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Dynamiques des connaissances scientifiques et des innovations sur les légumineuses à graines (soya & pulses) : Comment les sciences contribuent-elles au verrouillage ou déverrouillage ?

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Dynamiques des connaissances scientifiques et des innovations sur les légumineuses à graines (soya & pulses) : Comment les sciences contribuent-elles au verrouillage ou déverrouillage ?

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Tristan SALORD, Sociologue “Geek”, INRA, UMR AGIR

Tristan.Salord@inra.fr



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°727672



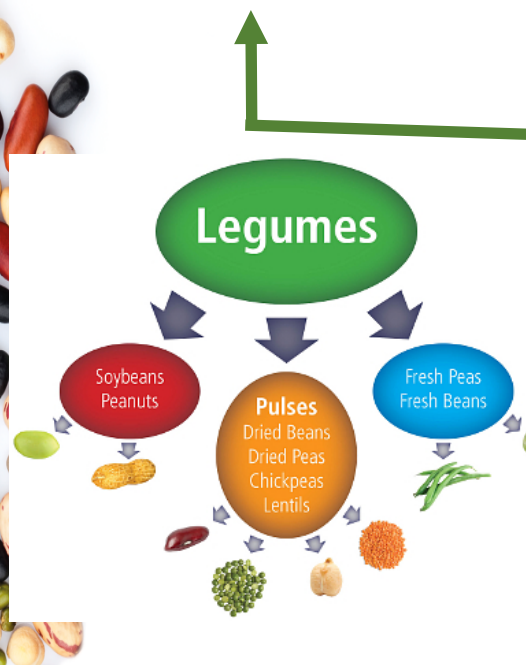
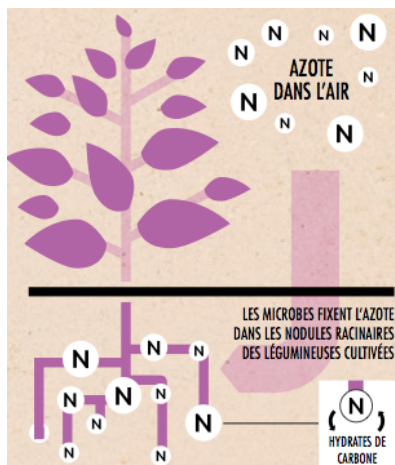
Institut de Recherche
en Informatique de Toulouse
CNRS - INP - UT3 - UT1 - UT2J

1. CONTEXTE ET ENJEUX DE RECHERCHE

Contexte : le verrouillage des « pulses »

- **LEGUMES = Soya + Pulses.** Des espèces d'une même famille botanique aux trajectoires de développement contrastées.

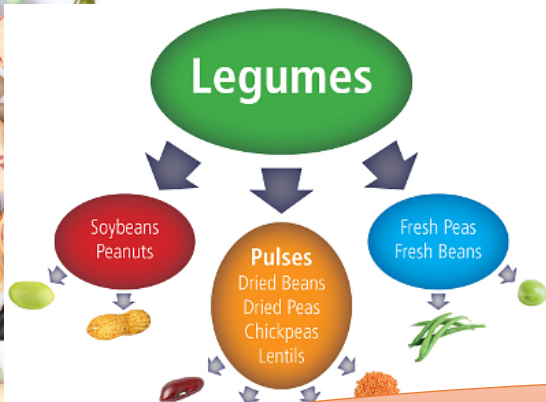
- **Enjeux accrus de biodiversité cultivée avec des légumineuses** pour la durabilité environnementale (GES, fertilité des sols, phytos...) et la santé humaine (équilibre protéines, maladies cardiovasculaires...)



“dried grains”

Year	Pulses	Soya	Cereals
1971	42	45	1 229
1981	41	88	1 632
1991	56	102	1 890
2001	56	177	2 104
2011	69	261	2 588
2017	95	352	2 980

Contexte : une volonté politique de déverrouillage



- Des espèces appartenant d'une même famille botanique aux trajectoires de développement contrastées.
- Des enjeux accrus de biodiversité cultivée avec des légumineuses pour la durabilité ...

BUT LOCK-IN : unsustainable situation very difficult to change



- Nouvelles recommandations nutritionnelles
- Plans protéins en cours....
- **Et les sciences : quelles nouvelles connaissances ?**

Nouveaux repères nutritionnels pour les adultes

P.N.N.S. 2017-2021 : Révision

- Au moins 5 fruits et légumes**
(1 portion de fruit = 80-100g)
Pas plus d'1 verre de jus de fruit/jour
- poignée de fruits à coque sans sel ajouté**
- Au moins 2 fois par semaine des légumineuses**
x : lentilles, pois chiches, haricots...
Les légumineuses peuvent être considérées comme des substituts aux volailles
- Produits céréaliers complets ou peu raffinés tous les jours**
- 2 produits laitiers par jour**
1 portion = 150mL de lait, 125g de yaourt, 30g de fromage
- Eau à volonté !**

Enjeux de recherche : mieux comprendre le verrouillage des pulses

Ecological Economics 126 (2016) 152–162

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecocon



Why are grain-legumes rarely present in cropping systems despite their environmental and nutritional benefits? Analyzing lock-in in the French agrifood system

Marie-Benoit Magrini^{a,*}, Marc Anton^b, Célia Cholez^{a,c}, Guenaelle Corre-Hellou^d, Gérard Duc^e, Marie-Hélène Jeuffroy^f, Jean-Marc Meynard^g, Elise Pelzer^f, Anne-Sophie Voisin^e, Stéphane Walrand^h

Magrini et al., 2016; 2017; 2018; 2019



ORIGINAL RESEARCH ARTICLE

Front. Sustain. Food Syst., 24 October 2018 | <https://doi.org/10.3389/fsufs.2018.00064>



Pulses for Sustainability: Breaking Agriculture and Food Sectors Out of Lock-In

Marie-Benoit Magrini^a, Marc Anton^b, Jean-Michel Chardigny^c, Gérard Duc^d, Michel Duru^e, Marie-Hélène Jeuffroy^f, Jean-Marc Meynard^g, Valérie Micard^h and Stéphane Walrand^h

^aAGIR, Université de Toulouse, INRA, Castanet-Tolosan, France

^bBIA, INRA, Nantes, France

^cALIMH, INRA, Dijon, France

^dAgrécologie, INRA, Dijon, France

^eAgonomie, INRA, Grignon, France

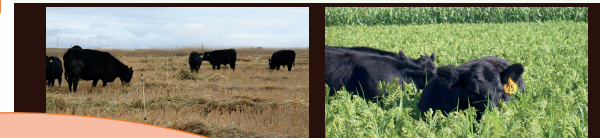
^fSADAPT, INRA, Paris, France

^gIATE, INRA, Montpellier SupAgro, Université Montpellier, CIRAD, Montpellier, France

^hUNH, Université de Clermont Auvergne, INRA, CRNH, Clermont-Ferrand, France

Crop diversification can improve the sustainability of Western agriculture. In particular, pulses are crops that can help both agriculture and the food industry become more ecological, as they reduce greenhouse gas emissions and help reduce animal-based consumption. Today, however, the development of these crops in Europe has been hindered due to lock-in, since major crops have been co-developed to a greater extent in farming and food systems. After briefly reviewing the major mechanisms that lead to this lock-in,

