

PlantLIBRA: Plant Food Supplements; Composition, Benefits, and Adverse Effects, Results and Sustainable Outputs

Jenny Plumb

Paul Finglas

on behalf of PlantLIBRA project partners

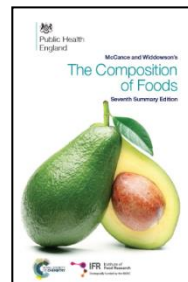
Food Databanks National Capability, Food and Health
Institute of Food Research, Norwich, UK

Natural Product Biotechnology Conference

Inverness 20th November 2014



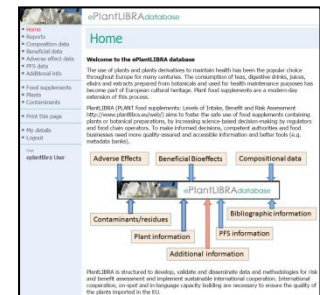
The only publicly-funded UK research institute addressing the fundamental science of food and health



Food Databanks National Capability (FDNC)

Nutrient food composition database

Bioactive composition database



Results Benefit Safety assessments Risk
 Laboratories Supplements Survey Botanicals Food Policy Plant perception
 Website History **PlantLIBRA** Consumer

Database



Plant Food Supplements History and Traditional Use

“Food supplements are concentrated sources of nutrients or other substances with a nutritional or physiological effect whose purpose is to supplement the normal diet.”



***'Stop drinking nothing but water;
take a little wine for your digestion,
for your frequent ailments'***

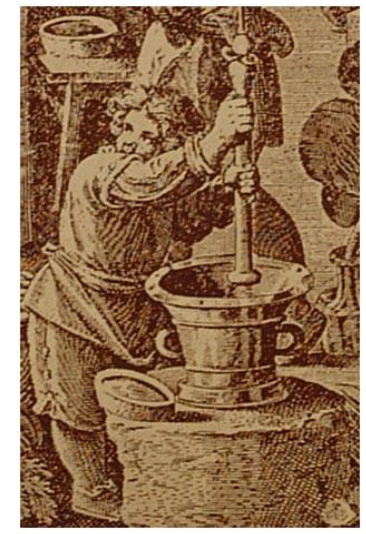
Timothy 5:23



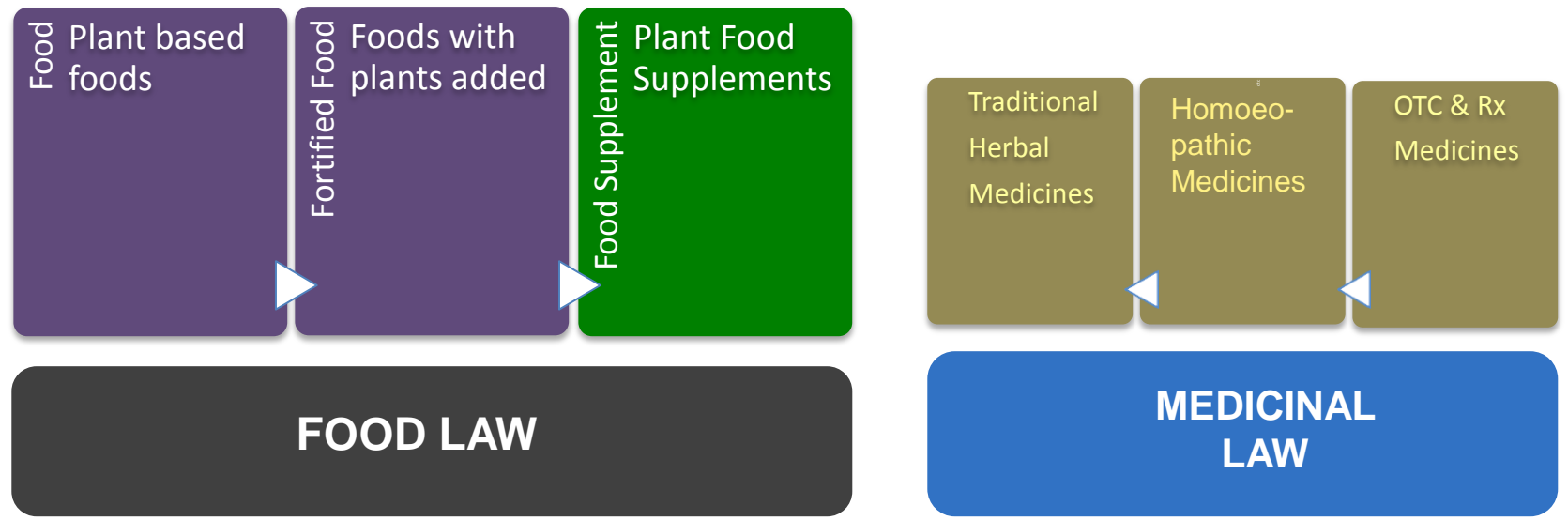
Plant Food Supplements to the present time



Botanical sage
 feverfew
 herbs History elixirs
 peppermint draughts dandelion
 balm Tradition **Health**



Food Supplement Directive 2002/46



Need for science based decisions & clear definitions & structured, searchable, reliable information on quality, safety and efficacy on botanicals

Project: Plant Food Supplements – intake, benefit and risk assessment



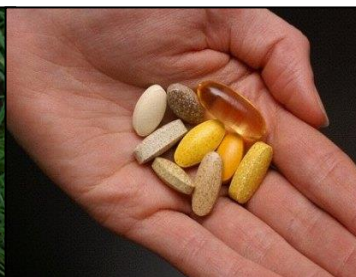
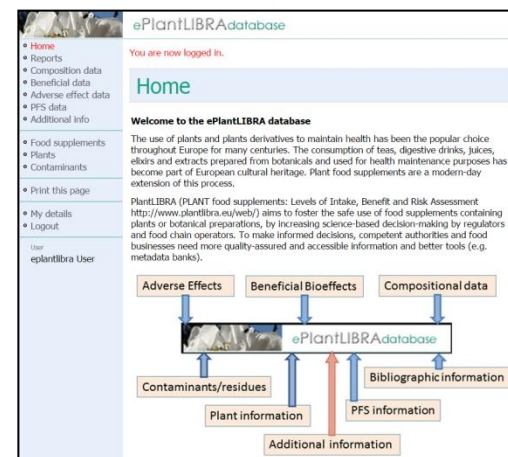
Main targets:

- To promote the safe use of PFS
- To increase science-based decision-making
- To create new data and methods
- To implement international cooperation

EC FP7 project: 2010-2014, 25 partners, 14 countries

Main PlantLIBRA outputs

- Consumer survey, Consumer perception
- Risk benefit studies
- Analytical methods
- Regulatory aspects
- ePlantlibra database



<http://www.eurofir.org/plantlibra>

Consumer survey

Intake estimation of Plant Food Supplements

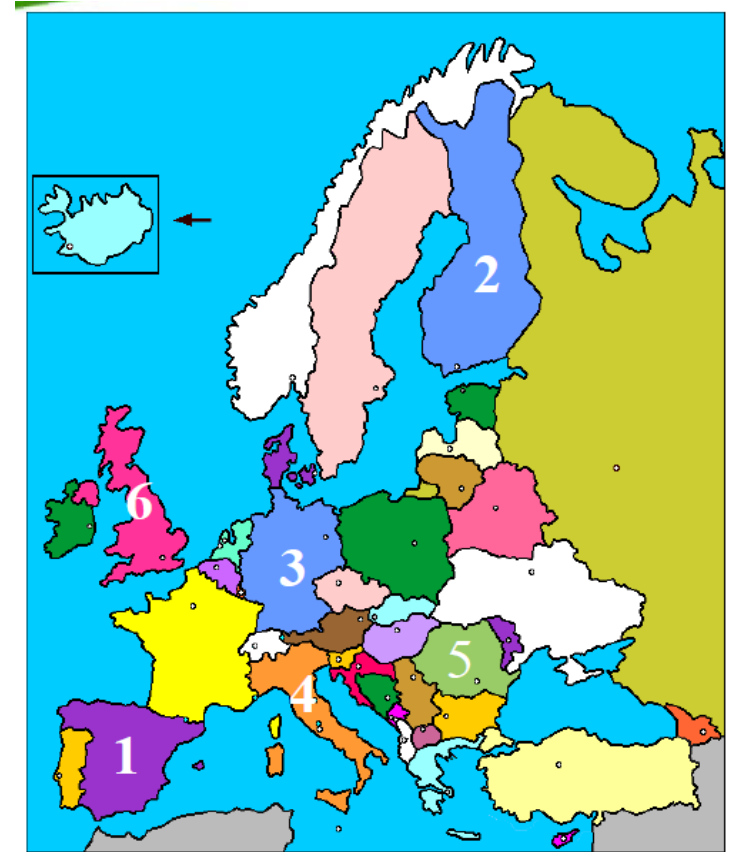
- Six EU countries, n=2359
Spain, Finland, Germany, Italy, Romania, UK

