Pack | Micro	4.645379	4.840948	4.840948	3.82E+00	-21.09%	0.4
Soup, cereals and vegetables, dehydrated and reconstituted, processed i	5.24241	5.380255	5.380984	4.26E+00	-20.83%	0.4
Soup, tomato and vermicelli, dehydrated and reconstituted, processed in	5.24241	5.380255	5.380984	4.26E+00	-20.83%	0.4
Soup, watercress, dehydrated and reconstituted, processed in FR | Ambi	5.674447	5.696302	5.696516	4.52E+00	-20.65%	0.2
Millet flour, processed in FR | Ambient (long) | Pack proxy | No preparat	13.01147	13.54575	13.54575	1.08E+01	-20.27%	1.2
Tofu, plain, processed in FR | Chilled | Pack | Microwave | at consumer {	7.821264	7.86871	7.86871	6.34E+00	-19.43%	0.3
Sauerkraut, without garnish, drained, cooked, processed in FR | Chilled |	17.34623	17.41319	17.41319	1.42E+01	-18.45%	1.2
Soup, watercress, prepacked, to be reheated, processed in FR | Ambient	6.097445	6.12835	6.128564	5.01E+00	-18.25%	0.2
Soup, tomatoes and vermicelli, prepacked, to be reheated, processed in	5.665313	5.812233	5.812962	4.76E+00	-18.11%	0.4
Buckwheat crepe, plain, prepacked, processed in FR | Ambient (long) | P	5.233755	5.284336	5.284338	4.33E+00	-18.06%	0.3
Soup, mixed vegetables, dehydrated and reconstituted, processed in FR	6.760085	6.962185	6.962263	5.81E+00	-16.55%	0.3
Soup, pumpkin, dehydrated and reconstituted, processed in FR | Ambier	7.581952	7.74552	7.745767	6.56E+00	-15.31%	0.4
Strawberry, raw, processed in FR | Ambient (average) | No pack | No pre	14.69415	14.37851	14.37851	1.22E+01	-15.15%	0.
Strawberry, in-season, raw, processed in FR | Ambient (average) | No pa	14.53788	14.22026	14.22026	1.21E+01	-14.91%	0.8
Strawberry, off-season, raw, processed in FR | Ambient (average) | No p	15.11383	14.80351	14.80351	1.26E+01	-14.89%	0.1
Soup, mixed vegetables, prepacked, to be reheated, processed in FR | Ai	7.183325	7.394514	7.394592	6.30E+00	-14.80%	0.3
Soup for baby, with vegetables, cereals and milk, processed in FR | Ambi	7.420655	7.635483	7.635561	6.54E+00	-14.35%	0.4

e.g.

"Soup, tomatoes, dehydrated and reconstituted, processed in FR | Ambient (long) | Pack proxy | Water cooker | at consumer {FR} [Ciqual code: 25935] U – FR"

Ecotoxicity Freshwater openLCA (CTUe)	*Ecotoxicity Freshwater SimaPro (CTUe)*	*%difference*	*Difference (CTUe)*
3.01	1.96	-34.9%	1.05

This difference is due to quite some flows taken into account by openLCA LCIA Method package that are not considered in SimaPro, see Table 1.

Table 1. List of flows taken into account by EF 3.1 LCIA Method in openLCA's method package but not in SimaPro's

Flow name	Compartment	unit	Characterisation factor	unit	Flow exists in EF 3.1?	What was done for openLCA LCIA Method package?
Iron ion	Elementary flows/Emission to water/ground water	kg	2108.501575	CTUe/kg	?	CF for iron was used
Iron ion	Elementary flows/Emission to water/river	kg	2108.501575	CTUe/kg	?	CF for iron was used
Iron ion	Elementary flows/Emission to soil/unspecified	kg	1148.396477	CTUe/kg	?	CF for iron was used
PAH, polycyclic aromatic hydrocarbons	Elementary flows/Emission to water/surface water	kg	239130	CTUe/kg	yes	this flow is not characterised in SimaPro (compartment does not exist)
Phenol	Elementary flows/Emission to water/surface water	kg	17344	CTUe/kg	yes	this flow is not characterised in SimaPro (compartment does not exist)
Spinosad	Elementary flows/Emission to soil/agricultural	kg	134083.4244	CTUe/kg	no	insecticides, unspecified
Tebutam	Elementary flows/Emission to soil/agricultural	kg	70308.77683	CTUe/kg	no	used same CF as herbicides, unspecified

2.3 Water use

Water use varies from 15% to -100%, see **Fehler! Verweisquelle konnte nicht gefunden werden.**. The differences can seem big and alarming, but they are explained by a different application of the "Water use" Impact Category in openLCA's EF 3.1 LCIA Method.