AGRO-ECOSYSTEM DIVERSITY RECONCILING CONTEMPORARY AGRICULTURE AND ENVIRONMENTAL QUALITY



THE DEVELOPMENT OF PLANT PROTEINS IN THE EUROPEAN UNION

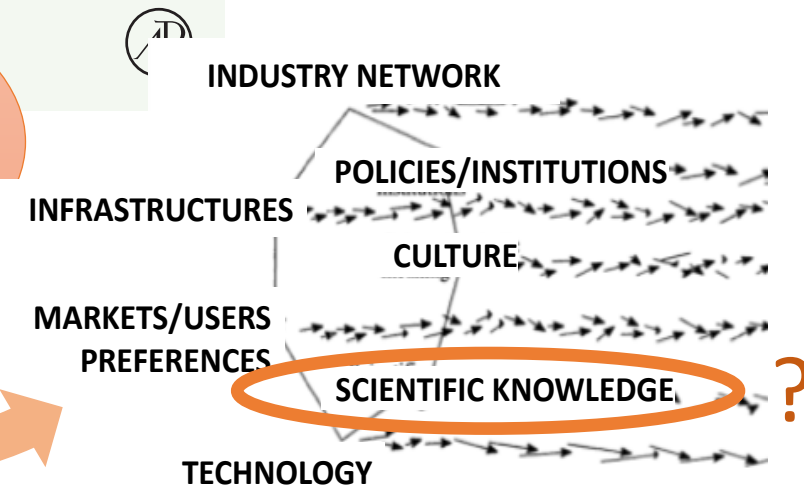
OPPORTUNITIES AND CHALLENGES

22 & 23 NOVEMBER 2018 - VIENNA

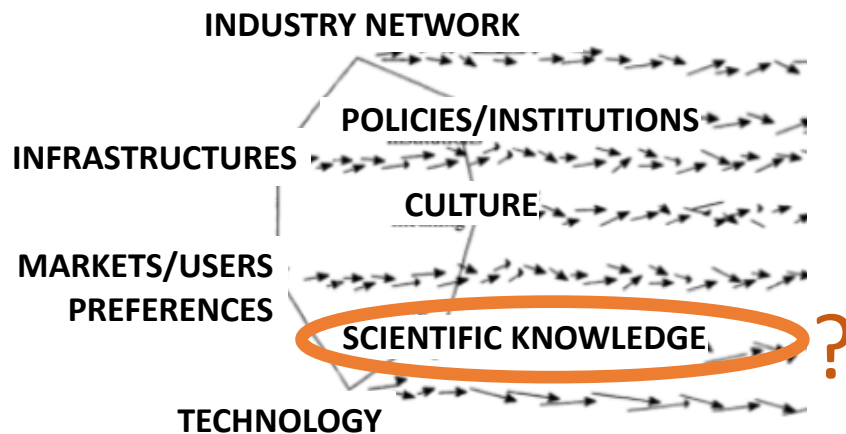
Panel “Supply Chains and Market Segments”

Report from Marie-Benoit Magrini,
French National Institute for Agricultural Research, INRA

**Current Socio-technical
regime Locked-in.
“How to un-lock is the
puzzle question”
(Geels, 2011)**

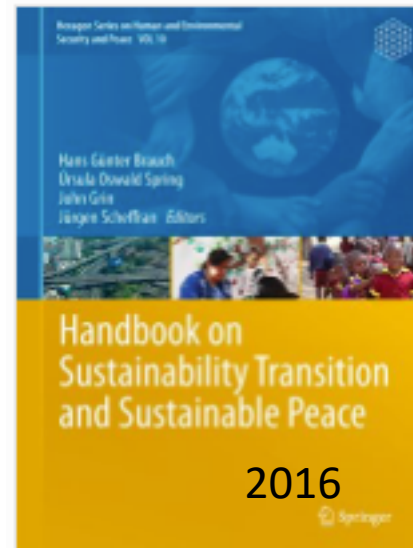


...analyse du verrouillage/déverrouillage/transition : des fronts de recherche en sciences humaines et sociales

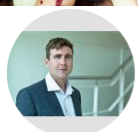


Geels - Transition Studies, voir aussi le SPRU

**Current Socio-technical regime Locked-in.
“How to un-lock is the puzzle question”
(Geels, 2011)**



...à coupler aux
approches
scientométriques



Frank Geels

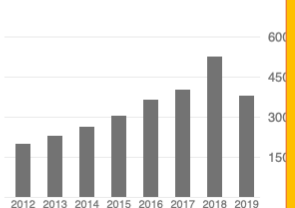
Professor of System Innovation and Sustainability, University of Manchester
Verified email at manchester.ac.uk - [Homepage](#)

[Sustainability transitions](#) [Multi-Level Perspective](#) [disruptive innovation](#) [socio-technical systems](#)

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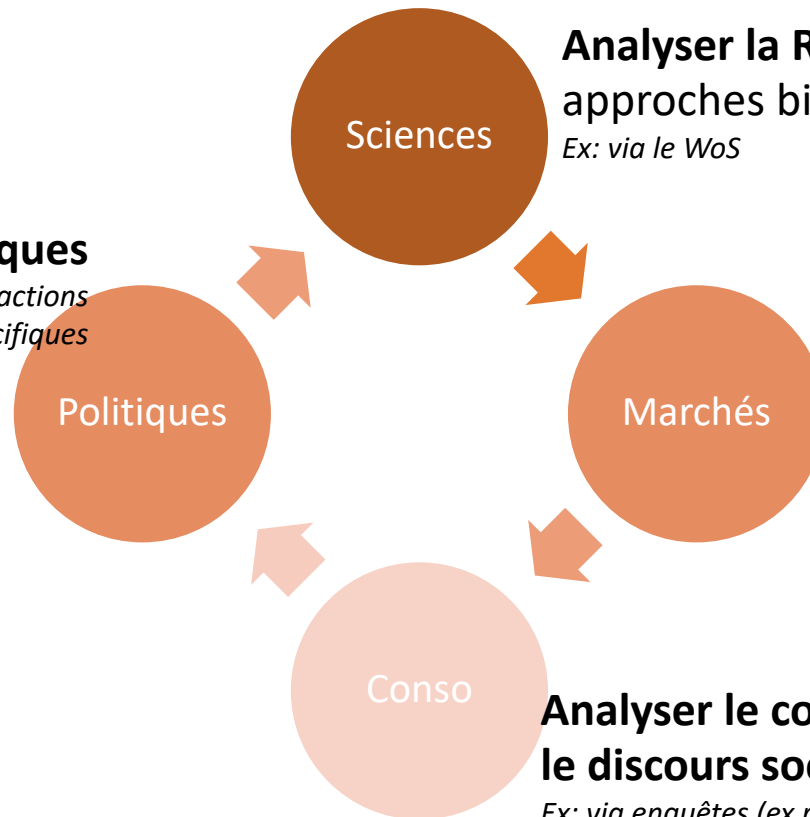
I will use the term ‘sociotechnical regimes’ to refer to the semi-coherent set of rules carried by different social groups. By providing orientation and co-ordination to the activities of relevant actor groups, ST-regimes account for the stability of ST-configurations. This stability is of a dynamic kind, meaning that innovation still occurs but is of an incremental nature. In evolutionary terms, ST-regimes thus function as selection and retention mechanism (deep structure). (Geels, 2002:1260)

TITLE	CITED BY	YEAR
Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study FW Geels Research policy 31 (8-9), 1257-1274	4542	2002
Typology of sociotechnical transition pathways FW Geels, J Schot Research policy 36 (3), 399-417	3520	2007



Vers la construction d'un programme de recherche de long terme sur les dépendances « sciences-marchés-politiques-consommateurs » dans l'analyse du verrouillage/déverrouillage des pulses


Analyser les politiques publiques
Ex: progression des aides PAC, plans protéines, actions spécifiques



Analyser la Recherche : apport des approches bibliométriques
Ex: via le WoS

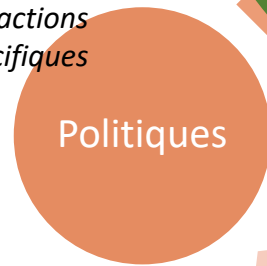
Analyser le marché : analyser les innovations produits
Ex: via MINTEL

Analyser le contexte d'usages, les pratiques, le discours social
Ex: via enquêtes (ex restauration collective), base presse grand public, réseaux sociaux,



Vers la construction d'un programme de recherche de long terme sur les dépendances « sciences-marchés-politiques-consommateurs » dans l'analyse du verrouillage/déverrouillage des pulses

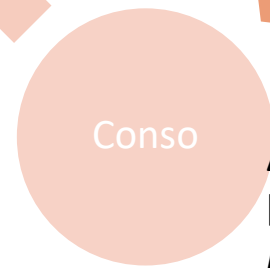
Analyser les politiques publiques
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Analyser la Recherche : apport des approches bibliométriques
Ex: via le WoS



Analyser le marché : analyser les innovations produits
Ex: via MINTEL



Analyser le contexte d'usages, les pratiques, le discours social
Ex: via enquêtes (ex restauration collective), base presse grand public, réseaux sociaux,

2. Analyser l'état des connaissances scientifiques:
les sciences contribuent-elles au verrouillage socio-technique ?

Construire un corpus de la littérature scientifique et l'analyser

- **Construction du corpus et statistique exploratoire** : analyse longitudinale du poids des espèces, des thèmes/domaines disciplinaires, positionnement des pays...
 - *ARTICLE SOUMIS avec la proposition d'une approche méthodologique originale, la création d'une plateforme favorisant les interactions entre experts et scientomètres*
- **Chronologie des champs de recherche**, poids des « topics »
 - *EN COURS via l'analyse des segments de mots*
- Analyse des réseaux épistémiques et des effets « translationnels » entre espèces ?
 - *ENVISAGÉ via l'analyse des citations*
- Quelle géographie de ces sciences et lien aux évolutions des marchés ?
 - *ENVISAGÉ*
- ...