Consumers

- Demographic information
- Socio-economic data
- Lifestyle factors

Products and botanicals

- Product information
- Consumption patterns



Most commonly used botanicals in PFS

Ginkgo biloba

Oenothera biennis

Cynara scolymus

Panax ginseng

Aloe vera

Foeniculum vulgare

Valeriana officinalis

Glycine max

Melissa officinalis

Echinacea purpurea

Vaccinium myrtillus

ginkgo

evening primrose

artichoke

ginseng

aloe

fennel

valerian

soybean

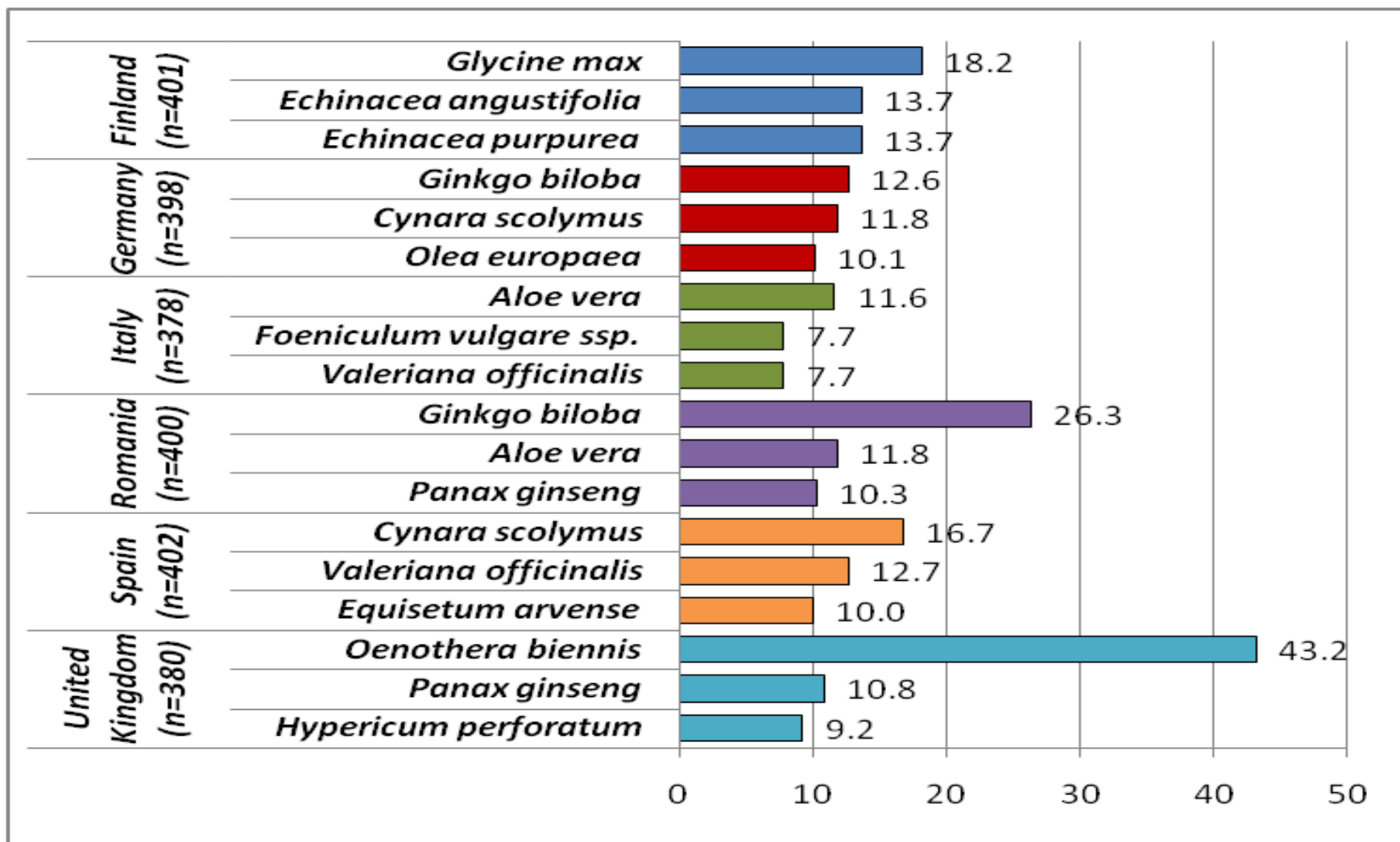
lemon balm

echinacea

blueberry



Three most used PFS-contained botanicals (%), per country



Ten most reported sources of recommendation of PFS consumption

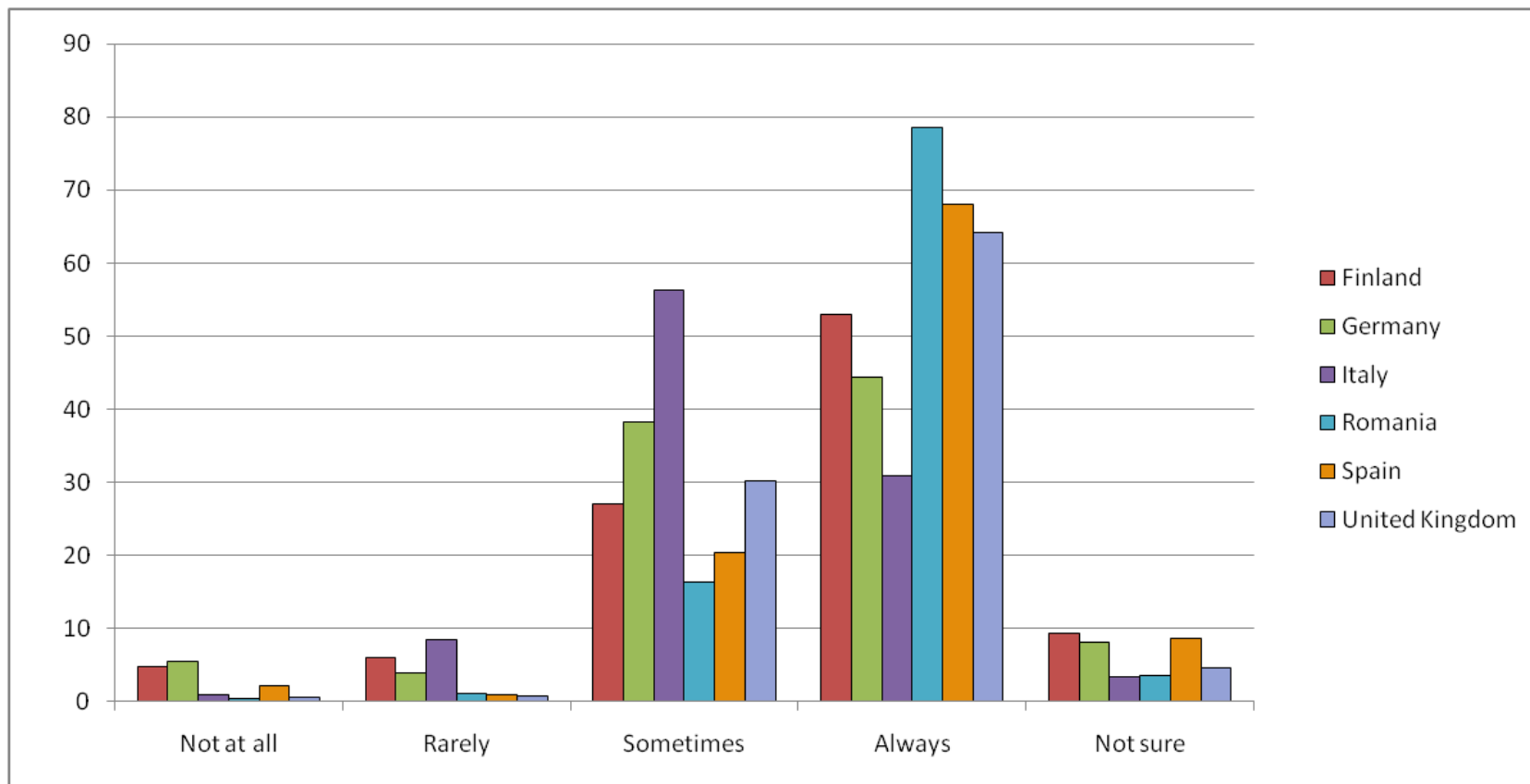
	Total %	Finland %	Germany %	Italy %	Romania %	Spain %	United Kingdom %
Friend/relative	38.2	41.1	44.9	30.7	39.7	33.1	38.1
Nobody/myself	23.2	42.7	22.3	15.6	16.4	14.3	18.3
Herbal shop assistant	15.6	17.2	6.2	34.2	10.3	15.2	10.4
Doctor/General Physician	10.7	4.7	12.2	12.3	22.6	9.7	4.6
Pharmacist	10.0	2.9	20.1	12.7	18.5	6.9	1.4
Nutritionist/dietitian	8.2	2.7	2.0	1.4	4.1	20.4	21.0
Magazine/newspaper	8.1	18.0	10.4	1.7	6.0	0.4	7.5
Internet/social group	6.5	7.9	12.2	3.1	6.5	4.0	4.8
Homeopath	5.1	2.3	10.2	3.3	2.6	9.3	4.1
TV/radio	2.2	3.8	3.1	0.9	3.0	1.1	0.2

