



Computational gastronomy:
a novel view to bridging the gap
between science and the kitchen

Marta Vila

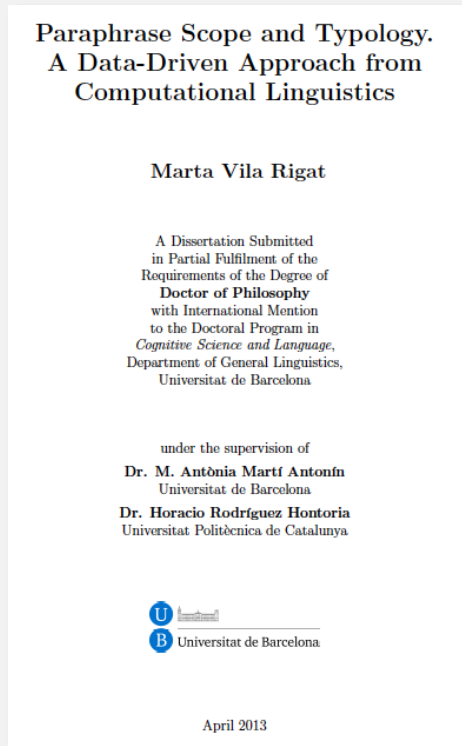
Department of Nutrition,
Food Sciences and Gastronomy
Food and Nutrition Campus
University of Barcelona

Parma Summer School
June 14 2017
University of Parma and EFSA

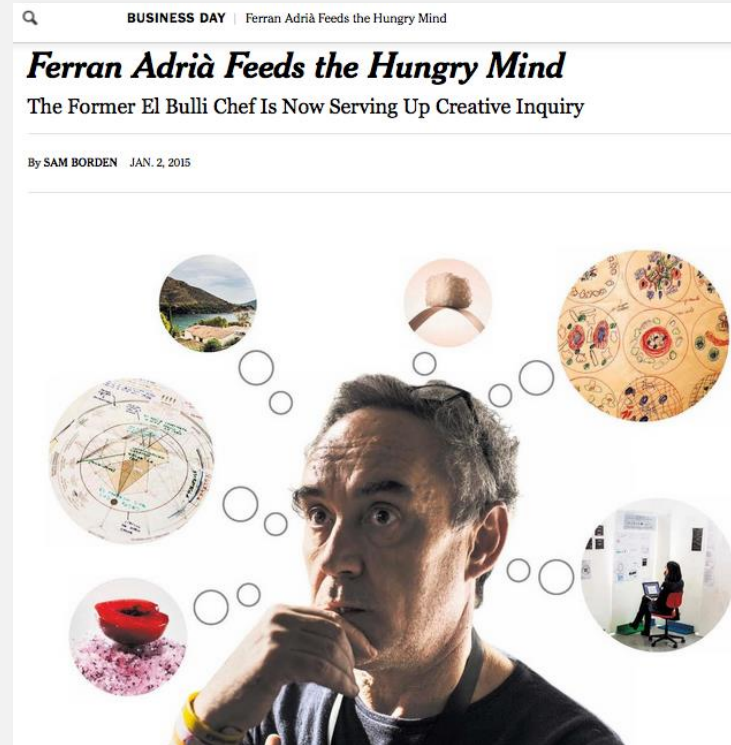
From linguistics to gastronomy



B.A. and M.A. in
Hispanic Philology (UB)



PhD in Computational
Linguistics (UB)

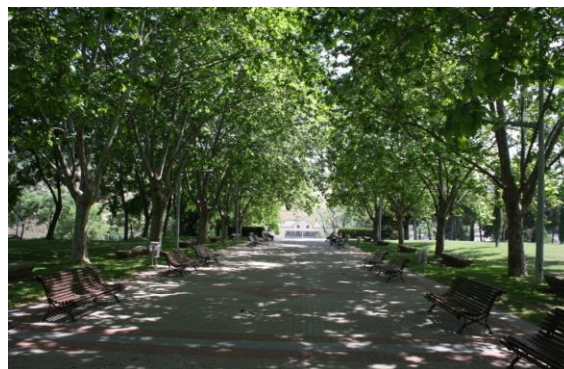


Project coordinator at the
UB-Bullipedia Unit



Associate professor
and researcher in Computational
Gastronomy (UB)

Department of Nutrition, Food Sciences and Gastronomy
Faculty of Pharmacy and Food Sciences
Food and Nutrition Campus
University of Barcelona



Bachelor's degrees

Food Science and Technology

Human Nutrition and Dietetics

Culinary and Gastronomic Sciences (UB-UPC)

Pharmacy and Human Nutrition and Dietetics (double)

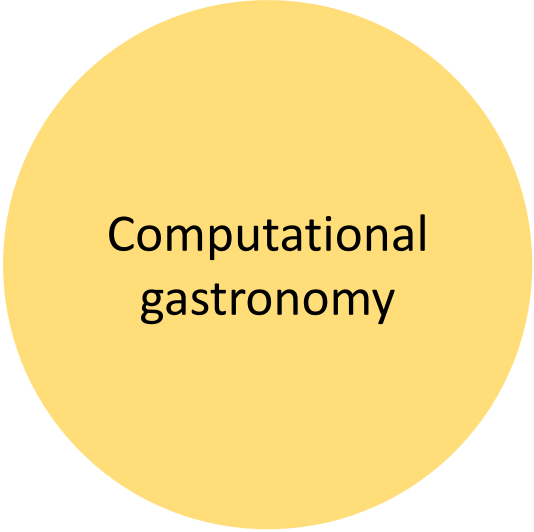
Master's degrees

Food Safety (UB-UAB-UPF-ACSA)

Nutrition in Physical Activity and Sport Sciences (UB-URV-UIB-CAR-INEF)

Food Ethics and Law

Science and Cooking (under development)



Computational
gastronomy



Flavor network and the principles of food pairing

Yong-Yeol Ahn^{1,2,3*}, Sebastian E. Ahnert^{1,4*}, James P. Bagrow^{1,2} & Albert-László Barabási^{1,2}

SUBJECT AREAS:

STATISTICAL PHYSICS,
THERMODYNAMICS AND
NONLINEAR DYNAMICS

APPLIED PHYSICS

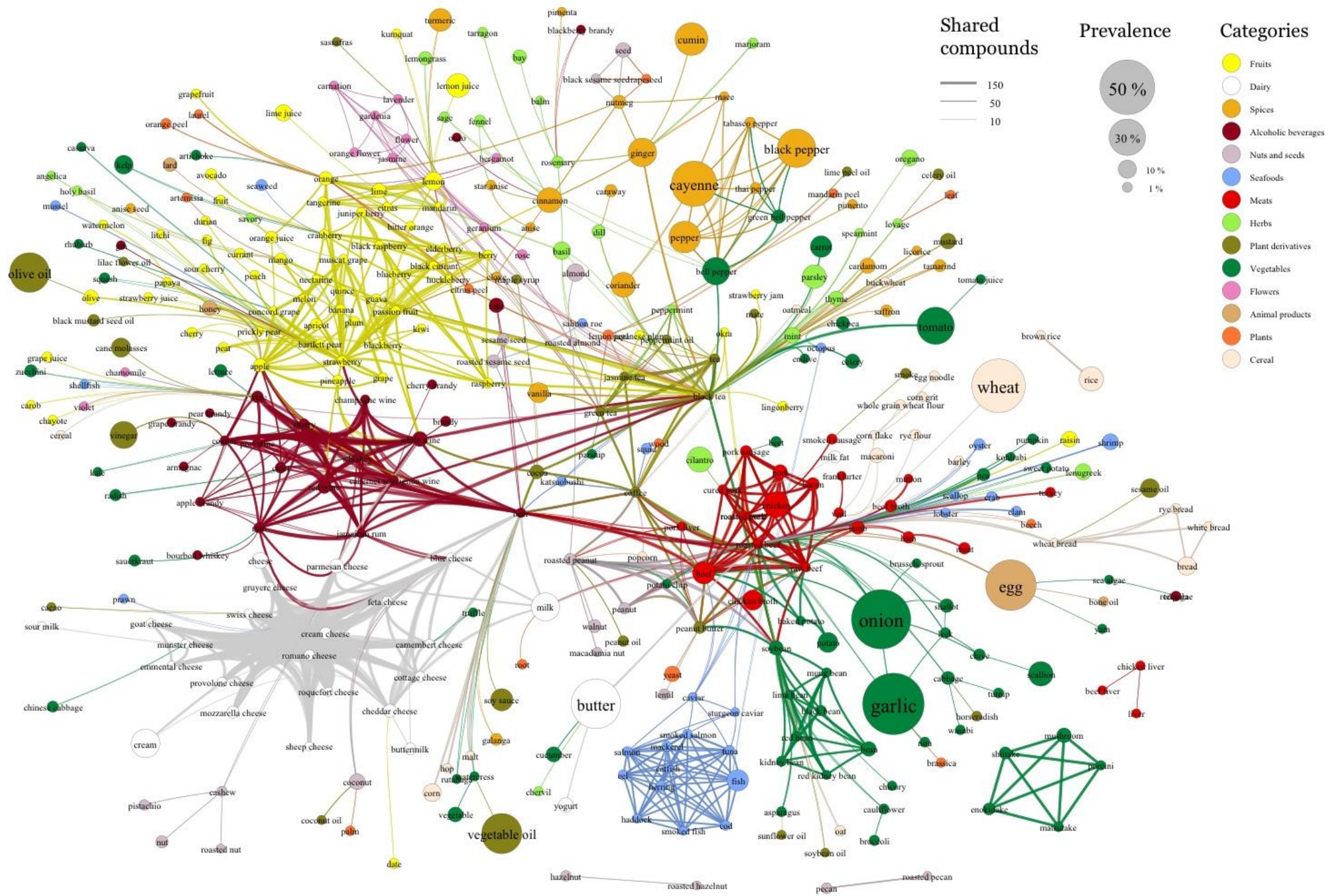
SYSTEMS BIOLOGY

STATISTICS

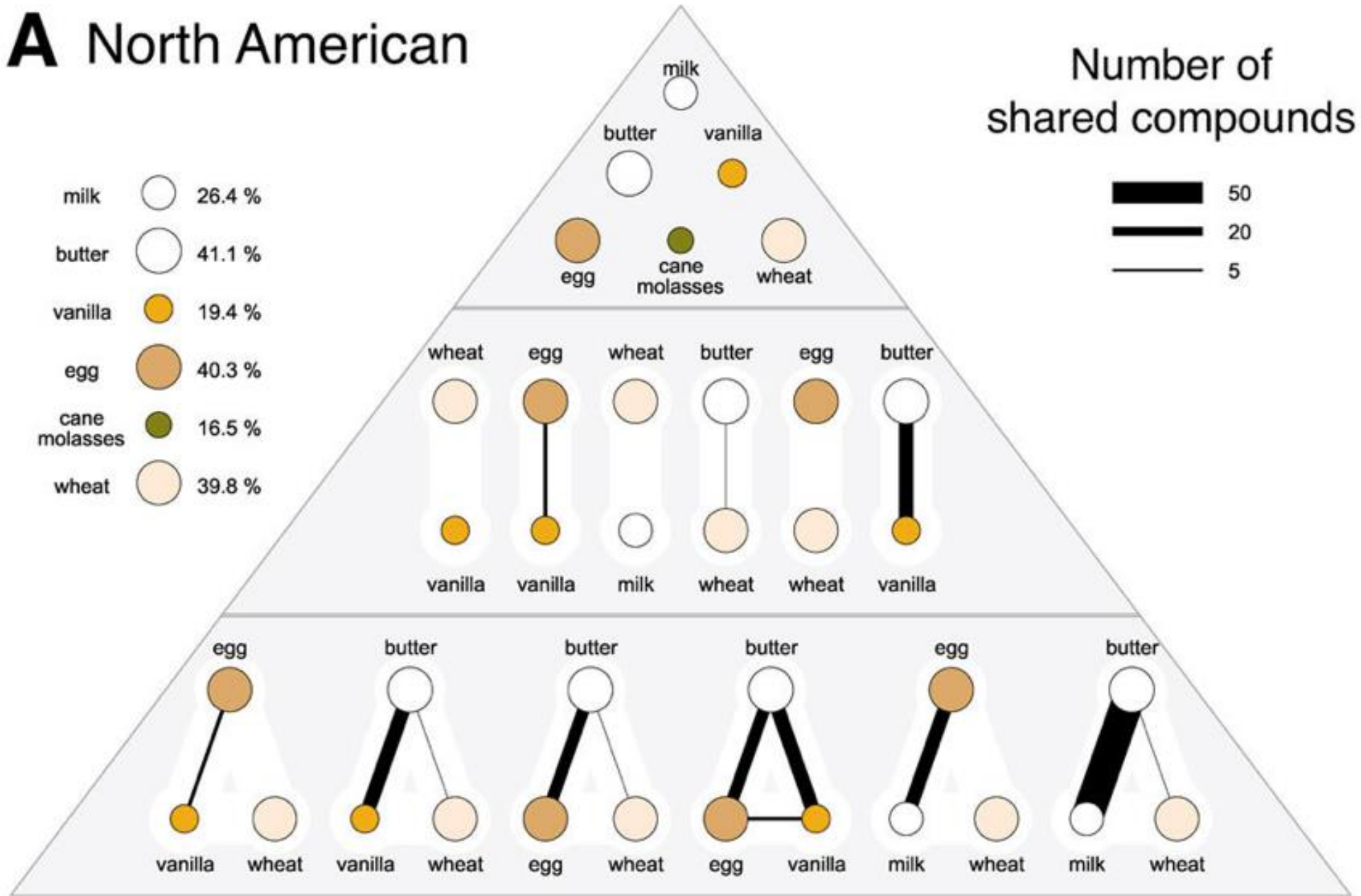
¹Center for Complex Network Research, Department of Physics Northeastern University, Boston, MA 02115, ²Center for Cancer Systems Biology Dana-Farber Cancer Institute, Harvard University, Boston, MA 02115, ³School of Informatics and Computing Indiana University, Bloomington, IN 47408, ⁴Theory of Condensed Matter, Cavendish Laboratory, University of Cambridge, Cambridge CB3 0HE, UK.

Received
18 October 2011

The cultural diversity of culinary practice, as illustrated by the variety of regional cuisines, raises the question of whether there are any general patterns that determine the ingredient combinations used in food today or principles that transcend individual tastes and recipes. We introduce a flavor network that captures the flavor compounds shared by culinary ingredients. Western cuisines show a tendency to use ingredient pairs that share



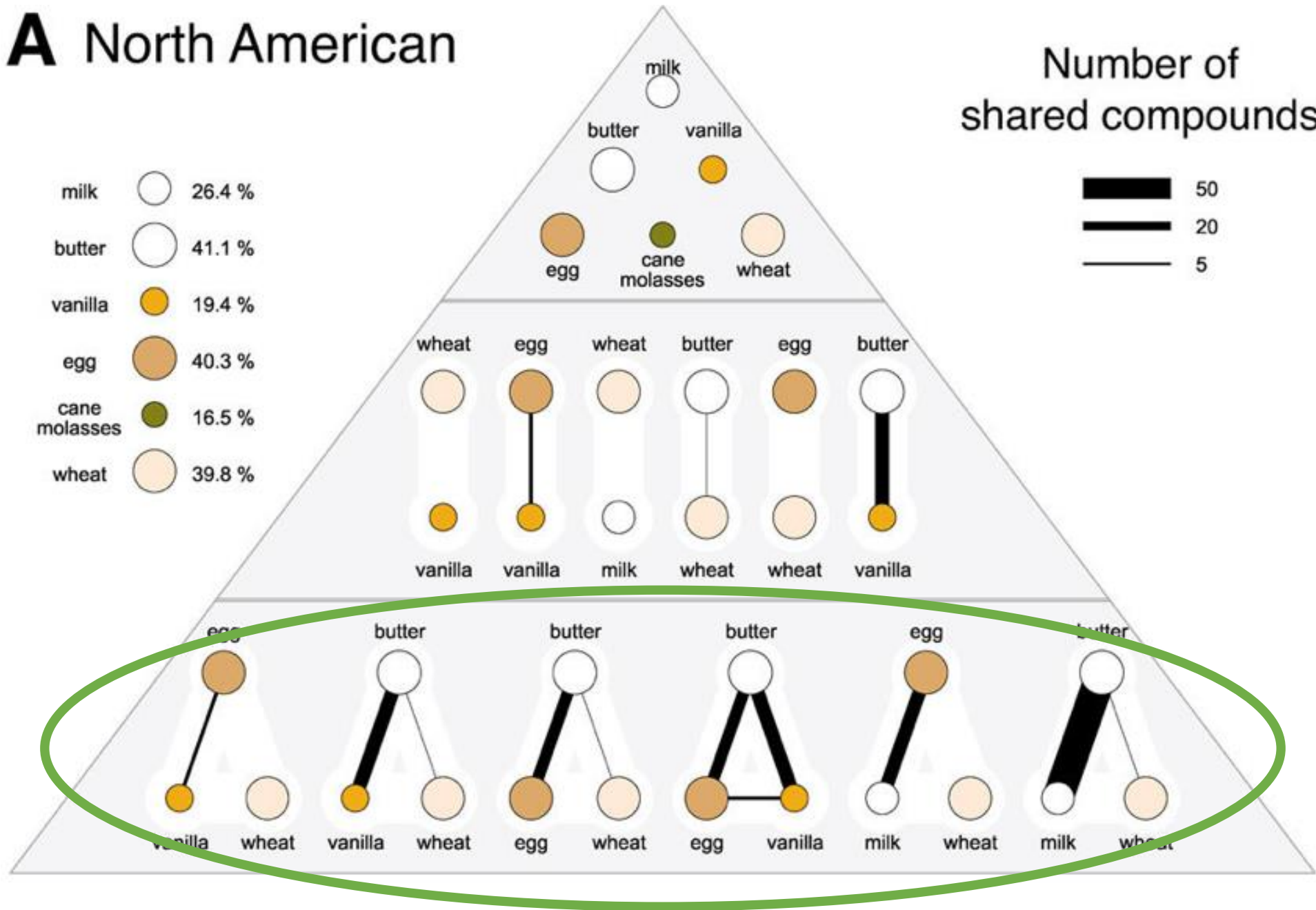
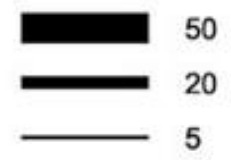
A North American