Construction du corpus BILAG et premières analyses

Worldwide Scientific Knowledge on Grain-legumes: to what extent does science contribute to agricultural diversity? A bibliometric method and analysis (1980-2018)

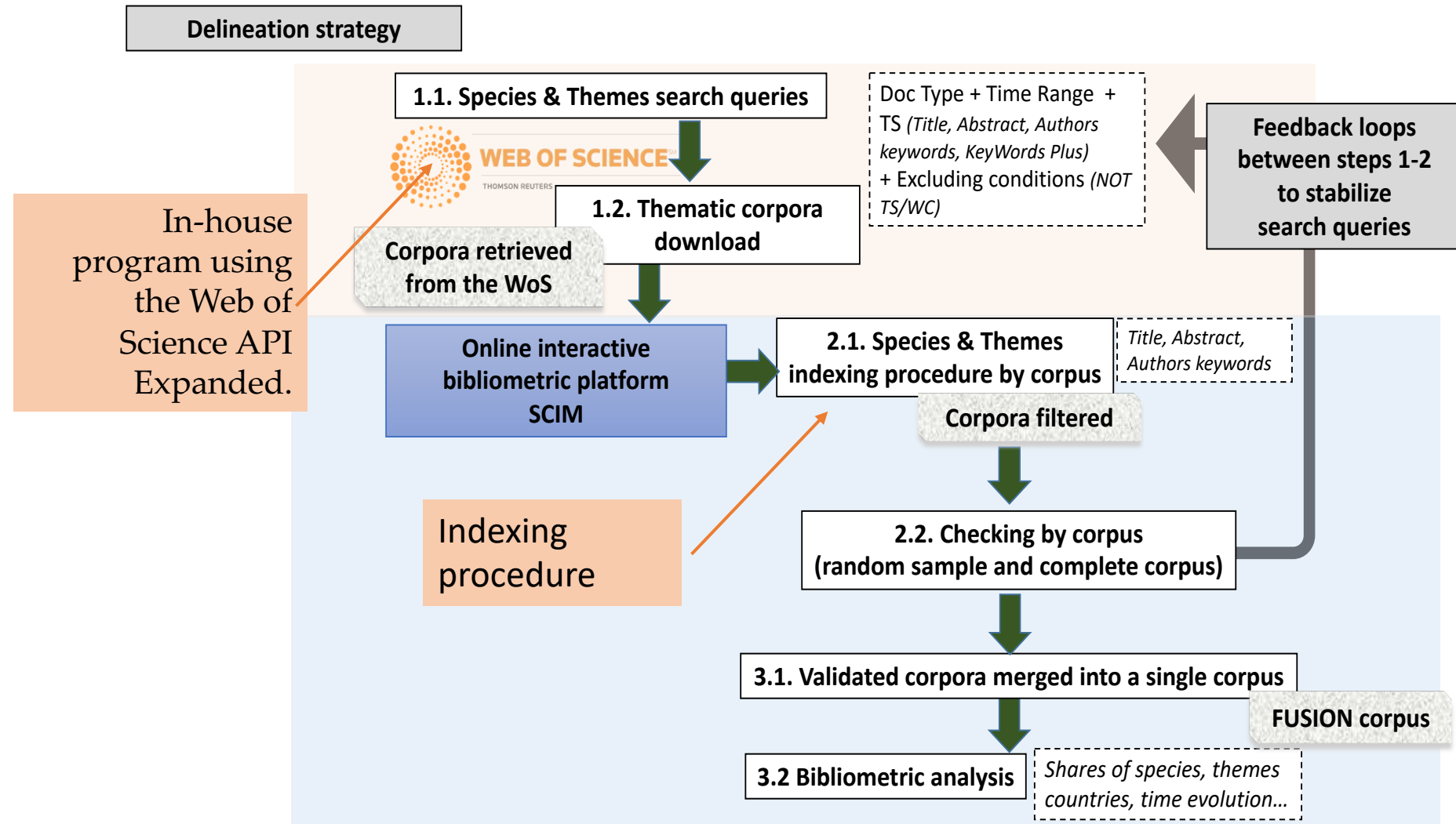
Soumis Sustainability journal

Marie-Benoît Magrini, Guillaume Cabanac, Matteo Lascialfari, Gael Plumecocq, Marie-Joséphine Amiot-Carlin, Marc Anton, Gaëlle Arvisenet, Alain Baranger, Laurent Bedoussac, Jean-Michel Chardigny, Gérard Duc, Marie-Hélène Jeuffroy, Etienne-Pascal Journet, Hervé Juin, Colette Larré, Hugues Leiser, Valérie Micard, Dominique Millot, Marie-Laure Pilet-Nayel, Christophe Nguyen-Thé, Tristan Salord, Anne-Sophie Voisin, Stéphane Walrand, and Jacques Wery



Choix méthodologiques : un travail associant experts du champ investi et scientométrés

- Managed by Clarivate Analytics, the WoS provides access to article records from more than 30,000 journals and books in various fields of science. The WoS 'Core Collection' includes about 70 million records
- BILAG-corpus (FUSION):
dataset of 107,823 scientific publications between 1980 and 2018...
- ...from 10 thematic subcorpus merged
- search queries addressing the *title, abstract, and authors' keywords* + indexing step to filter "keyword plus"



Un bruit résiduel restant de l'ordre de 20% (confirmé par analyse dendrogramme)

Thematic corpora investigated by experts.

Theme and underlying corpus name	Description of the theme	Number of scientific experts involved
SPECIES	Names used to designate the various main grain-legume species and varieties cultivated in temperate climates	2
GENETICS	Varieties, genes, breeding methods and objectives	2
AGRONOMY	Ways to grow legume crops and provided services	2
ECOPHYSIOLOGY	Plant physiology in relation to its abiotic environment	2
BIOAGGRESSORS	Weeds, diseases and pests life traits and control in crops	2
FEEDING	Feeding practices, animal nutrition	2
PROCESSING	Transformation and main types of food products excluding non-food uses	4
NUTRITION	Nutrition subjects for humans including health	4
ALLERGY	Concerns on allergy linked to the use of legumes in food	2
ACCEPTABILITY	Sensorial and organoleptic analysis for consumer acceptance	2
SOCIOECONOMICS	Any subject of interest using socio-economic approaches	2

Species identifier and species expressions used in the species search query

Species identifier (Genus or common name)	All species or common name terms included in the search query
Adzuki	phaseolus angularis, vigna angularis, red mung\$, red bean\$, red mungbean\$, adzuki\$, azuki\$
Bambara Bean	vigna subterranea*, bambara bean\$
Bean	phaseolus coccineus, phaseolus vulgaris, phaseolus lunatus, phaseolus spp, common bean\$, common field bean\$, common fieldbean\$, runner bean\$, runnerbean\$, lima bean\$, common bean\$, kidney bean\$, pinto bean\$, vigna aconitifolia, moth bean\$, vigna umbellata, rice bean\$
Chickpea	cicer arietinum, chickpea\$, chick pea\$
Cowpea	vigna unguiculata, cowpea\$, cow pea, cow peas, blackeyed pea, blackeyed peas, black-eye pea, black-eye peas, blackeyed bean\$, catjan\$, long bean\$
Faba bean	vicia faba, fava bean\$, faba bean\$, broadbean\$, broad bean\$, horse bean\$, horsebean\$, fababean\$, field bean\$, fieldbean\$
Fenugreek	trigonella foenum graecum, trigonella foenum graecum, fenugreek\$, fenugrec\$, fenu grec\$
Lathyrus	lathyrus sativus, lathyrus sativa, lathyrus ochrus, lathyrus cicera, grass pea\$, red pea\$, cyprus vetch\$, vetchling\$, gesse\$
Gram bean	vigna mungo, gram bean\$, black bean\$, black lentil\$, black gram, blackgram\$
Groundnut	arachis hypogea, arachis hypogaea, groundnut\$, peanut\$
Lablab	lablab purpureus, hyacinth bean\$, lablab bean\$, lablab\$
Lentil	lens culinaris, lentil\$
Lupin	lupinus albus, lupinus angustifolius, lupinus luteus, lupinus mutabilis, lupin\$
Mungbean	vigna radiata, vigna mungo, mungbean\$, mung bean\$, moong bean\$, mungo bean\$, green gram\$, golden gram\$, maash\$, moong sanskrit\$
Pea	pisum sativum, pea, peas
Pigeon Pea	cajanus cajan, pigeon pea, pigeon peas, pigeonpea\$
Soya	glycine max, soja, soya\$, soy\$, sojabean\$, soybean\$, soyabean\$
Vicia	vetch\$, vetch\$, vicia sativa, vicia villosa, vicia ervilia, ervil\$, vicia narbonensis, narbon bean\$
Winged bean	psophocarpus tetragonolobus, winged bean\$, asparagus pea\$, goabean\$, goa bean\$
Generic	leguminous, *legume, *legumes, pulse, pulses