Consumer Perception: benefits sought

- Defence /immunity (33%)
- Energy (15%)
- Digestive function (14%)
- Sleeping (10%)
- Flu/cold (10%)
- Hair/skin (9%)
- Body weight (9%)
- Relaxation (8%)
- Joints and bones (8%)



Level of confidence: “Do you think the product helps you?”



Beneficial properties

- **Systematic reviews:** epidemiological, clinical and human intervention studies
 - ❖ *cardiovascular health; post-menopausal bone health; menopausal symptoms; gastrointestinal health; inflammation.*
- The **biomarkers of intake** of PFS reviewed and validated in human studies.
- **Biomarkers of exposure methods:** Human intervention studies with a single dose of PFS to determine biomarkers in urine
 - ❖ *Ginkgo biloba, Panax ginseng, Camellia sinensis, Vitis vinifera*
- Development of a consensus for "**best practice**" for future human intervention studies on PFS.



Publications at <http://www.eurofir.org/plantlibra>



Gary Williamson
G.Williamson@leeds.ac.uk



Adverse effects

- **Systematic literature** review on 67 botanicals
- **Adverse effects** and poisonings in humans
- Assessed according to WHO classification for **causality** (association between exposure and effects)
 - ❖ **Certain**
 - ❖ **Probable**
 - ❖ **Possible**
 - ❖ **Unlikely/unclassifiable**
- Consideration of **misidentification** of botanicals
- A study with **European Poisons Centres** on adverse effects or poisoning due to consumption of, misidentification of or interactions with conventional drugs
- A network was created between PlantLIBRA partners and European Poisons Centres, establishing alerting system based on the websites of PlantLIBRA (www.plantlibra.eu) and the EAPCCT (www.eapcct.org)



Risks and benefits of PFSs

- Identification and chemical characterization of the botanical preparation of interest
- Parallel evaluation of adverse and positive effects of botanical preparation and single compounds

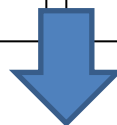


Risk assessment:

- Identification of adverse effect
- Characterization of the adverse effect
- Estimate of product intake
- Evaluation of the quality of scientific evidence

Benefit assessment:

- Identification of the beneficial effect
- Characterization of the positive effect
- Estimate of product intake
- Evaluation of the quality of scientific evidence



**Comparison between risks and benefits
and evaluation of their health impact**



RBA - The product

- Online tool for estimating concentrations and intakes of compounds in a PFS product
- Exposure assessment: possible to estimate mean, median, percentiles of intake of compound
- Integrated approach to risk-benefit assessment of PFS
- Assessments structured in different pages corresponding to the steps of the RBA methodology
- Data integration with e-plantilibra to be used in the tool for risk assessment. Compound intake estimator
- [http:// en.opasnet.org/compound_intake_estimator](http://en.opasnet.org/compound_intake_estimator)
- User can add own data for calculations



Analysis and Safety concerns

- Natural presence of toxic compounds and substances having a pharmacological action
- Mis-identification of botanical
- Substitution of non-harmful plants with harmful ones
- Contamination with different plants
- Presence of environmental contaminants
- Biological contamination
- Microbiological contamination
- Addition of synthetic drugs to enhance the efficacy of the product



Example of adulteration with alternative species

Adulteration of Star Anise, *Illicium verum*
Adulterants *I. anisatum* and other *I.* species
toxic compound Anisatin



Illicium verum Hooker

Star anise

Illicium anisatum L.
(*religiosum* Sieb.)

H. Sievers, PlantLIBRA Conference | 12/14 May 2014 |

Creation of Network of Laboratories

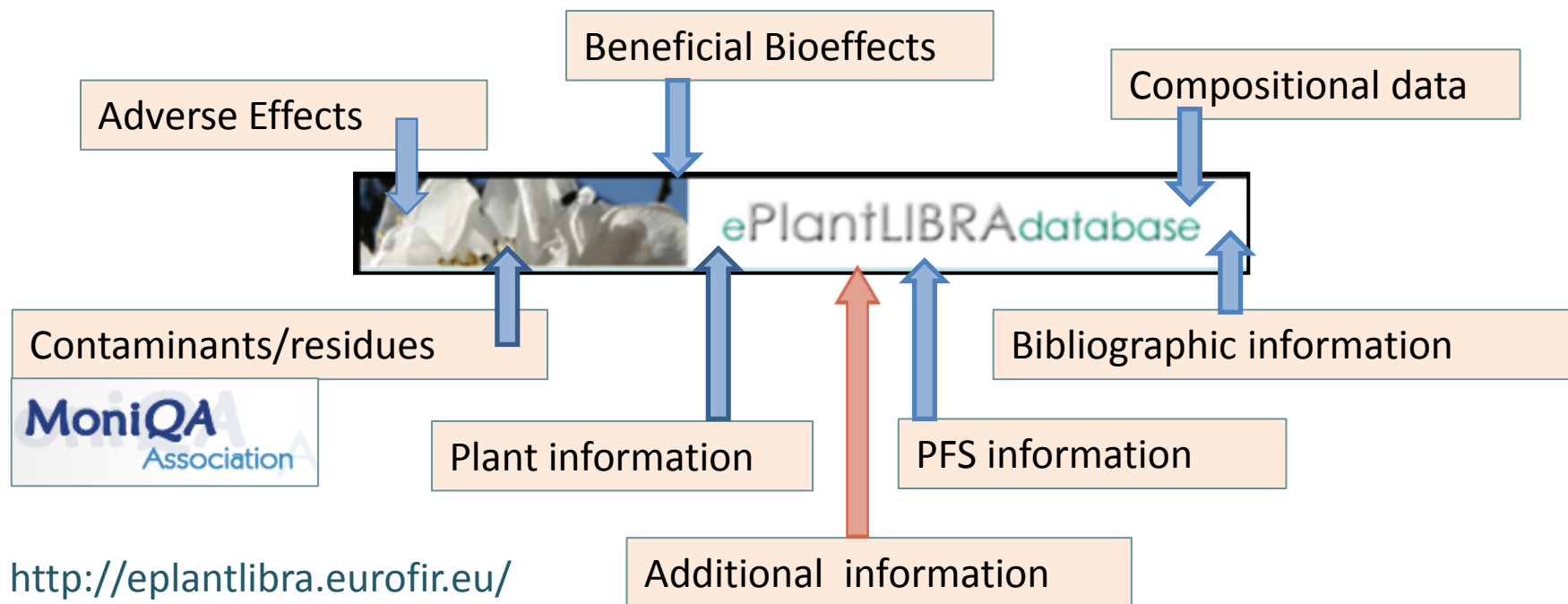
- Establishment of an **international network of laboratories** expertise in analysis of plants/extracts/PFS to both public and private sector
- Capable of performing reliable high quality analytical data on plants and botanical preparations and to detect contaminants and irradiation treatments
- Provide analytical tools to the European Poison Centres for rapid identification of adverse effects to plant ingredients