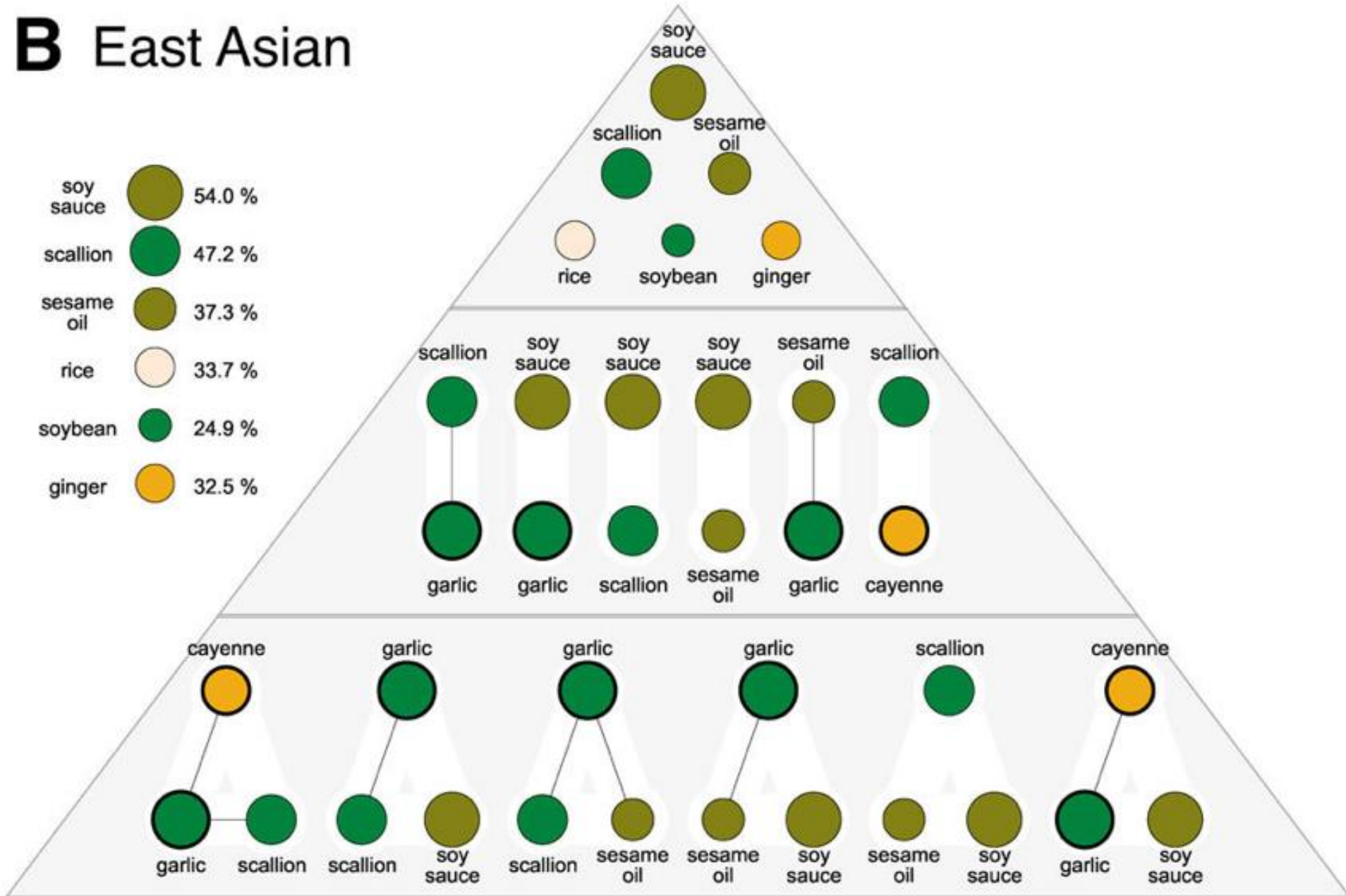
A North American

- milk ○ 26.4 %
- butter ○ 41.1 %
- vanilla ● 19.4 %
- egg ● 40.3 %
- cane molasses ● 16.5 %
- wheat ○ 39.8 %

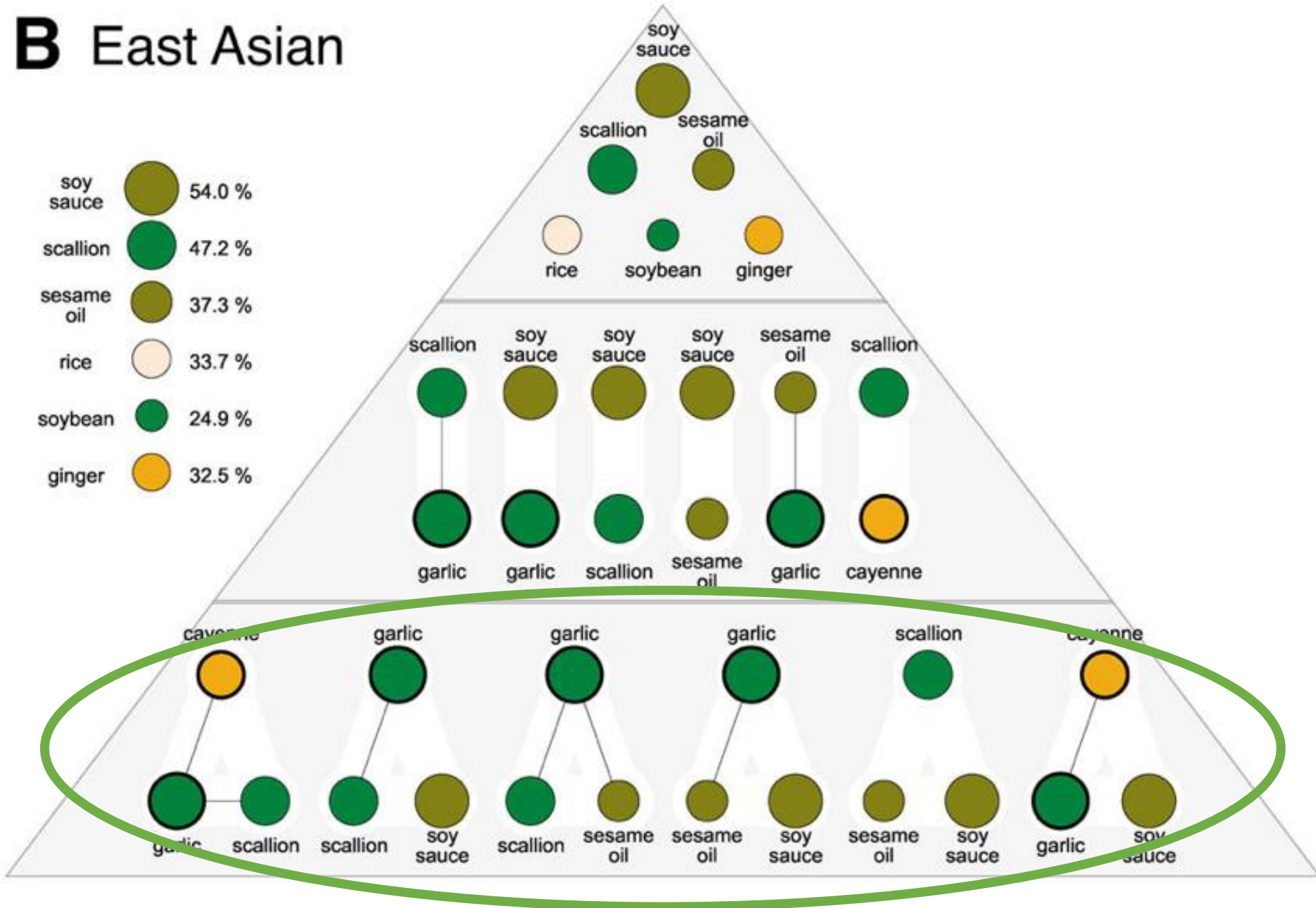
Number of shared compounds



B East Asian



B East Asian



OPINION

Open Access

Network analysis and data mining in food science: the emergence of computational gastronomy

Sebastian E Ahnert

Abstract

The rapidly growing body of publicly available data on food chemistry and food usage can be analysed using data mining and network analysis methods. Here we discuss how these approaches can yield new insights both into the sensory perception of food and the anthropology of culinary practice. We also show that this development is part of a larger trend. Over the past two decades large-scale data analysis has revolutionized the biological sciences, which have experienced an explosion of experimental data as a result of the advent of high-throughput technology. Large datasets are also changing research methodologies in the social sciences due to the data generated by mobile communication technology and online social networks. Even the arts and humanities are seeing the establishment of 'digital humanities' research centres in order to cope with the increasing digitization of literary and historical sources. We argue that food science is likely to be one of the next beneficiaries of large-scale data analysis, perhaps resulting in fields such as 'computational gastronomy'.

Keywords: Networks, Data mining, Sensory science, Computational gastronomy, Flavour compounds

Computational
gastronomy

Curriculum development for
culinary and gastronomic
sciences in higher education

NOU GRAU INTERUNIVERSITARI (UB-UPC)

CIÈNCIES CULINÀRIES I GASTRONÒMIQUES



Entitats promotores:



CETT



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Centre Superior d'Agricultura de Barcelona



Amb la col·laboració:





FIRST CYCLE DEGREE

GASTRONOMIC SCIENCE

(COD. 3001)

[WEBSITE](#)

A.Y. 2015/2016

CLASS:

L-26 - Classe delle lauree in Scienze e tecnologie alimentari

Years of study: 3

Credits (CFU): 180

First cycle degree

[FOOD SCIENCE AND TECHNOLOGY](#)

Second cycle degree

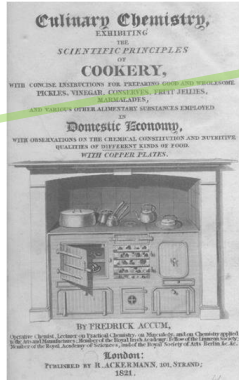
[FOOD SCIENCE AND TECHNOLOGY](#)

Single cycle degree course 5 years

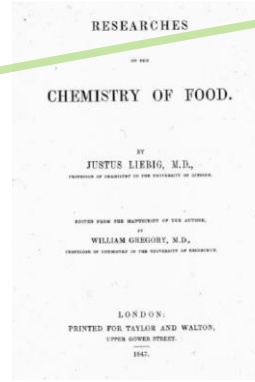
[PHARMACEUTICAL CHEMISTRY AND TECHNOLOGY](#)

[PHARMACY](#)

The relationship between science and cooking in the XIX



1821



1850



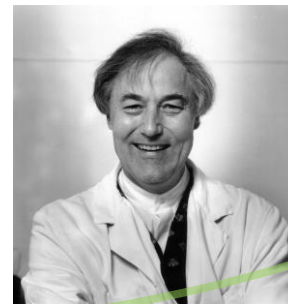
1895

Nicholas Kurti. 1969. *The Physicist in the Kitchen*



I think it is a sad reflection on our civilization that while we can and do measure the temperature in the atmosphere of Venus we do not know what goes on inside our soufflé.