INRA\DATA\VERSE: publication des requêtes

Auteurs:

Les experts, le documentaliste IST, G. Cabanac

Correspondant : 1er auteur

Renvoie à l'article pour la méthode car l'application *telle quelle* de la requete ne permet pas le filtrage des key-words plus

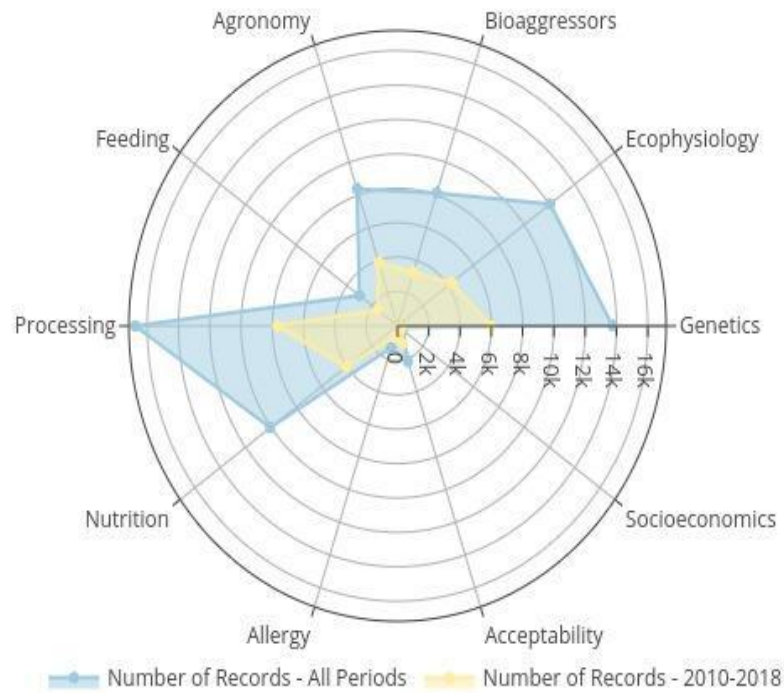
Fichiers associés:

- Requete du WoS format txt
- Les clés UT des records (après filtrage)

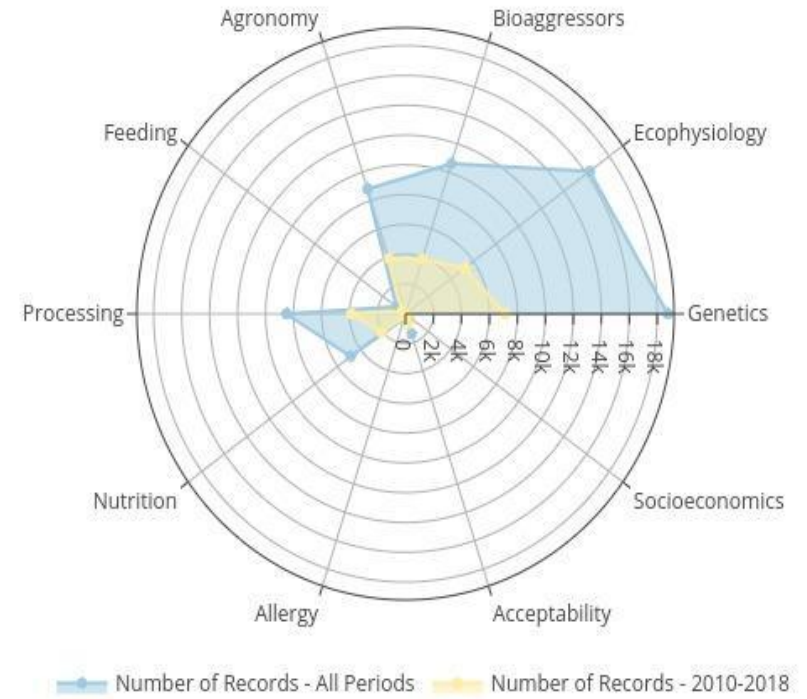
The screenshot displays the Dataverse interface for the dataset 'Socioeconomics and Grain-Legumes WoS DataSet'. At the top, the INRA logo and navigation menu are visible. The dataset title is prominently displayed with 'Version provisoire' and 'Non publiée' labels. Below the title, the authors and a DOI link are provided. The 'Description' section explains that the dataset is a search query for socioeconomic research on grain-legumes. The 'Subject' is listed as 'Economics', and a 'Related Publication' is cited. At the bottom, a file list shows two files: 'DataSet_UT_SocioEconomics.tab' (a tabular dataset) and 'Socioeconomics_and_GrainLegumes_WoS_Query.txt' (a plain text file). Blue arrows from the text boxes on the left point to the authors, the description, and the file list.

SOME RESULTS

Shares of themes within records indexed with Soya comparison to 2010-2018



Shares of themes within records indexed with Pulses comparison to 2010-2018



Thematic distribution for each legumes

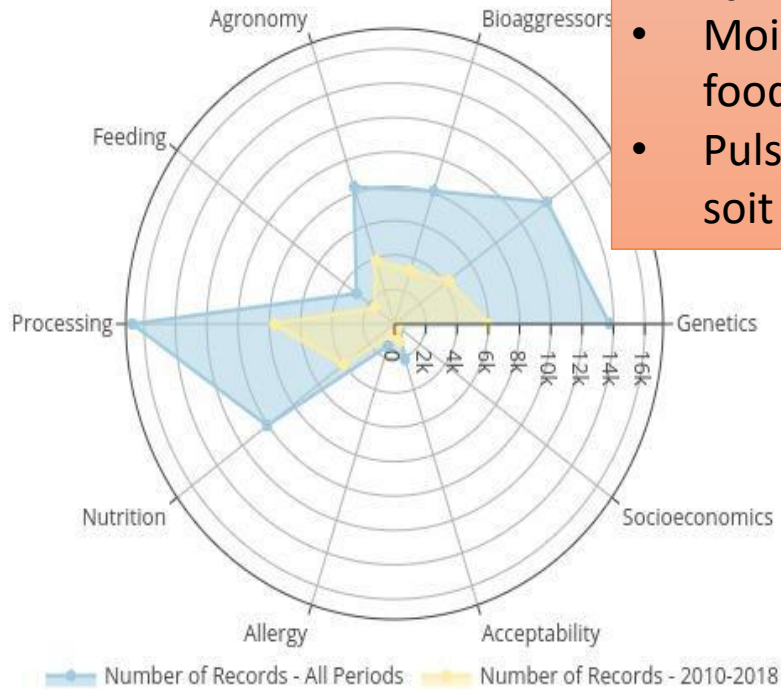
40% du corpus FUSION est sur la période 2010-2018

SOME RESULTS

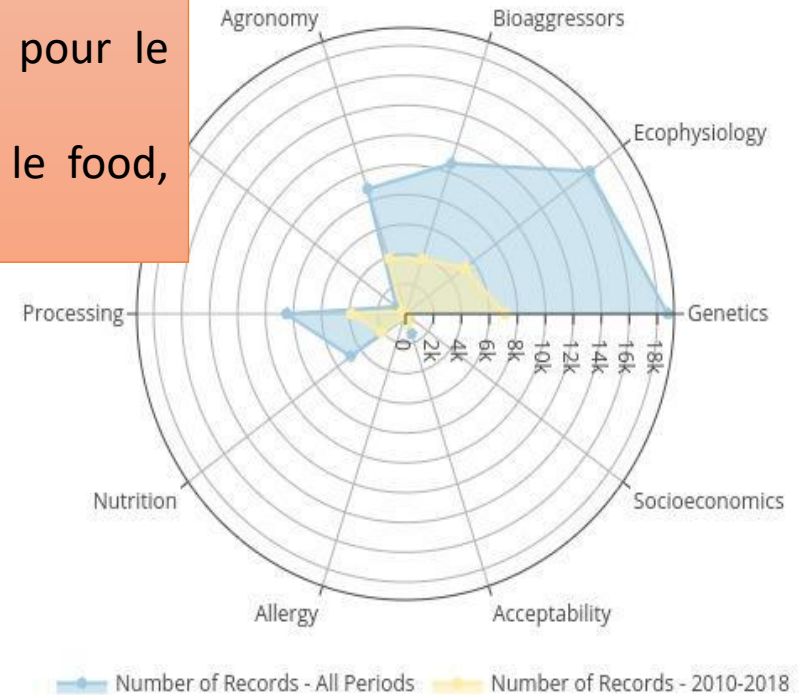
Poids déséquilibré des espèces soya/pulses en food sciences comparativement au marché

- Moins de 10% volume soja pour le food, soit 40 MT
- Pulses: au moins 60% pour le food, soit +50 MT