<http://www.eurofir.org/plantlibra/science/networks-of-labs>



ePlantLIBRA: A sustainable integrated meta-database of biologically active compounds, residues and contaminants

ePlantLIBRA: A sustainable, reliable, flexible and fit-for-purpose internet-deployed database, providing a unique comprehensive resource on PFS for researchers, health professionals, health educators, the food industry and policy makers



Definition - Bioactive Compounds

“Inherent non-nutrient constituents in plant foods with putative health-promoting and/or toxic effects”



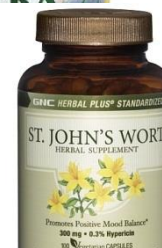
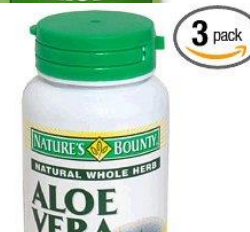
- Beneficial: May help to promote optimal health and to reduce the risk of chronic disease



- Plant-based bioactive compound classes including:



- Anthroquinones (e.g Aloe)
- Ginkgolides (e.g Ginkgo)
- Flavonoids (e.g. grapes, berries, onions, tea)
- Glucosinolates (e.g. Brussels sprouts, cabbage, broccoli)



eBASIS/ePlantLIBRA History: Bioactive Substances Information System

NOTIS (naturally occurring toxicants information system) IFR (CD Rom)

EU-AIR Nettox
1995-1997

Split and continued as
EuroFIR BASIS on-line database (EU FP6 2005-2010)
Nortox BASIS (Nordic Council of Ministers)

eBASIS: EuroFIR NEXUS 2010

eBASIS

To further additions to eBASIS via
BACCHUS 2012-2016 FP7
Cardiovascular benefits from food bioactives

BACCHUS
Cardiovascular benefits from food bioactives

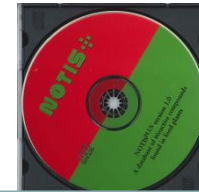
ePlantLIBRA
EC project number 245199

1990

TOXIP (naturally occurring toxicants in food plants) DTU 1990s

1995

EU BASIS 1999-2001
Fully functional database CD-Rom
300 food plants (12 European languages), 5000 compositional records, 75 toxicological studies



2000

2005

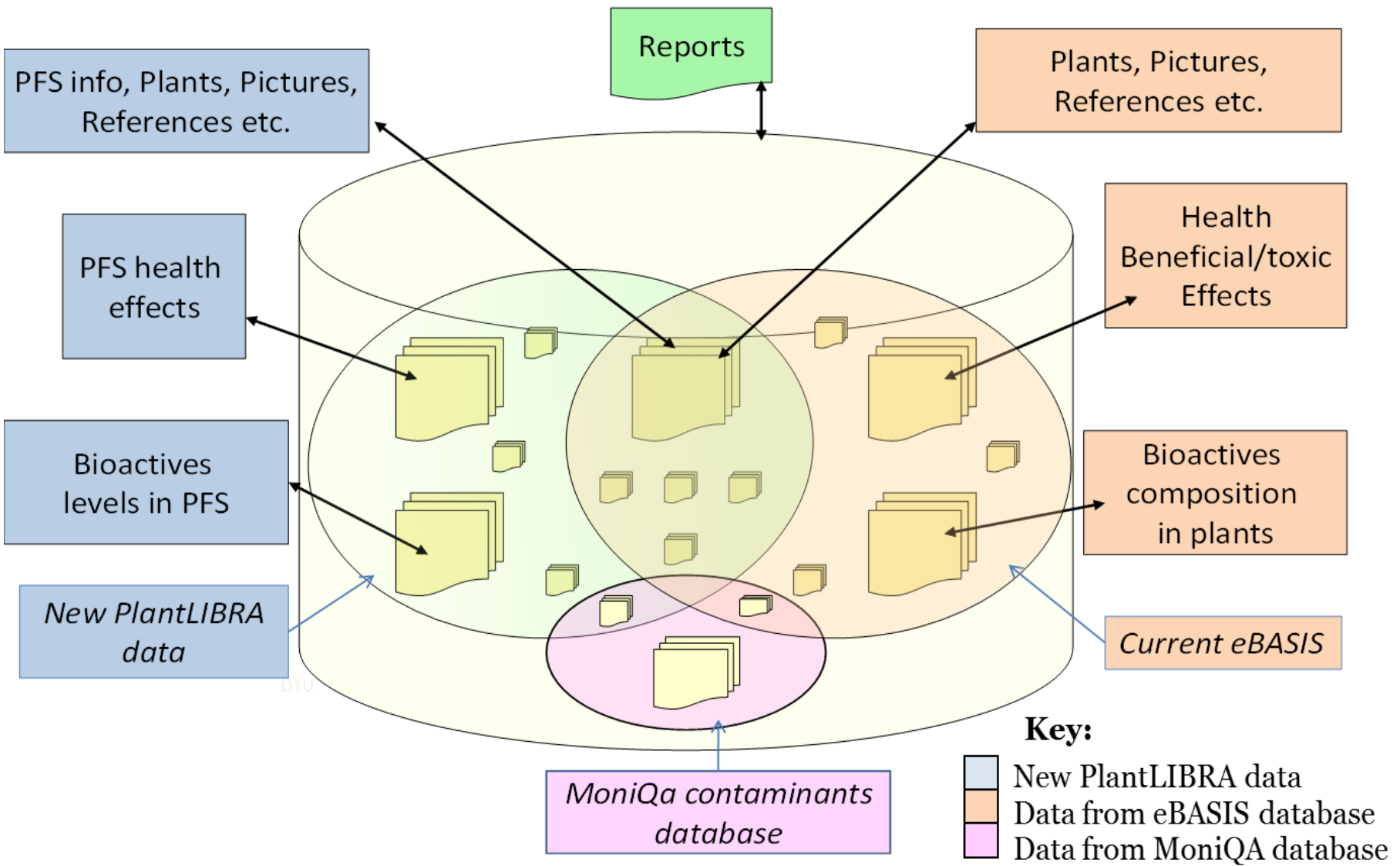
Databases combined **eBASIS: EFSA Bioactive Constituents of Food plants** 2009

2010

ePlantLIBRA 2010-2014 EU FP7 bioactives in plant food supplements

2015

ePlantLIBRA Structure



ePlantLIBRA functions

Data inputting:

Via 5 online systems

- Composition data
- Beneficial data
- Adverse effects
- PFS information
- Plant information:

Data reporting:

user led data retrieval software system, searchable by:

compound, food, biological effect:

- Composition
- Bio-effects
- PFS info
- Plant details
- Contaminants

ePlantLIBRA database

Plant Details

Identification

Scientific name:
 Family name:
 Family name synonym:
 Priority:
 Language code and term:

Plant Description

Edible parts:
 Colour:
 Size:
 Shape:
 Taste:
 Use:
 Remarks:

Plant Parts Used

C0167	Fruit or berry
C0294	Fruit or berry, peel only
C0229	Fruit or berry, peel removed
C0300	Juice

National Names

Bulgaria	Шладук портокал
Denmark	Bananel

PlantLIBRA Technical Home

Sampling Information

Sample year:
 Primary sample unit size:
 Primary sample units:
 Analytical sample size:
 Analytical portion size:
 Analytical portions:
 Portion replicates:
 Sample plan:
 Sample handling:

Compositional Information

Compound class:
 Compound:
 Analytical std.source:
 Analytical method name:
 Analytical method:

PlantLIBRA Technical Home

- Home
- Reports
- Composition data
- Beneficial data
- Toxicological data
- Additional info
- Food supplements
- Food plants
- Compounds

ePlantLIBRA database

Plant Food Supplement Details

Plant Food Supplement:

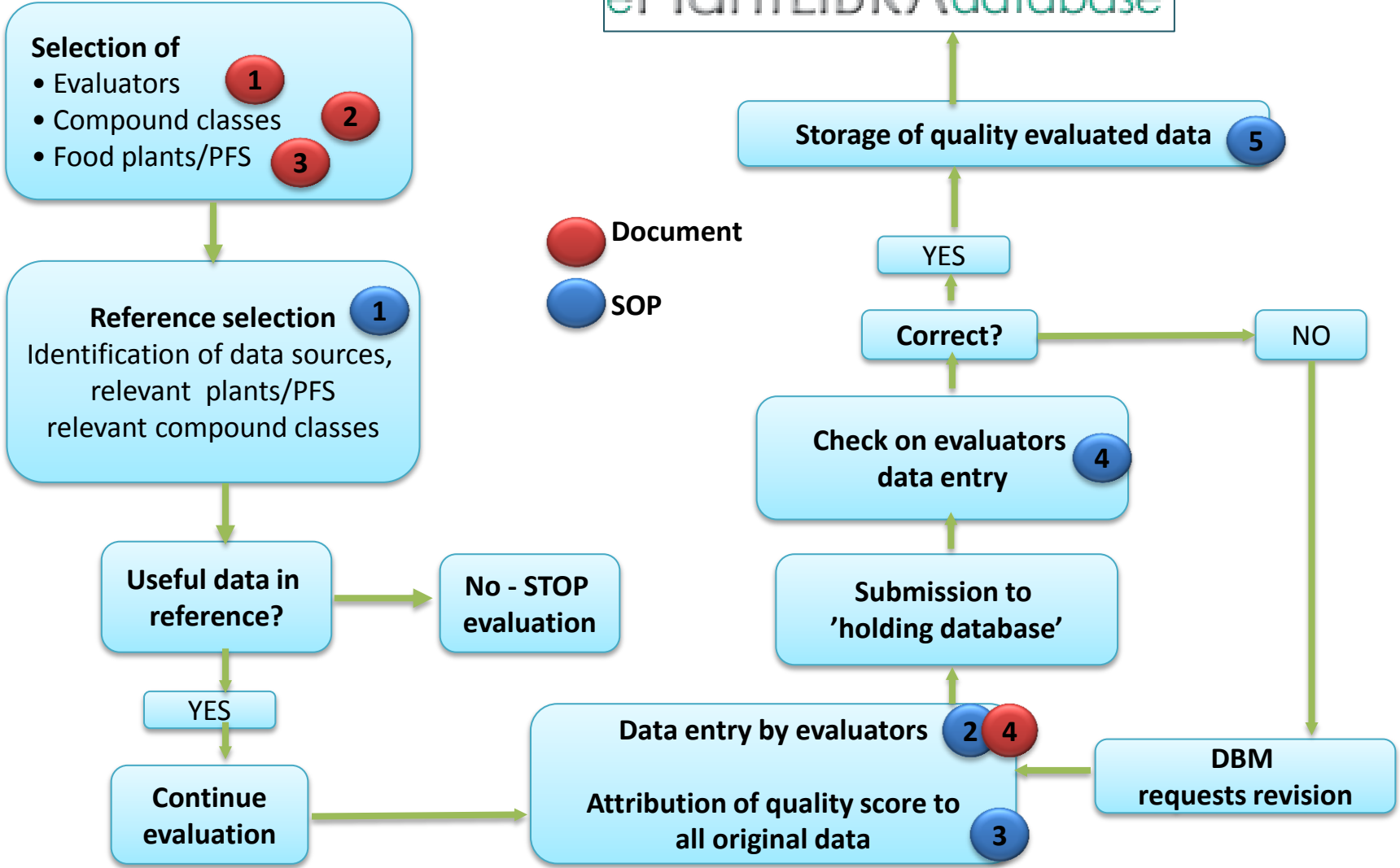
Name:
 Trade name:
 Category or claimed effect:
 Ingredients:
 Active substances (labelled):
 Daily dose:
 Target group:
 Contraindications:
 Legislation:
 Reference information:

General Information

You can upload JPG pictures and PDF documents and remove your own files. File size is limited to 2MB. Please save any updates before adding or removing files.

Compilation process

ePlantLIBRA database



Reporting: Composition data

Search for Beneficial data
 Search for beneficial bio-effect data, via one or more study types.

Search for Adverse effect data
 Search for adverse effect data, via one or more study types.


Search for Composition data
 Search for compositional data, via individual compound and plant.

Search for Additional info
 Search for individual reference details and supplementary information on compounds.

Search for Plant info
 Search for pictures, synonyms, language and other information are provided.

ePlantLIBRA database

Composition data

Click the  icon to delete a search criterion or an output field.



[New search]

New search Save search Use saved search

1. Search for Composition data

Select a Search type and click a Parameter to add search criteria. Selection lists are limited by the current search criteria. Currently **15** data points selected.

Search type Basic Full








Parameter	Selected Search Criteria
Plant Food Supplement	
Plant name	 Lemon balm  milkthistle
Compound class	
Compound name	
Analytical method name	

2. Create your Composition report

Please add output fields as required:

Add output fields View report

Selected Output Fields

-  Plant
-  Compound
-  Average level
-  Unit
-  Part
-  Sub-species/Cultivar
-  Reference no

VIEW REPORT

Reporting: Composition data

ePlantLIBRA database

Link to input form

Download as Excel file

Download Refs to EndNote

Link to plant details

Link to reference details and original publication


Close Print Excel Refs

Id	Plant	Comp	Unit	Part	Reference no	
27250	Lemon balm	Apigenin	<0.0001	mg/kg DW	Leaf	C0941
27246	Lemon balm	Caffeic acid	138	mg/kg DW	Leaf	C0941
27253	Lemon balm	Catechin	210	mg/kg DW	Leaf	C0941
27247	Lemon balm	p-Coumaric Acid	<0.0001	mg/kg DW	Leaf	C0941
27255	Lemon balm	(-)-Epicatechin	<0.0001	mg/kg DW	Leaf	C0941
27248	Lemon balm	Ferulic Acid	48	mg/kg DW	Leaf	C0941
27251	Lemon balm	Luteolin	<0.0001	mg/kg DW	Leaf	C0941
27252	Lemon balm	Naringenin	<0.0001	mg/kg DW	Leaf	C0941
27249	Lemon balm	Quercetin	<0.0001	mg/kg DW	Leaf	C0941
27254	Lemon balm	Rutin	<0.0001	mg/kg DW	Leaf	C0941
27261	milkthistle	5-Caffeoylquinic Acid	120.6	mg/kg DW	Plant above surface, excluding fruit and seed	C0943
27265	milkthistle	Cinnamic acid	5.6	mg/kg DW	Plant above surface, excluding fruit and seed	C0943
27262	milkthistle	p-Coumaric Acid	72.9	mg/kg DW	Plant above surface, excluding fruit and seed	C0943
27263	milkthistle	Ferulic Acid	82.6	mg/kg DW	Plant above surface, excluding fruit and seed	C0943
27264	milkthistle	o-coumaric acid	320.2	mg/kg DW	Plant above surface, excluding fruit and seed	C0943

Beneficial Biological effects

ePlantLIBRAdatabase

Beneficial data

Click the  icon to delete a search criterion or an output field.







[New search]

New search Save search Use saved search

1. Search for Beneficial data

Select a Search type and click a Parameter to add search criteria. Selection lists are limited by the current search criteria. Currently 7 data points selected.

Search type Basic Full

Parameter	Selected Search Criteria
<u>Plant Food Supplement</u>	 Black cohosh product  Ginkgo product  Milk-thistle product  Red clover supplement  Soy supplement
<u>Plant name</u>	
<u>Compound class</u>	
<u>Compound name</u>	
<u>Study type</u>	 Human clinical study
<u>Biomarkers</u>	
<u>Quality code</u>	

2. Create your Beneficial report

Please add output fields as required:

Add output fields View report

EC project number 245199

- in vivo*
 - ▶ Major parameters ?
 - ▶ Gender specific effect ?
- Results**
 - ▶ Result remarks ?
 - ▶ Effective level ?
 - ▶ Non-effective level ?
 - ▶ Adverse effects studied ?
 - ▶ Adverse effects, text ?
 - ▶ ADI
 - ▶ NOAEL
- Quality Assessment**
 - ▶ Study design ?
 - ▶ Subject ?
 - ▶ Test material ?
 - ▶ Conduction of study ?
 - ▶ Methodology ?
 - ▶ Results ?
 - ▶ Quality code ?
 - ▶ Quality comments ?
- Overall remarks**
 - ▶ Overall remarks ?