The EF 3.1 LCIA Method takes its characterisation factors from AWARE[1], however, EF 3.1 leaves out certain regionalisations. For example, for *Water, river, Europe without Switzerland* (Resource/in water) doesn't exist in the EF 3.1 LCIA Method original excel characterisation factors table[2]. SimaPro gives this flow the global average whilst we get the regionalised value from the AWARE LCIA Method and incorporate it within our EF 3.1 LCIA Method, see

LCI Name OPEN LCA	Water use - (m3 world eq)	Water use SIMAPRO	%difference
Beer, alcohol-free (		0.2583	#DIV/0!
Shandy, prepacked (		0.3292	#DIV/0!
Date, pulp and peel, dried, processed in FR | Ambient (average) |	-14.9999899	-17.24	14.93%
Tomato paste, concentrated, canned, processed in FR | Ambient (	7.780890161	8.796	13.05%
Morel, raw, processed in FR | Ambient (average) | No pack | No p	50.04075841	56.19	12.29%
Mushroom sauce, prepacked, processed in FR | Chilled | Pack pro	24.48328136	27.28	11.42%
Crepe or buckwheat crepe, filled with mushrooms and bechamel	17.89184469	19.89	11.17%
Spring vegetables, frozen, raw (french beans, carrots, potatoes, gr	7.812511885	8.627	10.43%
Mixed vegetables for soups, frozen, raw, processed in FR | Frozen	7.812511885	8.627	10.43%
Mixed vegetables, frozen, raw, processed in FR | Frozen | Pack | M	7.812511885	8.627	10.43%
Pizza, cheese and mushrooms, processed in FR | Chilled | Pack | C	15.75206401	17.36	10.21%
Cream sauce with mushrooms, prepacked, processed in FR | Chill	19.22367966	21.18	10.18%
Omelette, with mushrooms, processed in FR | Chilled | Pack prox	15.29409424	16.71	9.26%
Greek-style marinated mushrooms, processed in FR | Chilled | Pa	20.22468023	22.09	9.22%
Tomato paste, double concentrate, canned, processed in FR | Aml	9.578819361	10.46	9.20%
Hunter-style sauce (a garnish of mushrooms, shallots and tomato	7.544184099	8.165	8.23%

[1] https://wulca-waterlca.org/aware/

[2] https://eplca.jrc.ec.europa.eu/LCDN/developerEF.html

LCI Name OPEN LCA	Water use - (m3 world eq)	Water use SIMAPRO	%difference
Vanilla, alcoholic extract, processed in FR | Ambient (long) | Pack	159.9454879	0.6804	-99.57%
Vanilla, aqueous extract, processed in FR | Ambient (long) | Pack	159.9454879	0.6804	-99.57%
Whiskey-based cocktail, processed in FR | Ambient (long) | Pack p	33.87005458	0.1624	-99.52%
Clear fruit brandy or eau-de-vie, processed in FR | Ambient (long)	33.92099795	0.1666	-99.51%
Gin, processed in FR | Ambient (long) | Pack proxy | Chilled at cor	33.92454706	0.1691	-99.50%
Sake or rice wine, processed in FR | Ambient (long) | Pack proxy |	33.92454706	0.1691	-99.50%
Pastis (anise-flavoured spirit), processed in FR | Ambient (long) |	33.92454706	0.1691	-99.50%
Pure alcohol, processed in FR | Ambient (long) | Pack proxy | Chil	33.92454706	0.1691	-99.50%
Rum, processed in FR | Ambient (long) | Pack proxy | Chilled at cc	33.92454706	0.1691	-99.50%
Vodka, processed in FR | Ambient (long) | Pack proxy | Chilled at	33.92454706	0.1691	-99.50%
Whisky, processed in FR | Ambient (long) | Pack proxy | Chilled at	33.92454706	0.1691	-99.50%
Spirit made from wine, armagnac or cognac type, processed in FR	33.92454706	0.1691	-99.50%
Marsala wine, processed in FR | Ambient (long) | Pack proxy | Chi	33.88237385	0.2011	-99.41%
Cocoa powder, without sugar, powder, instant, non rehydrated, p	118.2815822	0.7424	-99.37%
Champagne, processed in FR | Chilled | Pack | Chilled at consume	61.84355415	0.4062	-99.34%
Wine, white, sparkling, flavoured, processed in FR | Chilled | Pack	57.4175276	0.3883	-99.32%
Wine, white, sparkling, processed in FR | Chilled | Pack | Chilled a	57.4175276	0.3883	-99.32%
Vinegar, balsamic, processed in FR | Ambient (long) | Pack proxy	21.58692135	0.1488	-99.31%
Vinegar, processed in FR | Ambient (long) | Pack proxy | No prop	21.58692135	0.1488	-99.31%

Figure 2. Differences in Water use results (EF 3.1 LCIA Method)

Table 2.

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Figure 2. Differences in Water use results (EF 3.1 LCIA Method)

Table 2. Water, river, Europe without Switzerland (Resource/in water) example between openLCA and SimaPro implementation of the Water use Impact Category.

	Characterization factor	*Unit*	*Impact assessment result*	
openLCA	20.94	m3 world eq/m3	1.301381	m3 world eq
SimaPro	42.95	m3 world eq/m3	2.66926	m3 world eq

2.4 Land use

Land use results range between 3% and -1% different between openLCA and SimaPro.

3 Calculation recommendations

It is recommended to download the latest package of the openLCA LCIA Methods: https://nexus.openlca.org/database/openLCA%20LCIA%20Methods.

The database is compatible with EF 3.1 LCIA Method.

4 Contact and Feedback

Feedback is welcome!

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