Shares of themes within records indexed with Soya comparison to 2010-2018



Shares of themes within records indexed with Pulses comparison to 2010-2018



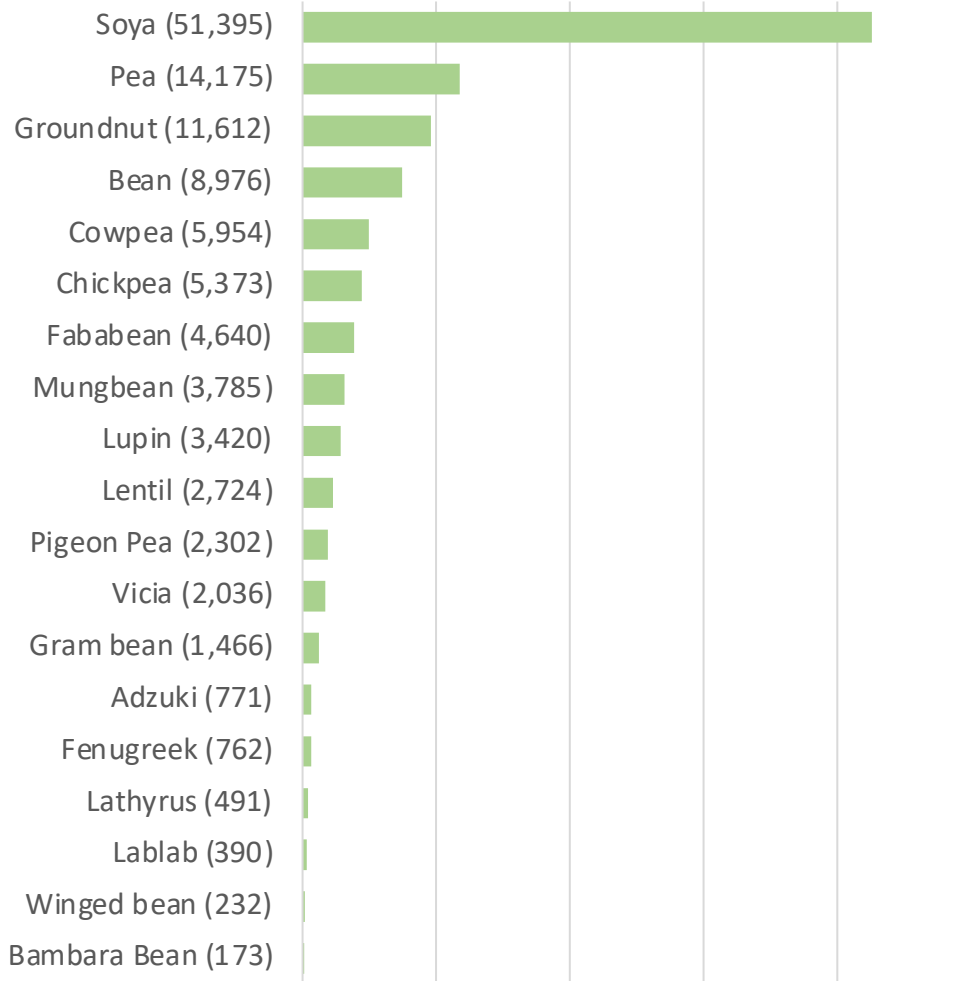
Thematic distribution for each legumes

40% du corpus FUSION est sur la période 2010-2018

POIDS DES ESPECES CITEES

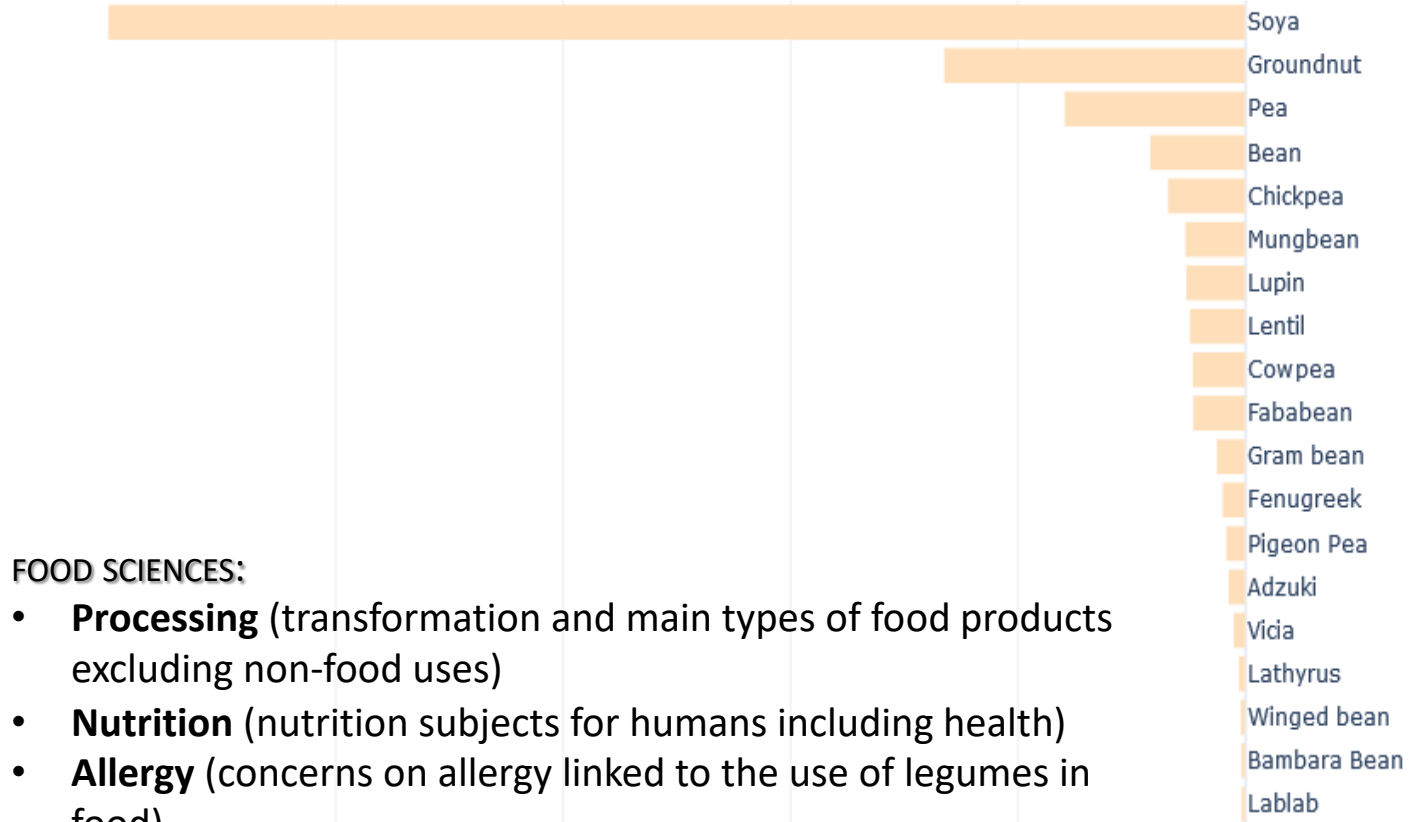
ALL CORPUS FUSION

0% 10% 20% 30% 40% 50%



CORPUS FOOD SCIENCES

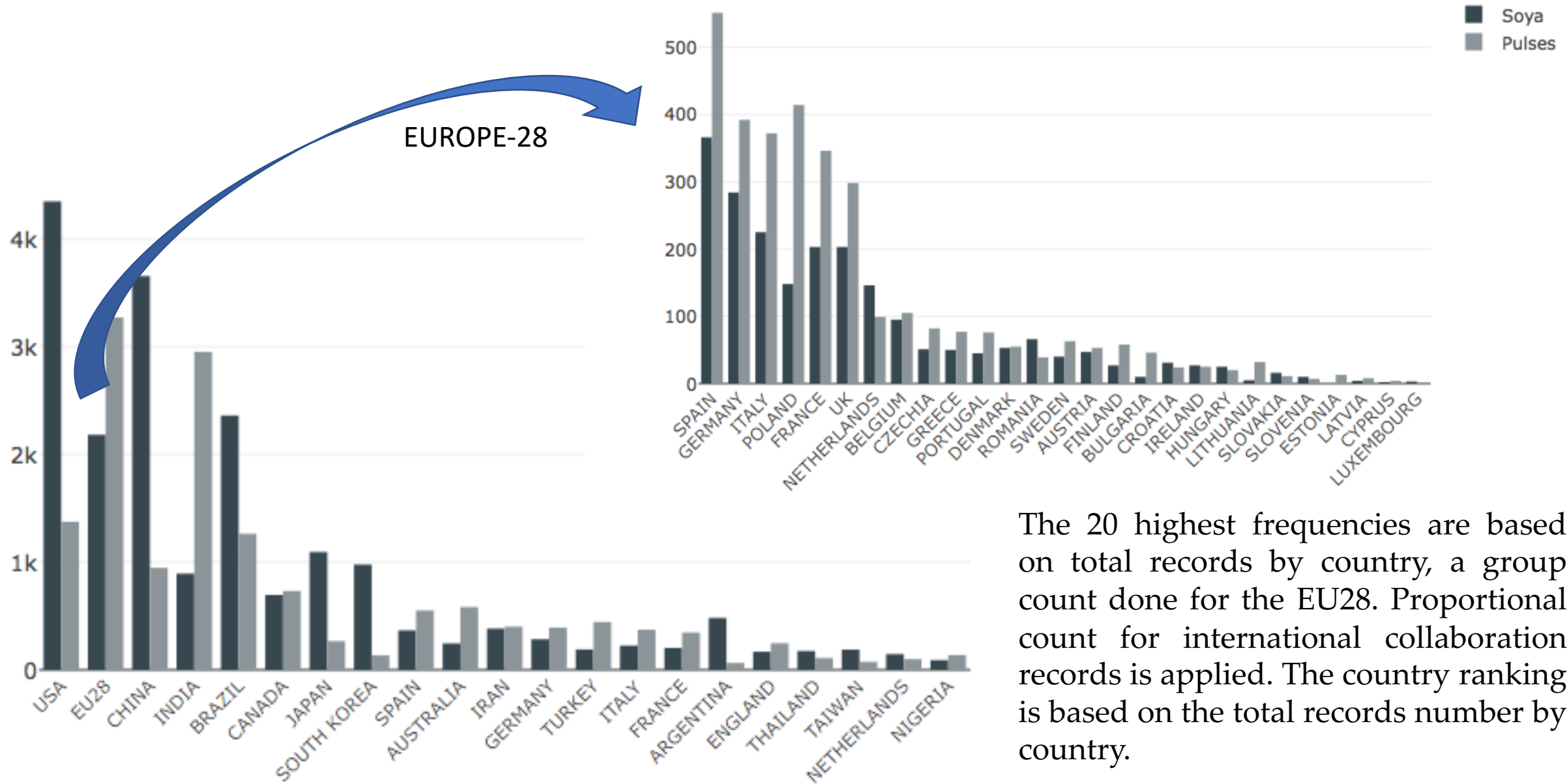
50% 40% 30% 20% 10% 0%



FOOD SCIENCES:

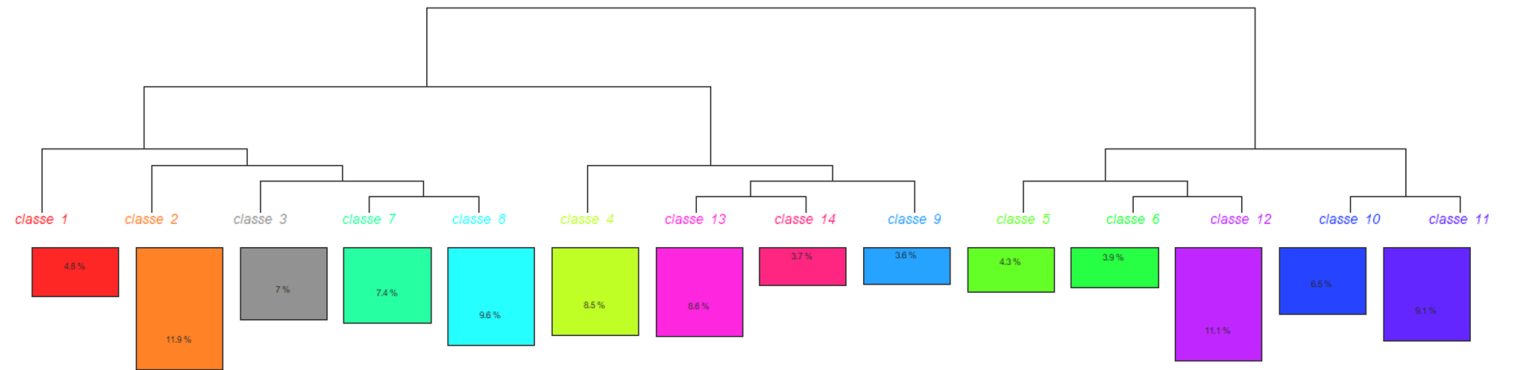
- **Processing** (transformation and main types of food products excluding non-food uses)