VIEW REPORT

Link to input form

Link reference details and original publication

[New search] 06/02/2013

Criteria: (Form status='Approved') and (pfsId='Black cohosh product' or pfsId='Ginkgo product' or pfsId='Milk-thistle product' or pfsId='Red clover supplement' or pfsId='Soy supplement') and (studyType='Human clinical study')

Close Print Excel Refs

Id	Reference no	Plant	Compound	Plant Food Supplement	Study type	Concentration/level	Experimental outcome
1569	L0010	Not specified	Isoflavone glucosides	Red clover supplement	Human clinical study	80mg red clover derived isoflavones per day	-Total HADS (anxiety and depression domain scores also) and SDS scores decreased more significantly after isoflavone treatment compared to placebo (p < 0.001) - No significant differences observed between study groups for basal characteristics.
1571	L0008	Not specified	Isoflavone glucosides	Soy supplement	Human clinical study	80mg or 120mg total isoflavones per day	-No overall bone-sparing effect of soy isoflavones in nonosteoporotic women with either the intent-to-treat or compliant analysis -Modest but protective effect on the decline in femoral neck bone mineral density observed (p = 0.024) once covariate factors had been taken into account in the compliant analysis.
1570	L0009	Not specified	Mixed isoflavones	Soy supplement	Human clinical study	45mg soy isoflavone powder twice daily	-No overall bone-sparing effect of soy isoflavones in nonosteoporotic women with either the intent-to-treat or compliant analysis -Modest but protective effect on the decline in femoral neck bone mineral density observed (p = 0.024) once covariate factors had been taken into account in the compliant analysis.
1576	L0022	Not specified	Mixed isoflavones	Red clover supplement	Human clinical study	378 mg (2 capsules) d × 12 mo	-Total HADS (anxiety and depression domain scores also) and SDS scores decreased more significantly after isoflavone treatment compared to placebo (p < 0.001) - No significant differences observed between study groups for basal characteristics.
1586	L0027	Not specified	Mixture	Ginkgo product	Human clinical study	120mg G.biloba extract twice daily	- no significant difference in CHD/CVD mortality between G.biloba and placebo groups - no significant difference in hospitalisations for cardiovascular events between groups (among those with no self-reported history of CVD at baseline) - significant reduction in peripheral vascular disease (PVD) events in subjects taking G.biloba supplement compared with placebo
1573	L0022	Not specified	Mixture	Black cohosh product	Human clinical study	128 mg (2 capsules) / d × 12 mo	Reductions in number of vasomotor symptoms after 12-month intervention were: black cohosh (34%), placebo (63%), and CEE/MPA (94%), with only CEE/MPA differing significantly from placebo. - Black cohosh did not significantly reduce the frequency of vasomotor symptoms as compared with placebo - Black cohosh was safe as administered - no improvements in other menopausal symptoms

Cardiovascular health
 Post-menopausal bone health
 Menopausal symptoms
 Gastrointestinal health
 Inflammation

Adverse effects reporting

ePlantLIBRA database

 PlantLIBRA

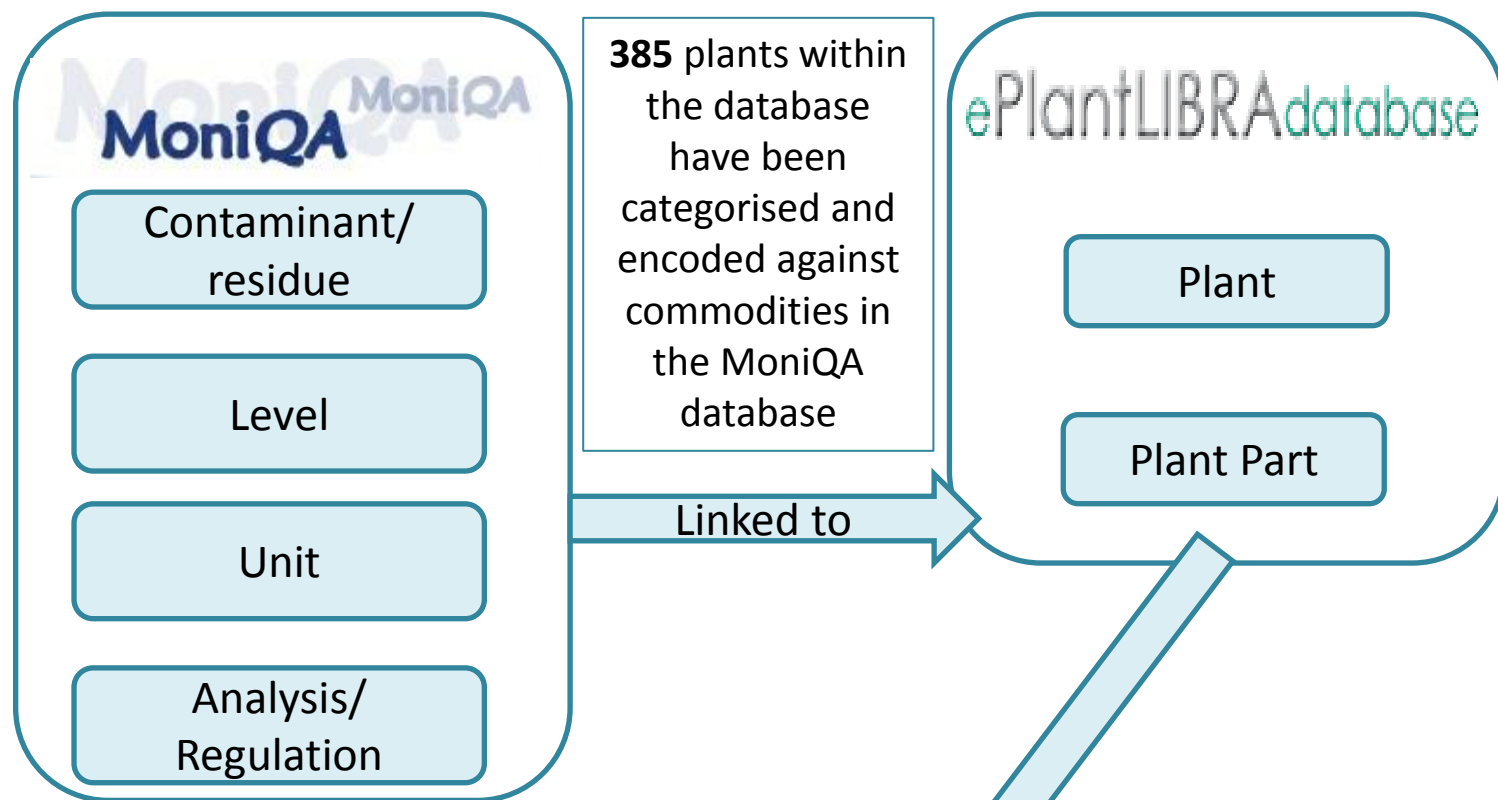
[New search] 06/02/2013

Criteria: (Form status='Approved')

and (pfsId='Ginkgo product' OR pfsId='Ginseng product' OR pfsId='St. Johns wort products')

Id	Reference no	Plant	Compound	Plant Food Supplement	Plant	Main clinical effects	Dose ingested	Outcome	Causality assessment	Conclusion
556	K0013	Not specified	not specified	Ginkgo product	Not specified	Spontaneous intracerebral haemorrhage	40 mg three times a day	The patient remained with a left inferior quadrantanopia	Possible/suspected	Auhors state there are grounds to suspect an association between Ginkgo biloba and intracranial haemorrhage
557	K0014	Not specified	not specified	Ginkgo product	Not specified	Nose bleeds, ecchymosis on hands and arms after minor trauma	75 mg per day	The patient discontinued ginkgo and had no further bleeding episodes.	Probable (evaluator - according to WHO classification)	None
559	K0027	Not specified	not specified	Ginkgo product	Not specified	Headache, back pain, nausea and sleepiness	40 mg of Ginkgo biloba tablets 3-4 times a day	The patients recovered uneventfully	Probable. The author state that it is not proven that the subarachnoid hemorrhage was caused by the Ginkgo biloba, but the absence of other risk factors, the temporal association of the increased bleeding time with the haemorrhagic stroke, and the antiplatelet aggregation profile of the extract, were suggestive of a pathogenic connection.	In their conclusions, the authors suggest that doses of herbal compounds must be carefully monitored to prevent rare but potential dangerous results.
560	K0026	Not specified	not specified	Ginkgo product	Not specified	Bilateral subdural hematomas	60 mg Ginkgo biloba twice/day	Thirty-five days after discontinuation of Ginkgo biloba. bleeding time was 6.5 min (normal). On follow-up, 15 months	In absence of other risk factors or trauma, the authors postulated that the bilateral subdural hematomas may have occurred, at least in part, due to the presence of abnormal platelet aggregability associated	The authors suggest a significant anti-platelet effect of Ginkgo biloba products, which could be responsible for the adverse effects described. They hope for further investigations in this field.