Molecular and Physical Gastronomy in the 80s



Nicholas Kurti, Harold McGee and Hervé This

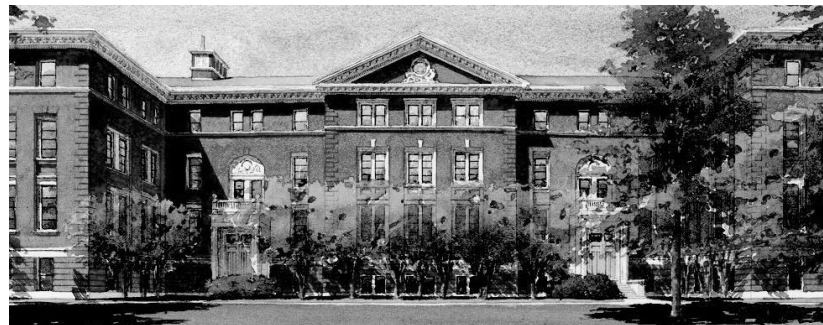
2003



Scientific Department at elBulli



Alicia Foundation



2010

Science and Cooking at Harvard University

From **cooking**
to **science**

From **science**
to **cooking**



Nicholas Kurti. 1969
The Physicist in the Kitchen



Ferran Adrià. 2003
Scientific Department at elBulli





Appetit

Inspiración culinaria

+

Big Data

Telefónica



Campus
de l'Alimentació

Universitat de Barcelona



UNIVERSITAT DE
BARCELONA

<http://appetit.lab.tid.es>

<https://www.youtube.com/watch?v=FUI2TJ13UWI>



Food-Bridging: A New Network Construction to Unveil the Principles of Cooking

Tiago Simas^{1,2}, Michal Ficek¹, Albert Diaz-Guilera^{3,4}, Pere Obrador¹ and Pablo R. Rodriguez¹*

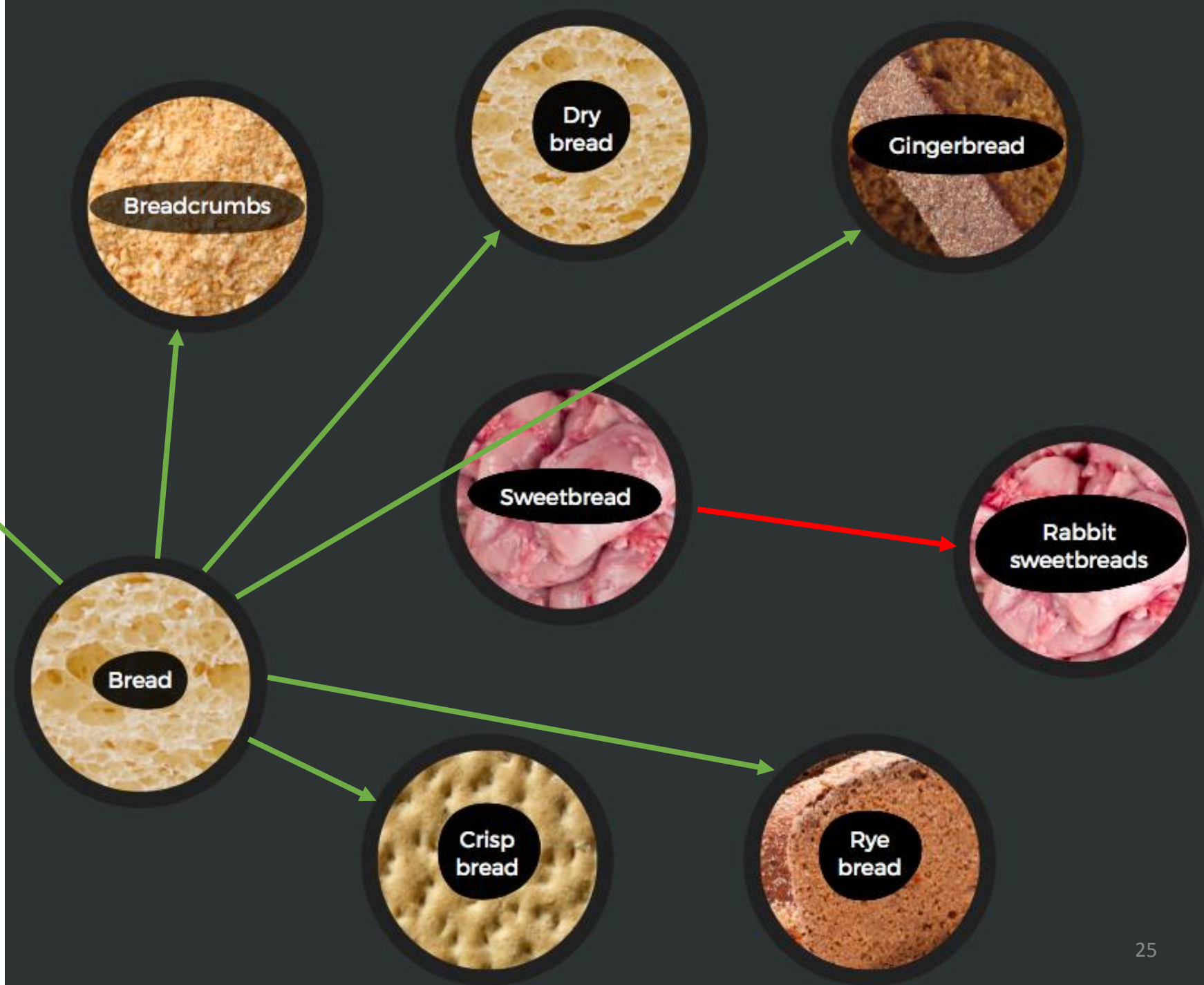
¹ Telefonica Research, Edificio Telefonica, Barcelona, Spain, ² Department of Psychiatry, University of Cambridge, Cambridge, United Kingdom, ³ Departament de Física de la Materia Condensada, Universitat de Barcelona, Barcelona, Spain, ⁴ Universitat de Barcelona Institute of Complex Systems (UBICS), Universitat de Barcelona, Barcelona, Spain

In this manuscript, we propose, analyze, and discuss a possible new principle behind traditional cuisine: the Food-bridging hypothesis and its comparison with the food-pairing hypothesis using the same dataset and graphical models employed in the food-pairing study by Ahn et al. (2011). The Food-bridging hypothesis assumes that if two ingredients do not share a strong molecular or empirical affinity, they may become affine through a chain of pairwise affinities. That is, in a graphical model as employed by Ahn et al., a chain represents a path that joints the two ingredients, the shortest path represents the strongest pairwise chain of affinities between the two ingredients. Food-pairing and











Skimmed milk



Goat milk



Condensed milk



Milk gianduja



Evaporated milk



Milk powder



Almond milk



Cooking milk chocolate



Skimmed powdered milk



Milk



Buttermilk



Coconut milk



Fermented milk



Milk chocolate



Raw pine nut milk



Skimmed milk



Goat milk



Condensed milk



Milk gianduja



Evaporated milk



Milk powder



Almond milk



Cooking milk chocolate



Skimmed powdered milk



Milk



Buttermilk



Coconut milk



Fermented milk



Milk chocolate



Raw pine nut milk

Categories ▾

Elaboration ▾

Nutrition ▾ ✓



- All
- Alcohol-Free
- Celery-Free
- Dairy-Free ✓**
- Egg-Free
- Fat-Free
- Fish-Free
- Gluten-Free
- Lupin-Free
- Milk-Free
- Mustard-Free
- Peanut-Free
- Pork-Free
- Sesame-Free
- Shellfish-Free
- Soy-Free
- Sulphites-Free
- Tree-Nut-Free
- Vegan
- Vegetarian
- Wheat-Free