- **Nutrition** (nutrition subjects for humans including health)
- **Allergy** (concerns on allergy linked to the use of legumes in food)
- **Acceptability** (sensorial and organoleptic analysis for consumer acceptance)

2010-2018



The 20 highest frequencies are based on total records by country, a group count done for the EU28. Proportional count for international collaboration records is applied. The country ranking is based on the total records number by country.

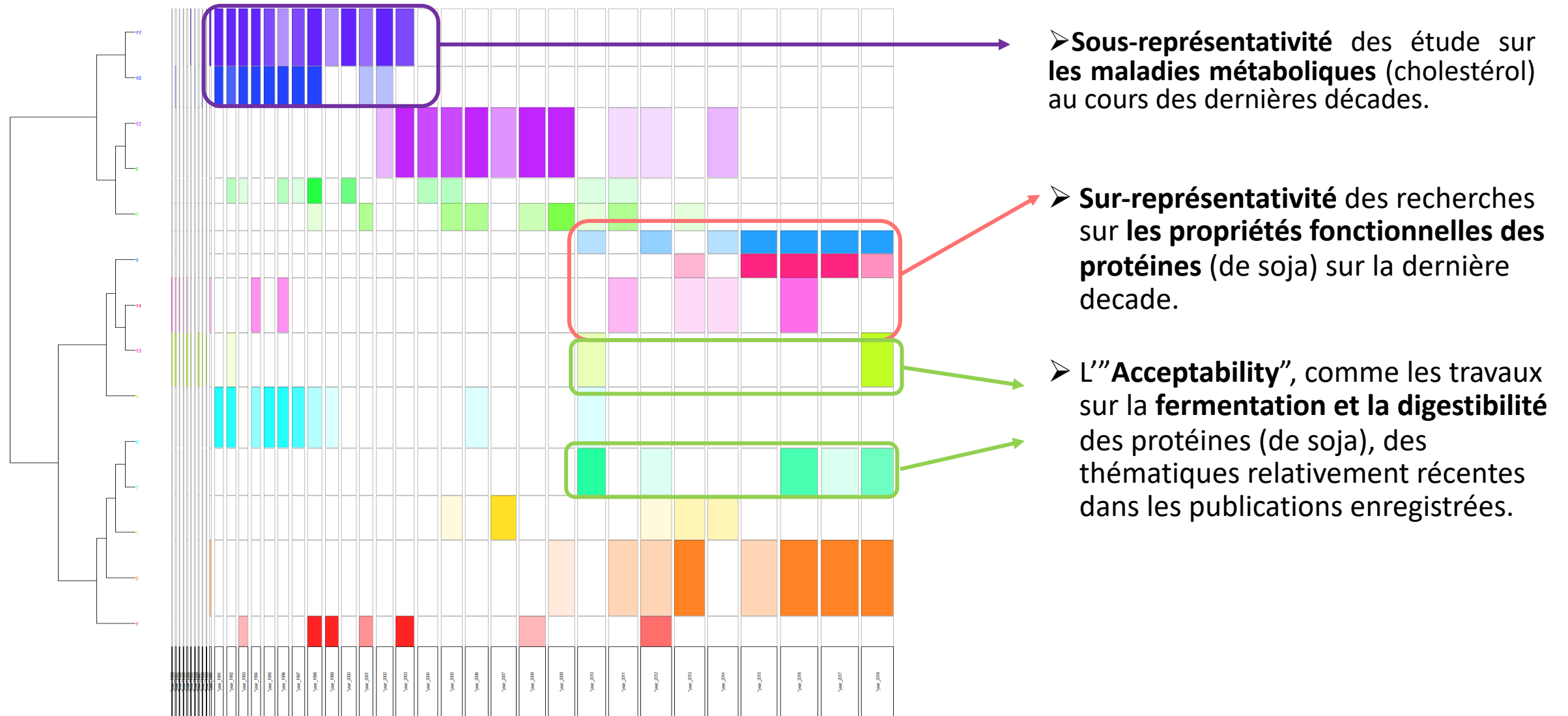
ILLUSTRATION - SOUS-CORPUS SOJA – 1980-2018