Contaminant information



Contaminant	Regulatory plant classification	MRL: max residue level	Unit	Analysis
Cadmium (flower)	3.2.2. Root and tuber vegetables (excluding celeriac, parsnips, salsify and horseradish), stem vegetables (excluding celery). For potatoes the maximum level applies to peeled potatoes	0.1	mg/kg wet weight	Regulation (EC) 333/2007, EFSA Opinion - cadmium
Lead (flower)	3.1.10. Vegetables, excluding brassica vegetables, leaf vegetables, fresh herbs, fungi and seaweed. For potatoes the maximum level applies to peeled potatoes.	0.1	mg/kg wet weight	Regulation (EC) 333/2007, EFSA Opinion - lead
Pesticides (flower)	027. Stem vegetables	MRLs for globe artichokes (0270050) apply	mg/kg	Regulation (EC) No 396/2005 and its Annex amendments

Additional information



- Home
- Reports
- Composition data
- Beneficial data
- Adverse effect data
- PFS data
- Additional info

- Food supplements
- Plants
- Contaminants

Print this page

- My details
- Logout

User
eplantlibra User

ePlantLIBRAdatabase

Additional Info

Here you can retrieve more specific information from the ePlantLIBRA database. The information will be shown in a new window, which must be closed before retrieving new information.

References

Retrieve information on individual references by entering a reference ID from a report or an author's name.

Reference ID

Reference author

Input forms

Retrieve information on individual input forms by entering an input form ID from a

Beneficial effect ID

Compositional ID

Adverse effect ID

Compound class information

View compound class information by selecting a compound class from the pick list only contains compound classes with attached compound class information.

Compound class

Related literature

Search a selection of [Additional reviews, books and databases](#) available covering information on botanicals, their traditional uses and dietary supplements.

ePlantLIBRAdatabase

Plant Details

Identification

Scientific name: *Cynara cardunculus* L.
 Family name: Asteraceae (Compositae)
 English name: Artichoke, globe
 Priority: H
 Langsk. Code/Plant name: B1456 ARTICHOKE

Plant Description

Edible parts: Dried, balled, only flower buds and the thick basal part of the separate leaves.

Colour: Green or purple

Size: 5-15 cm in diameter

Shape: Globose flower buds

Taste: Sweetish and delicate

Use: Balled, but also fried or balled.

Remarks:

Histochemistry:

Herbarium specimen:

Identification:

Adulteration:

Plant Parts Used

00289	Bud
00237	Flower or flower
00151	Head (plant)
00162	Inner tissue
00300	Juice
00068	Leaf
00150	Whole plant or most parts used

National Names

Bulgaria	Artichok
Denmark	Artichok
Finland	Läbi-artikkoka
France	Artichaut
Germany	Artichoke
Italy	Artichoke



MoniQA Association

The following information from MoniQA database (© 2013-03-29)

Artichoke, globe, *Cynara cardunculus* L. Globe artichoke Group

Regulatory limits for contaminants in this plant and its classification when looking up maximum residue levels for pesticides are given in the following table.

Contaminant	Regulatory limit classification
Cadmium (Flower)	3.2-3.6. Root and tuber vegetables (excluding celeriac, parsnips, salsify and horseradish), stem vegetables (excluding celery). For potatoes the maximum level applies to peeled potatoes.
Lead (Flower)	3.1.1.10. Vegetables, excluding brassica vegetables, leaf vegetables, fresh herbs, fungi and seaweeds. For potatoes the maximum level applies to peeled potatoes.
Pesticides (Flower)	027- Stem vegetables

ePlantLIBRAdatabase

Plant Food Supplement data

Click the icon to delete a search criterion or an output field.

demo general

1. Search for Plant Food Supplement data

Click a Parameter to add search criteria. Selection lists are limited by the current search criteria. Currently 4 data points selected.

Parameter	Selected Search Criteria
Plant name	<input checked="" type="checkbox"/> black cohosh <input checked="" type="checkbox"/> Cacao <input checked="" type="checkbox"/> Cape aloe/ Bitter aloe <input checked="" type="checkbox"/> Liquorice
Target group	
Claimed effect	
Ingredients	

2. Create your Plant Food Supplement report

Please add output fields as required:

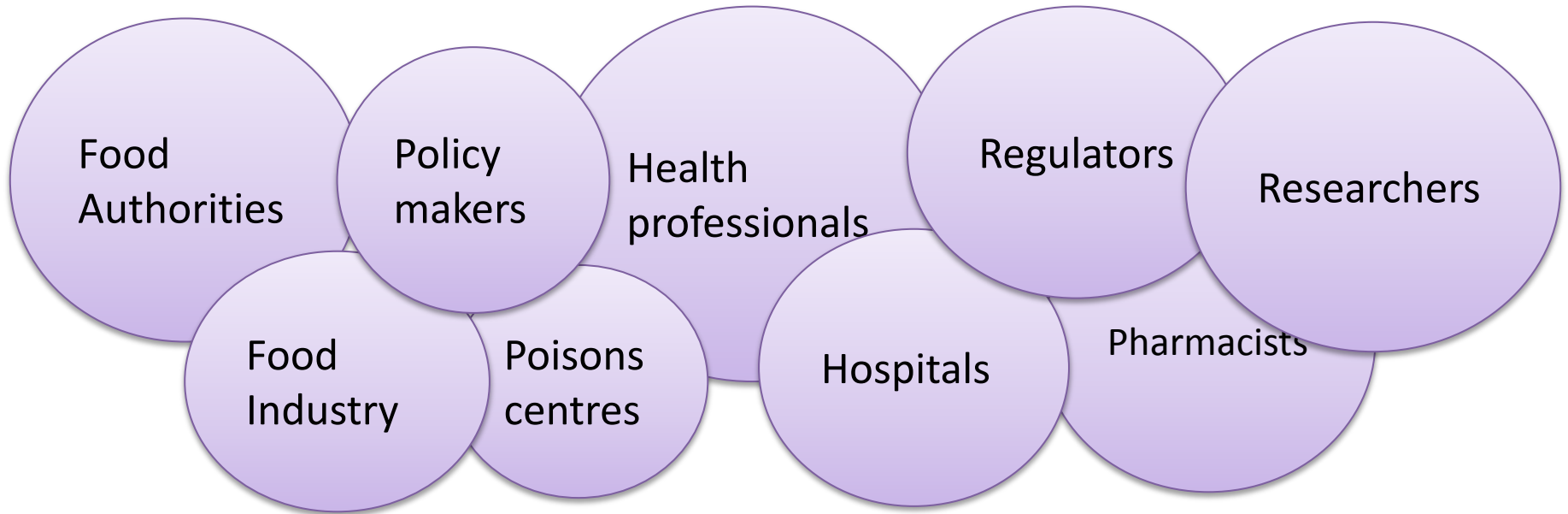
Selected Output Fields

- Plant
- Target group
- Reference information
- Active substances (labelled)
- Contraindications
- Category or claimed effect

ePlantLIBRA content

	Plants covered	PFS covered	Compounds	References	Datapoints
Composition	78 (260)	40	350 (600)	260 (460)	6500 (31,500)
Beneficial Bioeffects	33 (70)	32	161	82 (563)	82 (894)
Adverse Bioeffects	67	23	-	210	243
Contaminants	374				

Users and Uses of eplantlibra



- Regulatory issues,
- Science based decision making,
- Preparation of health claim dossiers
- Benefit/risk assessments

- Estimating exposure levels,
- Epidemiological studies,
- Supporting submissions to research

- New product development
- User friendly info on botanicals
- Easily accessible info on adverse effects

Example of PFS review

ePlantLIBRA Plant Food Supplement Report:

Ginkgo biloba/common ginkgo

What is Ginkgo biloba?

Ginkgo biloba or common ginkgo is one of the oldest types of trees in the world. Ginkgo is been cultivated all over the world but only can be found in the wild in China. (Royer)

According to Charles Darwin Ginkgo is a living fossil. It is the oldest living tree species in the world. After the ice age it was thought that it hadn't survived. In 1691 Englebert Kaempfer, a German Physician and Botanist, discovered in China a ginkgo biloba tree. It was not the same tree as its ancient ancestors due to environmental changes. (Nelson)

The tree normally reaches a height of 20–35 m, some specimens in China are known being over 50 m. The tree has an angular shaped crown and long, somewhat erratic branches, and is usually deep rooted and resistant to wind and snow damage. A combination of resistance to disease, insect-resistant wood and the ability to form aerial roots and sprouts makes ginkgo long-lived, with some specimens claimed to be more than 2,500 years old. (Royer).