Alfalfa sprouts

Almond

+ Add

i Info

+ Add

i Info



Anchovy

Anise oil

+ Add

i Info

+ Add

i Info



Skimmed milk



Goat milk



Condensed milk



Milk gianduja



Evaporated milk



Milk powder



Almond milk



Cooking milk chocolate



Skimmed powdered milk



Milk



Buttermilk



Coconut milk



Fermented milk



Milk chocolate



Raw pine nut milk



**Roasted
almond**



Almond



**Fried
almond**



**Bitter
almond**



**Tender
almond**



**Fried
almond
oil**



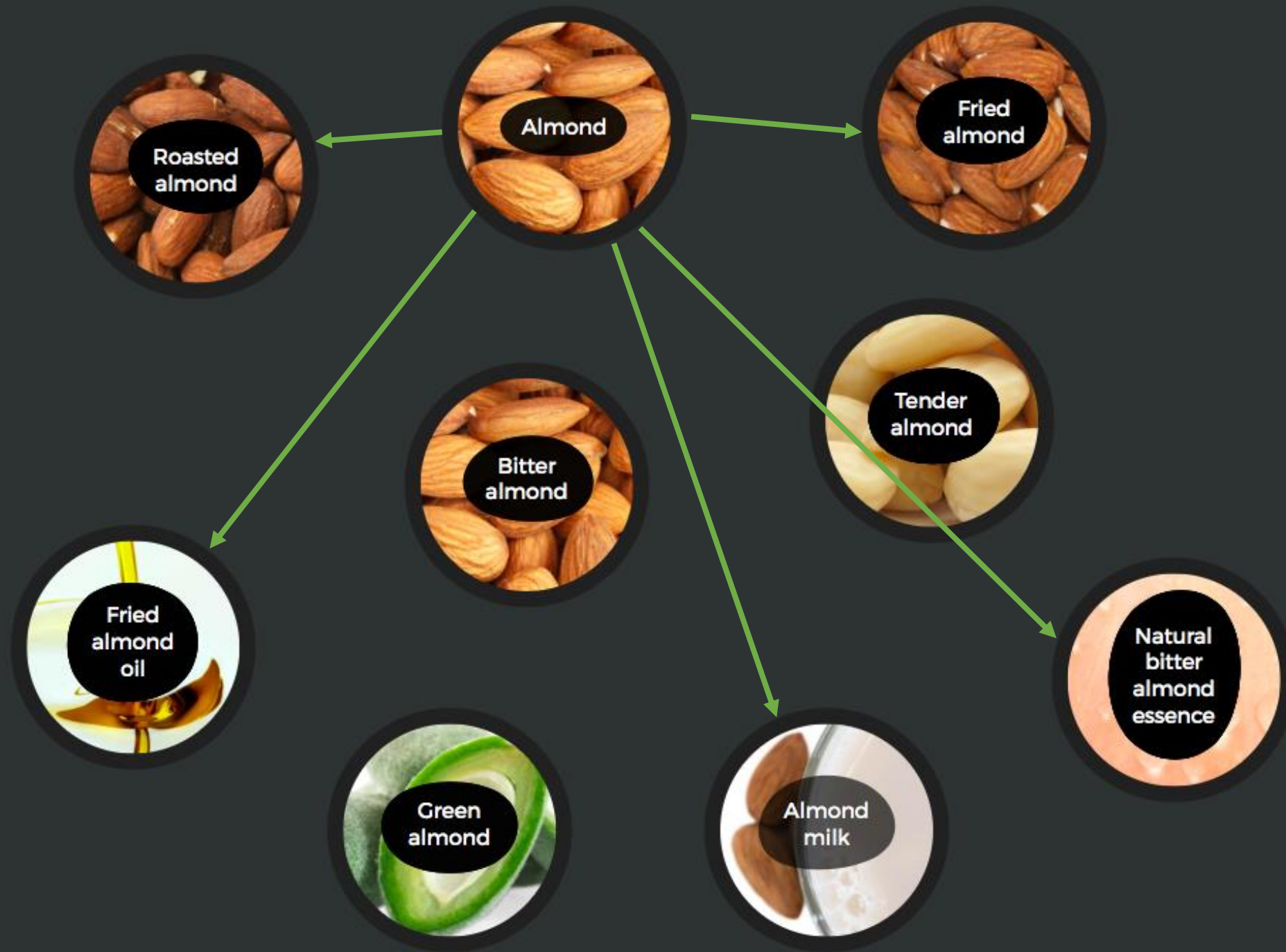
**Green
almond**



**Almond
milk**



**Natural
bitter
almond
essence**





Roasted almond



Almond



Fried almond



Bitter almond



Tender almond



Fried almond oil



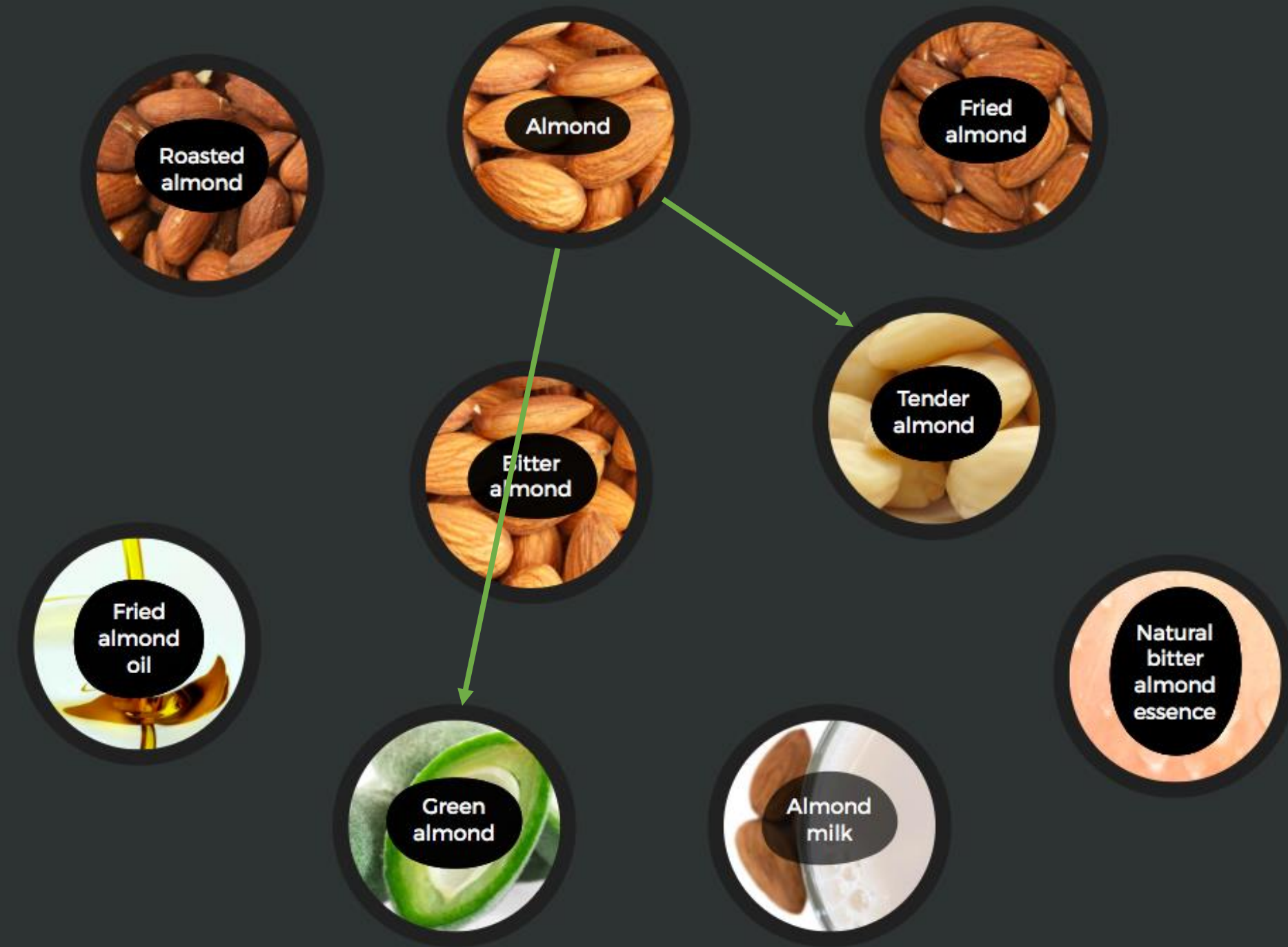
Green almond

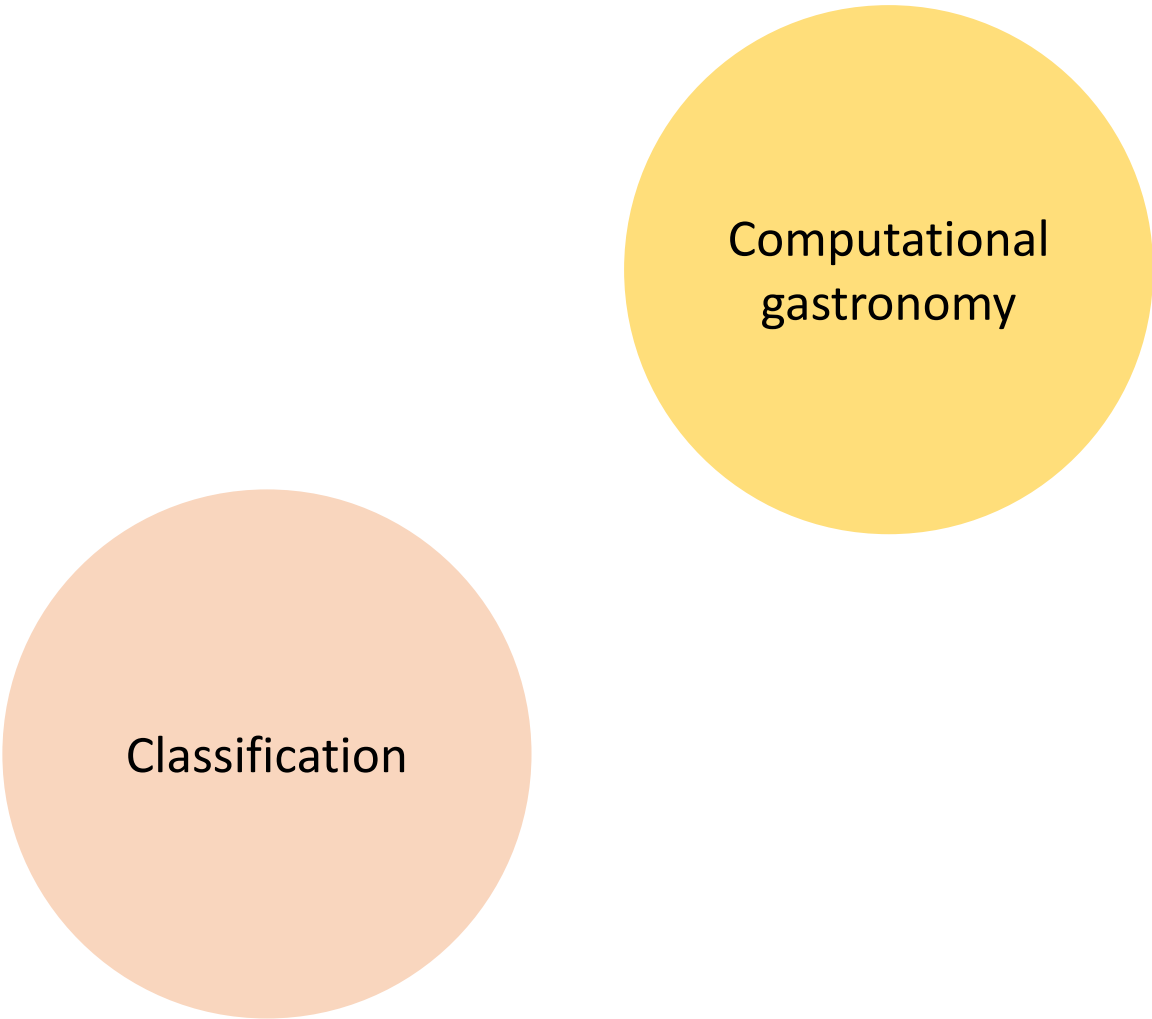


Almond milk



Natural bitter almond essence





Computational
gastronomy

Classification



FOOD, CULTURE & SOCIETY

2017

Classification of Unelaborated Culinary Products: Scientific and Culinary Approaches Meet Face to Face

**Ugo D'Ambrosio^{a,b†}, Marta Vila^{a†}, Ferran
Adrià^c, Laura Bayés-García^a, Sergio
Calsamiglia^d, Pere Castells^a, Oriol Castro^c,
Teresa Garnatje^b, Joaquim Gosálbez^a, Joan
Jofre^a, Abel Mariné^a, Lourdes Reig^e, Màrius
Rubiralta^a, Eduard Xatruch^c and Joan Vallès^a**

*^aUniversitat de Barcelona; ^bInstitut Botànic de Barcelona
(IBB-CSIC-ICUB); ^cEiBullifoundation; ^dUniversitat Autònoma de
Barcelona; ^eUniversitat Politècnica de Catalunya*

Table 1. Overall classification of major culinary elements in an increasing ranking order.