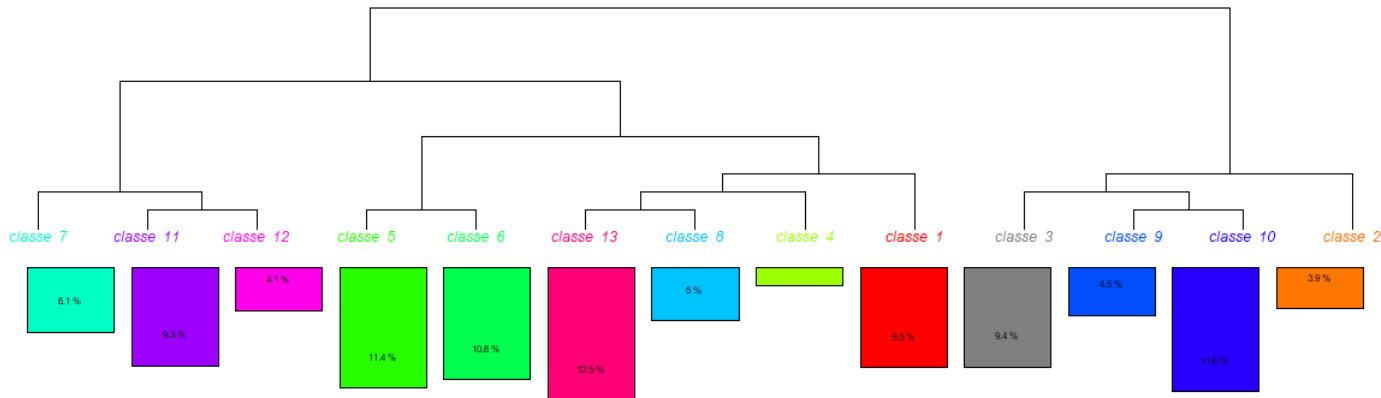
monocult	plant	method	ferment	activity	sensory	emulsion	liposome	film	cell	allergy	woman	diet	cholesterol
salmonella	soil	spectrometry	fermentation	antioxidant	flour	gel	encapsulation	tensile	tumor	immunology	risk	feed	diet
h7	crop	chromatography	aspergillus	inhibitor	texture	emulsify	drug	mechanical	genistein	child	cancer	sbm	casein
log	gene	extraction	koji	trypsin	bread	protein	delivery	strength	expression	patient	intake	cow	feed
o157	seed	hpic	oryzae	radical	quality	solubility	microencapsulation	adhesive	apoptosis	allergic	health	meal	group
tryptic	sequence	mass	bacillus	enzyme	acceptability	property	encapsulation	composite	receptor	allergen	postmenopausal	digestibility	plasma
coli	root	column	solidstate	scavenge	cook	stability	dry	resin	proliferation	atopic	disease	pig	serum
tsb	fungus	standard	produce	peptide	dough	gelation	air	infrared	mammary	sensitization	consumption	silage	live
listeria	leaf	liquid	traditional	phenolic	extrusion	11s	release	biodegradable	inhibit	challenge	dietary	holstein	hepatic
iamo	dna	sample	baillusubtilis	dpph	moisture	foam	spray	fourier	estrogen	food	association	milk	triglyceride
cfu	pcr	quantification	culture	purify	hardness	aggregate	bed	property	pathway	prick	breast	feed	blood
agar	germination	analytical	strain	protease	color	structure	vesicle	vapor	macrophage	symptom	cardiovascular	crudeprotein	insulin
broth	transgenic	calibration	starter	aminoacid	product	7s	temperature	diffraction	activation	dermatitis	isoflavones	ruminal	male
inoculate	encode	ionization	waste	hydrolysis	textural	droplet	microcapsule	fit	mcf7	asthma	man	gain	lipoprotein
strain	recovery	recovery	betaglycosidase	inhibitory	screw	heat	model	xray	er	diagnosis	intervention	performance	lipid
count	cultivar	gas	korean	acid	colour	denaturation	carrier	wood	differentiation	groundnut	equol	calf	hdl
bacterium	genetically	elisa	rhizopus	lipoxygenase	extrude	glycinin	diffusion	plywood	daidzein	skin	trial	hay	ldl
plate	genome	precision	cultivation	hydrolysate	blend	aggregation	equation	plastic	signal	hypersensitivity	questionnaire	ration	dietary
lactobacillus	genetic	separation	raffinose	ace	flavor	hydrophobic	flow	spectroscopy	human	reaction	participant	broiler	glucose
growth	drought	couple	subtilisin	enzymatic	formulation	stabilize	velocity	plasticizer	apoptotic	igemediate	healthy	lactation	level
escherichia	clone	chromatography	natto	extract	property	rheological	inlet	transform	kinase	anaphylaxis	consume	age	bodyweight
survival	stage	m	optimization	free	wheat	interfacial	fit	glycerol	epithelial	age	randomize	latin	ovx
typhimurium	stress	limit	yeast	ic50	patty	network	particlesize	sem	e2	egg	may	rumen	postprandial
pathogen	fungus	spike	aglycones	serine	fry	surface	zeta	cast	tnfalpa	clinical	phytoestrogen	alfalfa	fecal
trypticase	flood	tandem	enzyme	compound	extruder	disulfide	nanoparticle	bond	nfkappa	history	prevention	carcass	control
biofilm	shoot	deviation	abts	inhibition	extrudates	interface	dryer	reinforce	colon	spt	evidence	lactate	body
staphylococcus	gm	solidphase	xylanase	proteinase	bake	ionic	entrapment	poly	necrosis	diagnostic	isoflavone	ileal	compare
aureus	nodule	simple	flask	inhibit	starch	fraction	particle	polymer	cytokines	elimination	menopausal	replace	spraguedawl
listeria	mycorrhizal	quantitation	stachyose	oxidation	acceptance	emulsification	constant	cellulose	suppress	milk	bone	forage	hdlc
tryptone	pod	accuracy	sufu	alcalase	batter	hydrophobic	wall	permeability	induction	oral	review	multiparous	muscle
antagonist	community	electrospray	nitrogen	chymotrypsin	alutentfree			water	beta	urinary	ndf	obese	female

- 21 860 'records'
- 118 646 segments de textes
- 88 134 formes/termes distincts
- 14 clusters thématiques obtenus (96.5 % de l'ensemble des segments du sous-corpus analyses)

FOOD SCIENCES – SOYA : « TRENDING SUBJECTS »