Ginkgo's are also popular subjects for growing as bonsai.

It takes 20-35 years for trees to reach maturity and start bearing seeds. Male and female trees are separate; male trees have pollen-producing catkins while female trees, once fertilised, bear rounded and yellowish seeds with a fleshy outer coat. (Simmonds)



Figure 1 Ginkgo biloba leaves and seed. (Health)

The following tables and charts report the amount of the above described compounds in Ginkgo biloba plant and in plant food supplements obtained from scientific publications.

3 structure of bilobalide

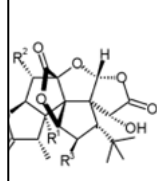


Figure 4 Structure of ginkgolide

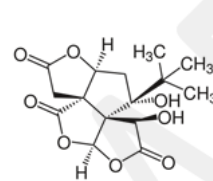
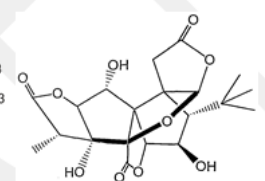


Figure 5 structure of terpene trilactones



1 Bilobalide in Ginkgo biloba leaves

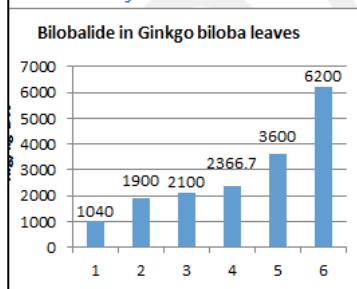
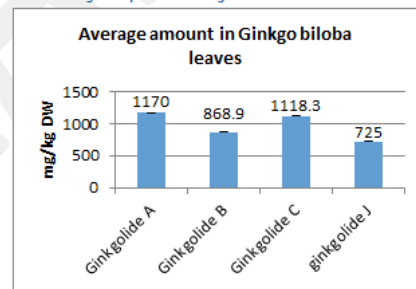


Chart 2 Ginkgo compounds in Ginkgo biloba leaves



1 shows that the documented quantity of bilobalide in leaves varies between 1040 and 6200 mg/kg DW.

Causality assessment

Chart 5 Causality assessment adverse effect data

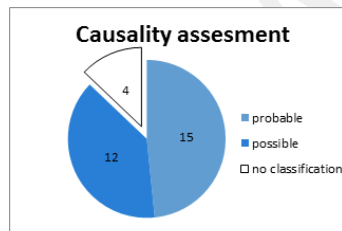


Chart 5 shows the amount of possible and probable interactions of Ginkgo biloba in the observed adverse effects. In 4 papers no classification was given due to lack of information or that no good judgement could be made.

Conclusions

Prepared by Tom Segers

PlantLIBRA project outcomes: Policy

- Creation and establishment of a Policy Advisory Board, consisting of EU regulators and international agencies from Argentina, China and United States
- Policy implications at the international level were analysed and reported
- The policy report:
 - policy context and an update on the legal situation of botanicals in the EU and in selected regions outside the EU;
 - the potential policy implications on the basis of the project's outcomes and presents conclusions and recommendations.

PlantLIBRA outcomes : Microsite

benefit
assessment
publications
Laboratories
consumers
risk
industry
policy
website
ePlantLIBRA

News

Welcome to the ePlantLIBRA Microsite !

EuroFIR AISBL is pleased to welcoming you on this new ePlantLIBRA microsite. You will have a direct access to the ePlantLIBRA which is a comprehensive database on botanicals, with quality - assured information on composition, adverse effects, potential benefits and contaminants on composition, adverse effects, potential benefits, and contaminants. ePlantLIBRA will help you understand established and new botanicals you are evaluating, with more and new data, identify potential beneficial effects, and potential risks, in the context product development, dossier preparation or safety assessment.

ePlantLIBRA development was based on three existing databases; eBASIS (Bioactive Substances in Food Information System), developed by EuroFIR (<http://ebasis.eurofir.eu>); the MoniQA contaminants database, EU FP6-funded MoniQA (Monitoring and Quality Assurance in the total food supply chain) database (www.moniqua.eu); and Fera's HorizonScan database (www.horizon-scan.com)

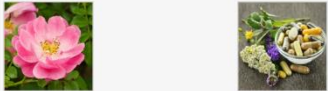
What information is available in the database ?

For all plants within ePlantLIBRA scientific name, plant family, synonyms, common name in 15 European languages, colour photograph identification and links to the Gremplam Resources Information Network (GRIN, <http://www.arb-gtin.gov>) have been included. Languag. code for food description and term <http://www.languag.org> is included, together with details on edible parts, colour, size and shape.

How to access the database ?

Log in is by individual user name and password contact Carlos Ramos at EuroFIR secretariat@eurofir.org for log in.

For queries on structure, function and content please contact Jenny Plumb jenny.plumb@jifr.ac.uk.



Networks of Labs

Analysing botanicals for beneficial compounds, for contaminants, for identity markers, to detect irradiation, for harmful compounds or other markers is often challenging. A network of labs is available to perform quality-controlled testing of most botanicals used in the EU.

Preparations for ring-tests are ongoing.


Labs interested in joining the network should contact.... For further information, on ring test please contact xx

Case study

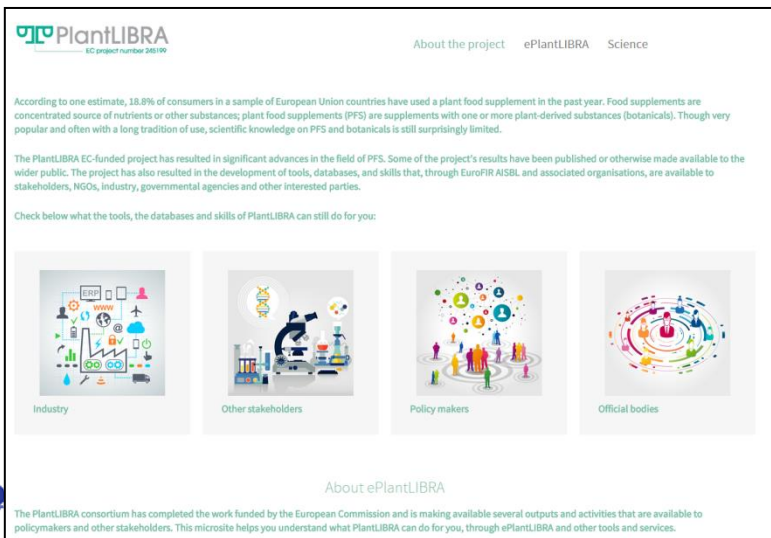
The problem: a single company claimed that one botanical contained a compound that had been so far considered only man made. Most experts disagreed with the claim, but there was no final proof.

Our work: we set up a large sampling effort, with plants of verified origin and standardised extraction, to prove that the substance was not naturally present in the plant.

[Click here to view the list of laboratories.](#)



<http://www.eurofir.org/plantlibra>



PlantLIBRA
EC project number 245199

About the project ePlantLIBRA Science

According to one estimate, 18.8% of consumers in a sample of European Union countries have used a plant food supplement in the past year. Food supplements are concentrated source of nutrients or other substances; plant food supplements (PFS) are supplements with one or more plant-derived substances (botanicals). Though very popular and often with a long tradition of use, scientific knowledge on PFS and botanicals is still surprisingly limited.

The PlantLIBRA EC-funded project has resulted in significant advances in the field of PFS. Some of the project's results have been published or otherwise made available to the wider public. The project has also resulted in the development of tools, databases, and skills that, through EuroFIR AISBL and associated organisations, are available to stakeholders, NGOs, industry, governmental agencies and other interested parties.

Check below what the tools, the databases and skills of PlantLIBRA can still do for you:

- Industry
- Other stakeholders
- Policy makers
- Official bodies

About ePlantLIBRA

The PlantLIBRA consortium has completed the work funded by the European Commission and is making available several outputs and activities that are available to policymakers and other stakeholders. This microsite helps you understand what PlantLIBRA can do for you, through ePlantLIBRA and other tools and services.

Acknowledgements

PlantLIBRA members and 3rd Parties

The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 245199. It has been carried out within the PlantLIBRA project (website: www.plantlibra.eu). This report does not necessarily reflect the Commission views or its future policy on this areas

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www.ifr.ac.uk/fooddatabanks

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