1st rank	2nd rank	3rd rank: Worlds	4th rank: Levels & categories	Example of primary level
Unelaborated products	Living beings	Plants and fungi	Primary to up to tertiary levels	Apple tree (<i>Malus domestica</i>) Portobello mushroom (<i>Agaricus bisporus</i>)
		Animals	Primary to up to quaternary levels	Brown trout (<i>Salmo trutta</i>)
		Microorganisms	Primary to up to secondary levels	Yeast (<i>Saccharomyces cerevisiae</i>)
	Inorganic materials	Waters	–	Spring water (H ₂ O)
		Minerals	–	Sea salt (NaCl and other salts)

Living beings
> Plants and fungi
> Terrestrial
> Plants



PRIMARY LEVEL
Tree
Almond tree

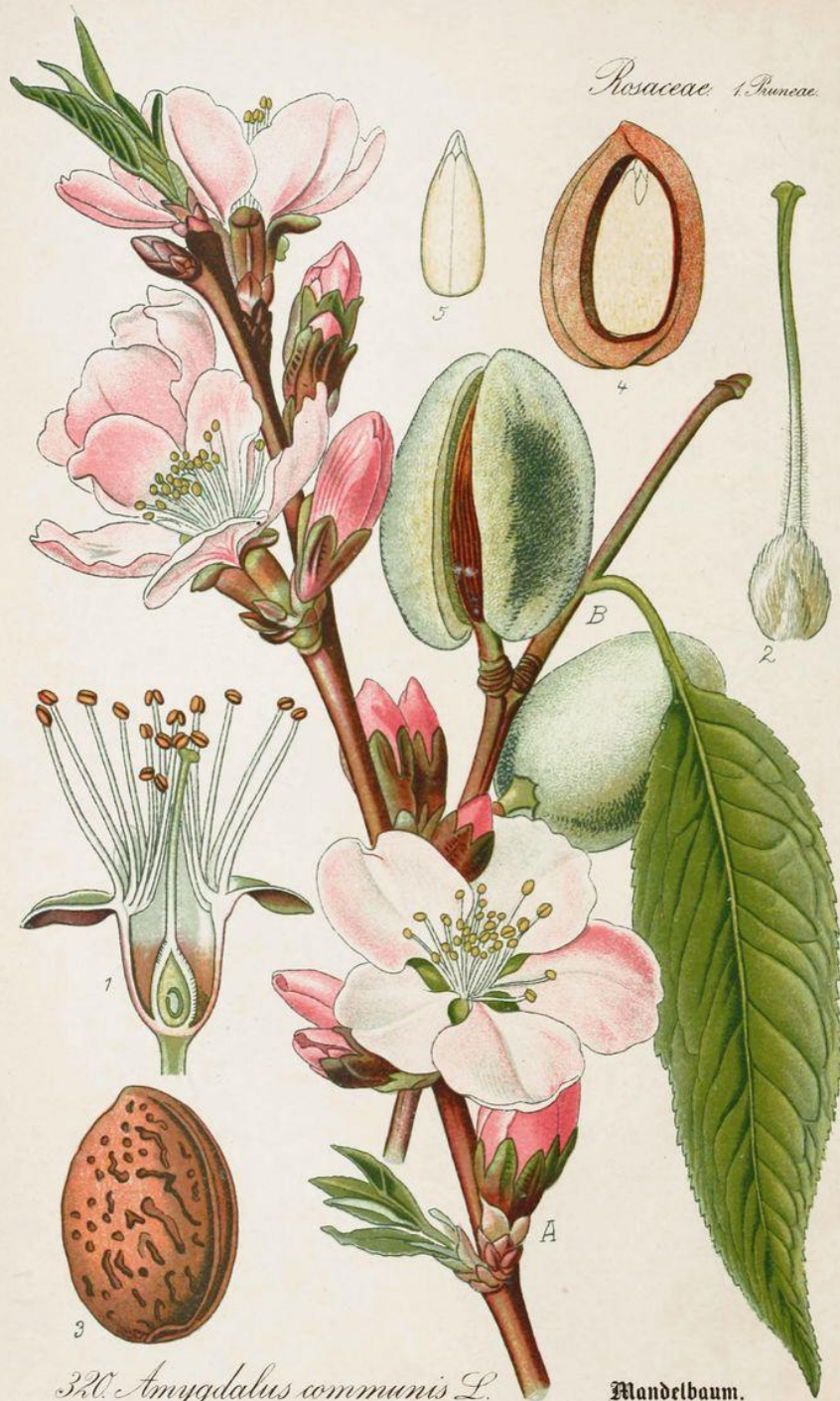


SECONDARY LEVEL
Fruit
Green almond



TERTIARY LEVEL
Seed
Shelled almond

Rosaceae 1. Prunaceae.



320. *Amygdalus communis* L.

Mandelbaum.