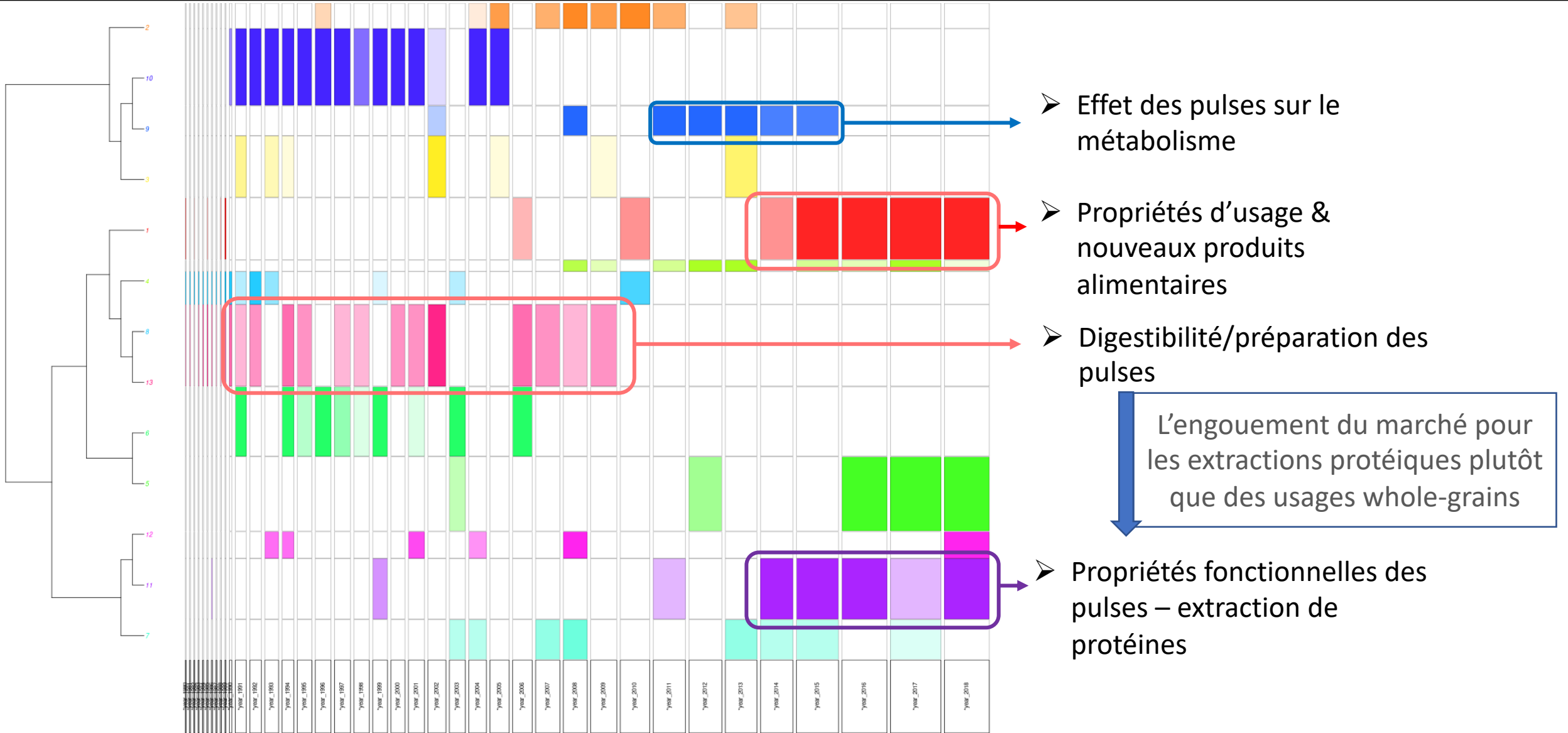
SOUS-CORPUS PULSES – TOUTES PÉRIODES



temper: model moisture equation speed screw air bed dry constant rpm fit coefficient kinetics equilibrium diffusivity kinetic dryer mathematical peleg experiment time diffusion arrhenius fluidized rate predict density phase extrudates die expansion
 emulsio stability foam film emulsify protein ppi solubility droplet strength protein hydrophob interfacial denaturatic gelation legumin gel rheological surface oil mechanical modulus capacity thermal charge aggregation gum tension aggregate oilin polymer stabilize
 starch amylose granule gelatinizati swell paste viscosity amylopecti peak enthalpy diffraction crystallinity xray setback smooth dsc wrinkle native scan anneal retrogradati calorimetry crystalline ctype potato gelatinize granular waxy temperature breakdown sem rva oval
 food crop vegetable health fruit yield consumer soil fertilizer consumptic manure rotation practice cost benefit country child market farmer recommen winter season meet economic nutrition farm need sustainable world person intercroppin irrigation
 diet feed intake meal pig group blood cholesterol glucose cow casein plasma gain bodyweight control dietary male insulin sbm ileal postprandia weight fee milk trial supplement libitum animal meat carcass appetite ad serum
 cook content soak germinati tannin iron acidphyti raw digestibilit zinc process seed antinutritio vitro bioavailab phytate fababean tia bean mineral calcium sprout germinate leguminou: lentil polyphenol dehulling ash phenolic legume boil
 genotyp variety cultivar bean seed composi kabuli accession desi unguiculat phaseolus vulgaris variation coat location proximate walp variability chemical convicine vicine breed content navy trait cotyledon pod cultivate 100seed landraces bambara
 radical scaveng dpph antioxidai abts phenolic teac frap tpc trolox gallic orac activity hydrolysat 2diphenyl ferric alcalase ferulic radicalscav 1diphenyl pcoumaric equivalent tfc prt epicatechin free flavan3 chelate superoxide dot protocatech isovitexin
 flour bread sensory wheat quality fermentati acceptabil product ferment pasta snack nutritional blend texture acceptable glutenfree dough formulation score biscuit lactobacillus rice lacticacid evaluation bake semolina aroma durum colour millet
 fungus root plant growth strain soil pathogen mycorrhiza rhizospher inoculatio bacterium rhizobium specie fungal infection fusarium shoot host inoculate nodule bacillus arbuscular pseudomon salmonella amf infect pathogenic nodulation resistance solani bacterial dlofus
 cell receptor expressio cancer pea15 apoptosis proliferatio mrna macrophag tumor hepg2 ped live hepatic pathway lps oxidative glutathione antiinflam: tnfalpa inflammator: sod administrati sperm mcf7 ht29 il6 inhibit cannabinoic injury epithelial colon brain
 sequen gene purify enzyme chromatog encode cdna mass electrophc dna molecular affinity subunit peptide purification spectromet nterminal clone polypeptid: lectin chloroplast fragment bind filtration expression recombinai inhibitor homology catalyze membrane gel ion
 patient allergy immunog allergen allergic crossreact sensitizati sera groundnut anaphylaxi skin clinical prick symptom spt asthma sensitize challenge allergenic reaction igebinding pollen anaphylacti history elisa lupine ara hypersensit birch immunoblot rhinitis child

- 19 054 'records'
- 100 880 segments de textes
- 63 229 formes/termes distincts
- 13 clusters thématiques obtenus (95 % de l'ensemble des segments du sous-corpus analysés)

Food Sciences – Pulses : « *trendings subjects* »



➤ Effet des pulses sur le métabolisme

➤ Propriétés d'usage & nouveaux produits alimentaires

➤ Digestibilité/préparation des pulses

L'engouement du marché pour les extractions protéiques plutôt que des usages whole-grains

➤ Propriétés fonctionnelles des pulses – extraction de protéines

3. Analyser les innovations produits sur le marché :

Les axes de recherche des food sciences se concrétisent-ils au travers des innovations produits ?

La progression des sciences sur les pulses contribue-t-elle au déverrouillage socio-technique ?

MINTEL – GNPD

The screenshot displays the Mintel GNPD (Global New Product Database) interface. At the top, there are navigation tabs for 'INSIGHTS Expert Analysis', 'PRODUITS Mintel GNPD', and 'PLUS Mintel Products'. A user is logged in as 'Bienvenue, Salord Tristan' in French. A search bar is prominently featured with the text 'Chercher dans GNPD' and a search icon. Below the search bar, there are filters for 'Recherche', 'Ingrédients', and 'Tableau de bord'. A 'MUST READ' banner highlights an article titled 'Support the functional...' with a sub-headline 'From prebiotics to probiotics, microorganisms are essential for a healthy microbiota.' Below this, there are sections for 'Mes recherches sauvegardées' and 'Hoppers enregistrés'. The main content area shows a list of search results for plant-based products, including:

- Gluten-Free Oriental-Style Vegetables & Soy**: Enterprise: Groupe Ekibio, Marque: Ma Vie Sans Gluten. Description: Ma Vie Sans Gluten Gluten-Free Oriental-Style Vegetables & Soy is rich in fibres and proteins. This vegan product cooks in three minutes and retails in a 250g recyclable pack featuring heating instructions, the EU Green Leaf and AB logos and V-label seal from the European Vegetarian Union. (ID: 6225129). Location: Espagne, Date: Déc 2018, Category: Plats préparés & plats principaux.
- Wholegrain Pasta with Chickpea Cream and Broccoli Filling**: Enterprise: Pastificio Rana, Marque: Giovanni Rana Bio Integral. Description: Giovanni Rana Bio Integral Massa Fresca Integral com Ovos e Recheio à Base de Brócolos e Grão-de-Bico (Wholegrain Pasta with Chickpea Cream and Broccoli Filling) cooks in three minutes and is a source of fibre, proteins, vitamins and minerals. The organic product is made with ingredients that respect natural soil fertilisation, biodiversity, local ecological balance, as well as animal well-being and natural feeding. It retails in a 250g pack featuring the FSC Mix, EU Green Leaf, Instagram, Facebook and CCPB logos, as well as cooking instructions. (ID: 6227413). Location: Portugal, Date: Déc 2018, Category: Mets d'accompagnement, Pâtes.
- Aromatic Moroccan Lemon & Herb Cooking Sauce**: Enterprise: Symington's, Marque: Chicken Tonight. Description: Chicken Tonight Aromatic Moroccan Lemon & Herb Cooking Sauce is now available. The product is an aromatic blend of herbs, spices and lemon with chickpeas and natural ingredients that is said to help create exciting, quick and easy meals. It is free from gluten and added sugar, and retails in a 250g pack that serves two portions and features Facebook and Twitter logos. (ID: 6232793). Location: Royaume-Uni, Date: Déc 2018, Category: Sauces & assaisonnements, Sauces de cuisine.

At the bottom of the interface, there is a search bar with the placeholder text 'I'm looking for...' and filters for 'Category' and 'Region'.

Construire une base de données des innovations agro-alimentaires à base de soya et pulses et l'analyser :

- Poids des espèces, de leur formulation (réseau d'ingrédients) et rapport aux allégations (réglementaires/marketing)
- Analyse longitudinales dans le monde, selon pays

Merci pour votre attention