Living beings
> Plants and fungi
> Terrestrial
> Plants



PRIMARY LEVEL
Tree
Almond tree



SECONDARY LEVEL
Fruit
Green almond



TERTIARY LEVEL
Seed
Shelled almond

Living beings
> Plants and fungi
> Terrestrial
> Plants



PRIMARY LEVEL
Tree
Almond tree



SECONDARY LEVEL
Fruit
Green almond



TERTIARY LEVEL
Seed
Shelled almond

Living beings
> Plants and fungi
> Terrestrial
> Plants



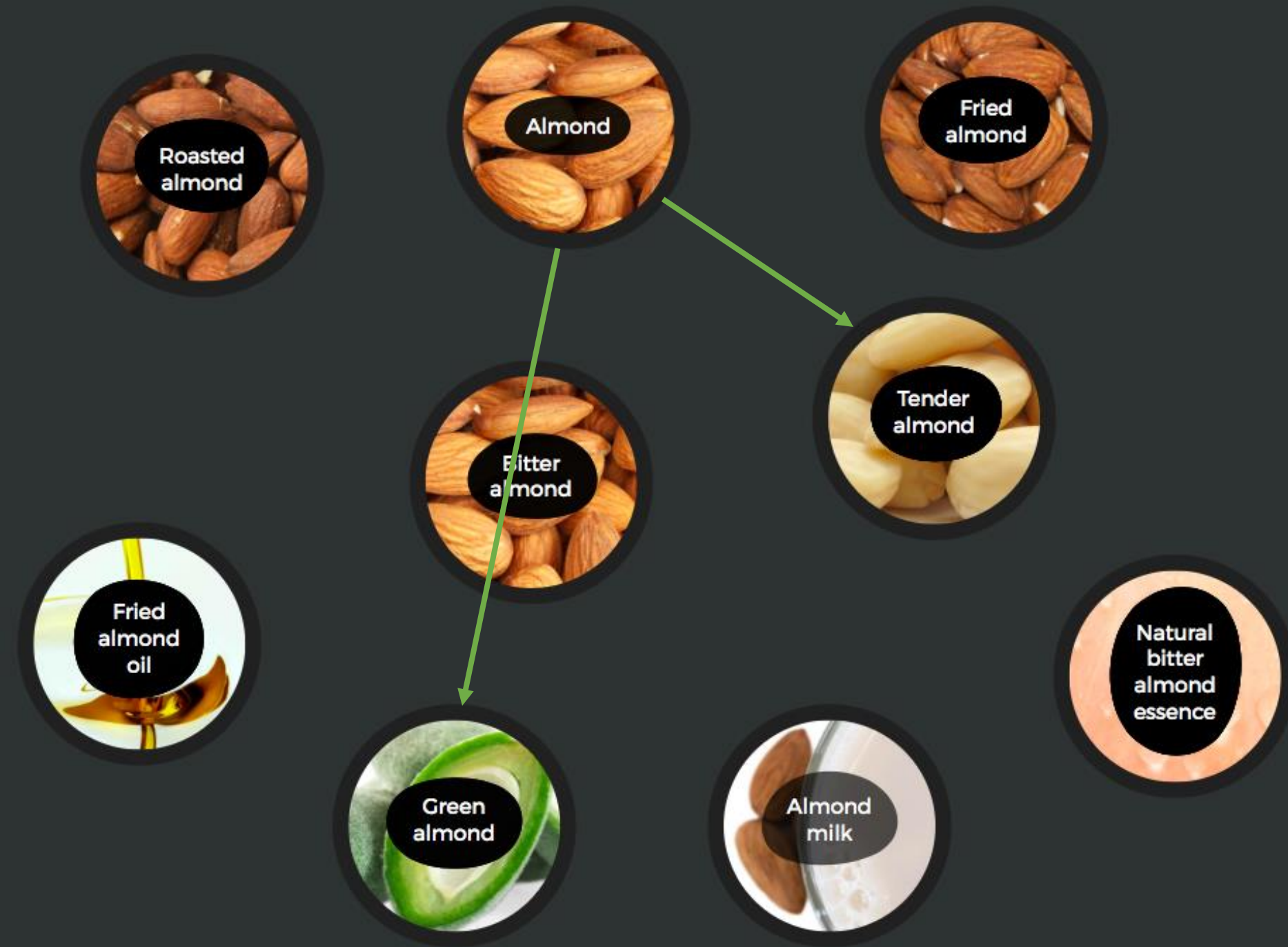
PRIMARY LEVEL
Tree
Almond tree

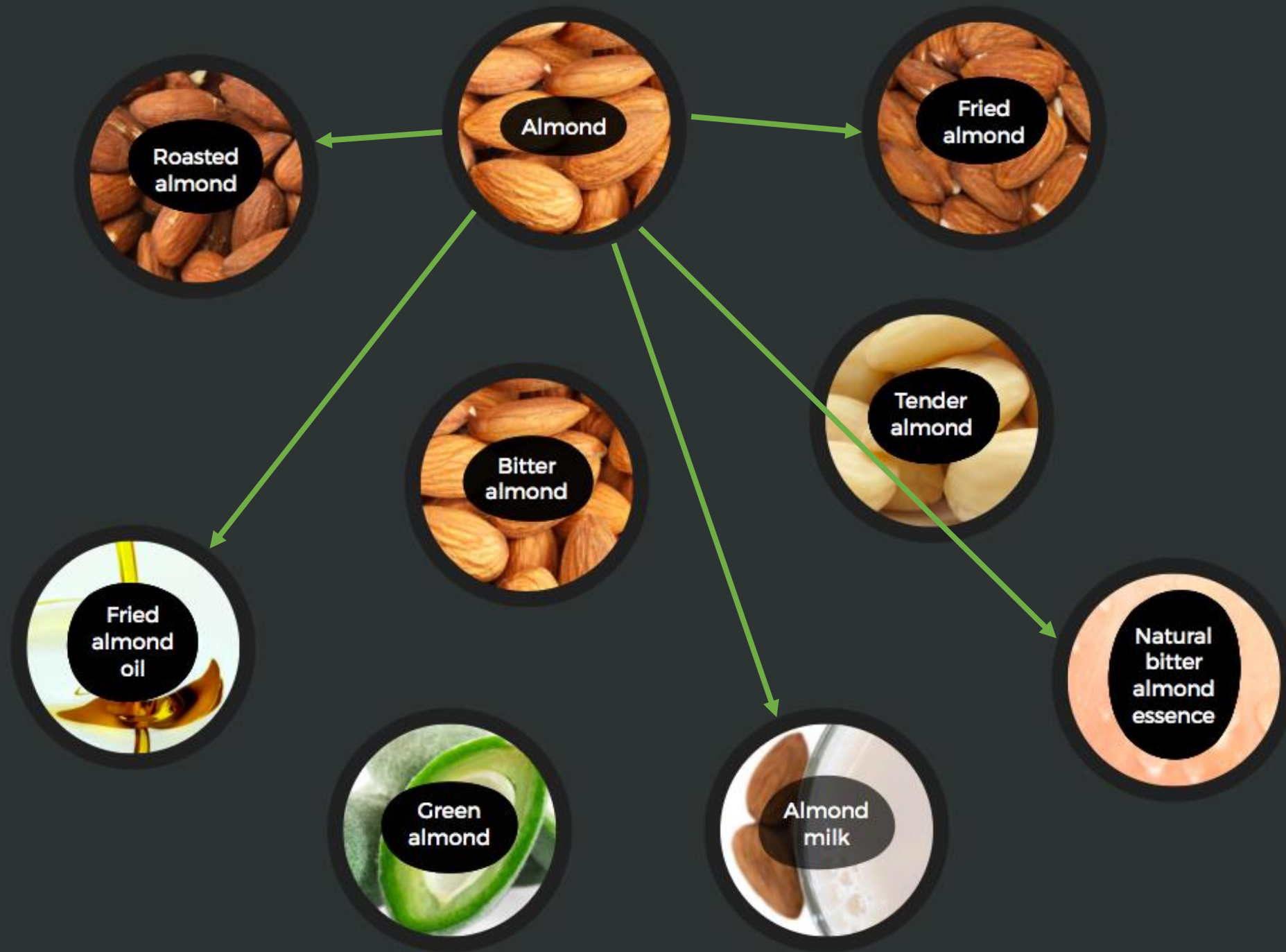


SECONDARY LEVEL
Fruit
Green almond



TERTIARY LEVEL
Seed
Shelled almond







Roasted almond



Almond



Fried almond



Tender almond



Bitter almond



Fried almond oil



Natural bitter almond essence



Green almond



Almond milk



Ingredient, technique and relationship



Ingredients

Elaboration




Information extraction and
Natural Language Processing

Allioli


Ingredients
2 grans d'**all**
15 cl d'**oli d'oliva**
Sal

Elaboració
En un morter amb una mica de sal, **piqueu**-hi els alls fins a fer-ne una pasta molt fina.
A continuació **afegiu**-hi l'oli **de gota en gota** i **aneu-ho remenant** sense parar amb la mà de morter, fins a aconseguir una salsa ben espessa i compacta.


Comparative analysis

A circular image showing a reddish-brown, crystalline substance, likely muscovado sugar gelatin.


Muscovado
sugar
gelatin

A circular image showing a fine, white, powdery substance, likely icing sugar.


Icing
sugar

A circular image showing a coarse, brown, granular substance, likely palm sugar.

Palm
sugar

A circular image showing a coarse, brown, granular substance, likely muscovado sugar.


Muscovado
sugar

A circular image showing a coarse, yellowish-brown, granular substance, likely spicy sugar.


Spicy
sugar

A circular image showing several stalks of green sugarcane.


Sugarcane

A circular image showing a fine, white, crystalline substance, likely sugar.


Sugar

A circular image showing a coarse, yellowish-brown, granular substance, likely brown sugar.


Brown
sugar

A circular image showing a smooth, light orange-brown liquid, likely inverted sugar.


Inverted
sugar

A circular image showing a smooth, dark orange-brown liquid, likely caramelized sugar.


Caramelized
sugar

A circular image showing a reddish-brown, crystalline substance, likely muscovado sugar gelatin.

Muscovado
sugar
gelatin

A circular image showing a fine, white, powdery substance, likely icing sugar.


Icing
sugar

A circular image showing a coarse, brown, granular substance, likely palm sugar.


Palm
sugar

A circular image showing a dark brown, swirling liquid, likely dark caramel.

Dark
caramel

A circular image showing a coarse, brown, granular substance, likely muscovado sugar.


Muscovado
sugar

A circular image showing a coarse, yellowish-brown, granular substance, likely spicy sugar.


Spicy
sugar

A circular image showing several stalks of green sugarcane.


Sugarcane

A circular image showing a fine, white, crystalline substance, likely sugar.


Sugar

A circular image showing a coarse, yellowish-brown, granular substance, likely brown sugar.

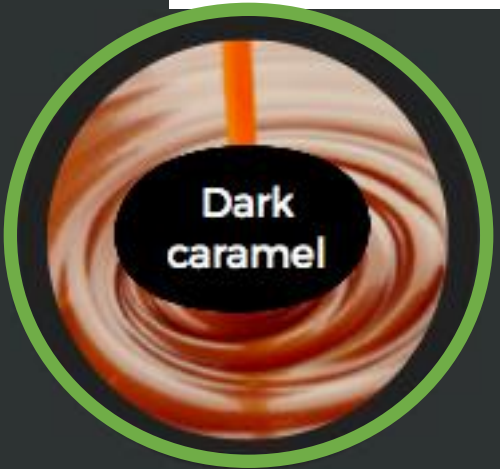
Brown
sugar

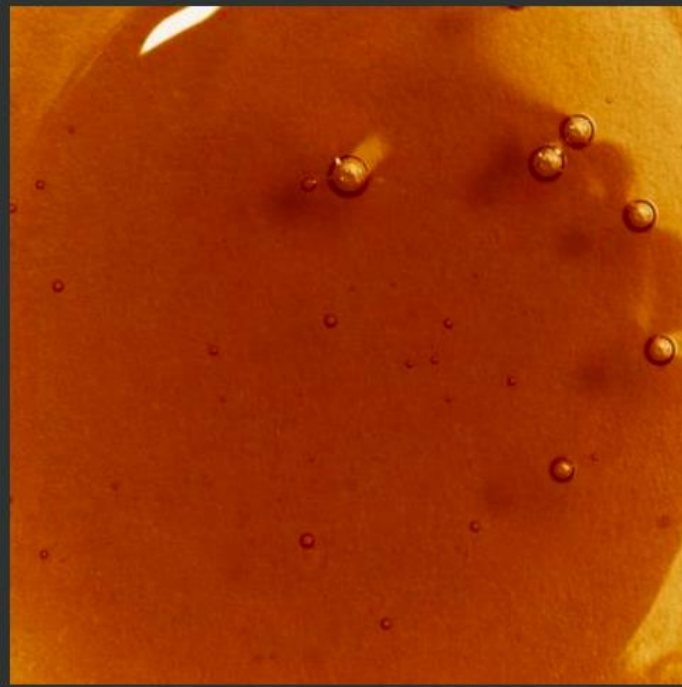
A circular image showing a smooth, light orange liquid, likely inverted sugar.

Inverted
sugar

A circular image showing a dark brown, thick liquid with small bubbles, likely caramelized sugar.

Caramelized
sugar





Caramelized sugar

Category: [Caramel](#)



Sugar is the generalized name for sweet, short-chain, soluble carbohydrates, many of which are used in food. They are carbohydrates, composed of carbon, hydrogen, and oxygen. There are various types of sugar derived from different sources. Simple sugars are called monosaccharides and include glucose (also known as dextrose), fructose and galactose. The table or granulated sugar most customarily used as food is sucrose, a disaccharide. (In the body, sucrose hydrolyses into fructose and glucose.) Other disaccharides include maltose and lactose. Longer chains of sugars are called oligosaccharides. Chemically-different substances may also have a sweet taste, but are not classified as sugars. Some are used as lower-calorie food substitutes for sugar described as artificial sweeteners. (from [Wikipedia](#))

Nutrition: [Peanut-Free](#), [Lupin-Free](#), [Celery-Free](#)



Dark caramel

Category: [Caramel](#)



Caramel ([/ˈkærəmɛl/](#) or [/ˈkɑrməl/](#)) is a beige to dark-brown confectionery product made by heating a variety of sugars. It can be used as a flavoring in puddings and desserts, as a filling in bonbons, or as a topping for ice cream and custard. (from [Wikipedia](#))

Nutrition: [Peanut-Free](#), [Lupin-Free](#), [Celery-Free](#)

Disclaimer

These allergy and intolerance labels are part of an ongoing development project, and therefore, in evolution. This information has been obtained from different publicly available sources, but this is merely a guiding point; therefore, Telefonica is not accountable for, neither the possible errors these labels may have, nor the consequences they may cause.

For information purposes, we show some of the sources we have used below:



Caramelized sugar



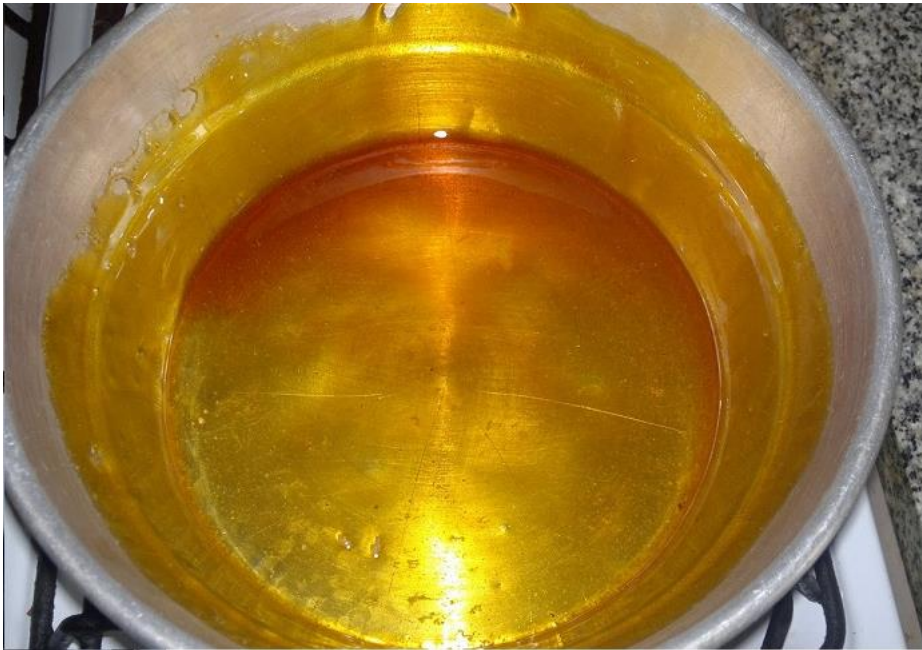
Dark caramel



Caramelized sugar
Liquid stage sugar



Dark caramel
Burnt sugar



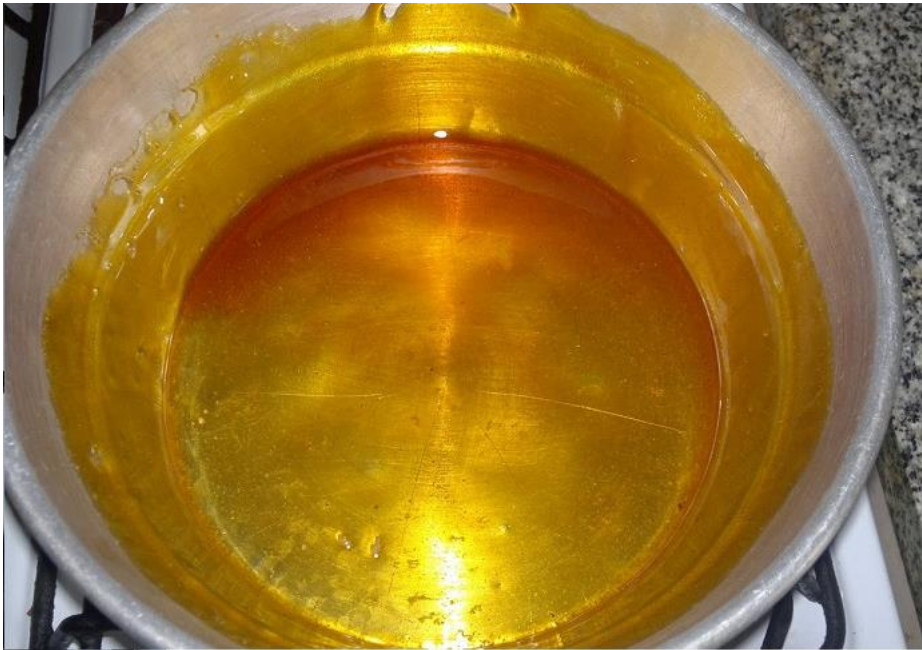
Caramelized sugar
Liquid stage sugar

ca - punt de caramel
es - punto de caramelo
fr - caramel
it - zuccherò caramellato
it - caramello



Dark caramel
Burnt sugar

ca - sucre cremat
es - azúcar quemado
es - punto de caramelo
fr - caramel brun
fr - caramel foncé
it - caramello scuro



Caramelized sugar

The result of heating syrup to a temperature between 150 and 170°C. This is when caramelization takes place.



Dark caramel

The result of heating syrup to a temperature between 170 and 190°C. This is when the syrup boils and loses its sweetness.

Computational
gastronomy

Classification

Terminology

CLAUDI MANS

LA VACA ESFÈRICA

Conceptes científics quotidians
que, d'entrada, jo no devia
entendre prou bé



Coent sucre: fils, volants i boles

29/09/2015



©iStock-stray_cat

Quan es posa al foc, el sucre, sol o amb una mica d'aigua, canvia ràpidament de temperatura i experimenta diferents transformacions. Cada fase o estadi de cocció es defineix per un interval de temperatura i per una viscositat i té utilitats concretes en cuina i pastisseria.

Les diferents fases de cocció del sucre es poden comprovar de diverses maneres. La manera més precisa d'elaborar **xarop** al punt de cocció que es necessita és mesurant-ne la densitat (en **graus Brix**) i la temperatura (en graus centígrads). Tanmateix, hi ha una manera tradicional de detectar les fases de cocció del sucre sense aparells de mesura ni escales de cap mena, i de manera igualment precisa. Això és mitjançant el tacte amb els dits polze i índex, i amb estris de cuina tan senzills com una cullera o una escumadora, a partir d'unes característiques físiques particulars basades en la viscositat del xarop, és a dir, la resistència que ofereix el fluid al moviment relatiu de les seves partícules. I una bona vista.

Per mirar de fixar i acordar les denominacions catalanes adequades per a cada fase i delimitar els conceptes, sobretot pel que fa a l'interval de temperatura a què correspon cadascuna, vam reunir al TERMCAT uns quants especialistes de l'àmbit de la pastisseria, vinculats a la **UB-Bullipèdia**. Els resultats d'aquesta reunió, amb aportacions també d'altres especialistes, van ser estudiats i ratificats posteriorment pel Consell Supervisor.

Els diferents punts de cocció d'un xarop tenen uns noms tan descriptius i suggeridors com **punt de fil**, **punt volant**, **punt de bola** o **punt de caramel**. Per exemple, se submergeixen els dits polze i índex en aigua freda i tot seguit s'agafa una mica de xarop, se separen els dits i el xarop agafa la forma de fil, fins que es trenca (**punt de fil**). El fil pot trencar-se de seguida (**fil fluix**) o pot arribar a ser una mica més llarg i trigar una mica més a trencar-se (**fil fort**). O bé s'agafa xarop amb una escumadora i se'l fa passar, bufant, a través dels forats i el xarop forma bombolles (**punt volant**). Es pot agafar també amb una cullera, submergir-la un moment en un recipient amb aigua freda, i llavors agafar el xarop amb els dits i formar una bola (**punt de bola**) que es pot aixafar més fàcilment o no tant. O quan, a mesura que es va escalfant, el xarop va agafant color, ens hem de fixar en tota la gamma de grocs, ocres i marrons per determinar quin **punt de caramel** tenim. Fins que el xarop forma escuma a la superfície, aleshores tenim **sucre cremat**, que ja no és dolç, encara que es digui sucre, i és l'últim sospir abans de la carbonització.

Tot aquest món de termes al voltant de la cocció del sucre el podeu trobar en forma de fitxes terminològiques a la **Neoloteca** i al **Cercaterm**.





Ingredient, technique and relationship



Ingredients

Elaboration



Information extraction and
Natural Language Processing

Allioli

Ingredients

2 grans d'all
15 cl d'oli d'oliva
Sal

Elaboració

En un morter amb una mica de sal, **piqueu**-hi els alls fins a fer-ne una pasta molt fina.

A continuació **afegiu**-hi l'oli **de gota en gota** i **aneu-ho remenant** sense parar amb la mà de morter, fins a aconseguir una salsa ben espessa i compacta.

Comparative analysis

OIL JELLY

La gelatina d'oli és una elaboració d'oli d'oliva...

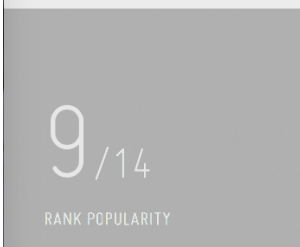


14 / 14

RANK POPULARITY

OIL AIR

L'aire d'oli o escuma lleugera d'oli, és una...

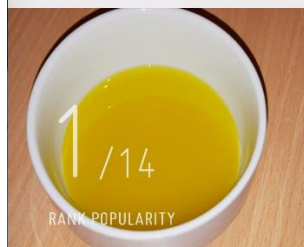


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RANK POPULARITY

OIL CREAM

La crema d'oli és una elaboració d'oli d'oliva...



1 / 14

RANK POPULARITY

MAYONNAISE - OLIVE OIL

La maionesa d'oli o emulsió d'oli és una...



8 / 14

RANK POPULARITY

BUTTER OIL

La mantega d'oli d'oliva és una elaboració d'oli...



2 / 14

RANK POPULARITY

OIL CLOUD

El núvol d'oli és una elaboració gastronòmica d'...

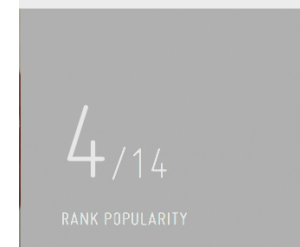


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RANK POPULARITY

ENCAPSULATED OIL

L'encapsulació d'oli és un procediment per crear...

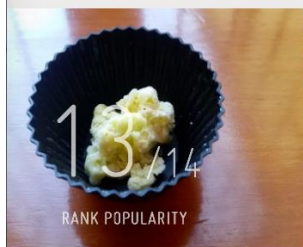


4 / 14

RANK POPULARITY

OIL POPCORN

Les crispetes d'oli són una elaboració d'oli...



13 / 14

RANK POPULARITY

OIL FOAM

L'escuma d'oli és una elaboració d'oli texturizat...



6 / 14

RANK POPULARITY

OIL DESTILLATE

El destil·lat d'oli és una elaboració...



10 / 14

RANK POPULARITY

OIL HONEY

La mel d'oli és una elaboració d'oli d'oliva...



12 / 14

RANK POPULARITY

OIL CREAM CARAMEL

El flam d'oli és una elaboració d'oli d'oliva ...

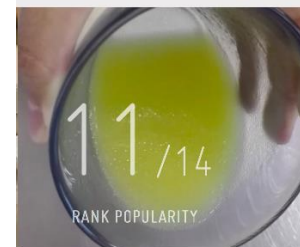


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RANK POPULARITY

SOPA D'OLI

La sopa d'oli és una elaboració d'oli d'oliva...



11 / 14

RANK POPULARITY

OIL POWDER

La pols d'oli, també anomenada oli polvoritzat o ...



3 / 14

RANK POPULARITY

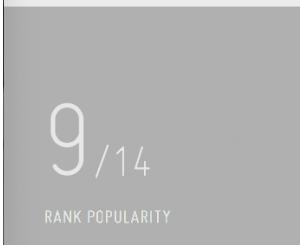
OIL JELLY

La gelatina d'oli és una elaboració d'oli d'oliva...



OIL AIR

L'aire d'oli o escuma lleugera d'oli, és una...



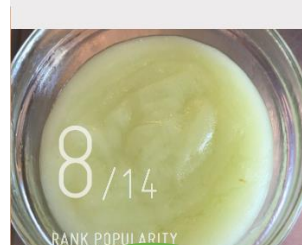
OIL CREAM

La crema d'oli és una elaboració d'oli d'oliva...



MAYONNAISE - OLIVE OIL

La maionesa d'oli o emulsió d'oli és una...



BUTTER OIL

La mantega d'oli d'oliva és una elaboració d'oli...



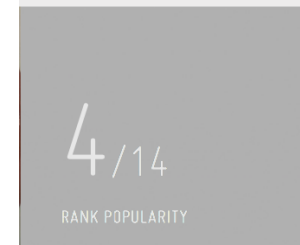
OIL CLOUD

El núvol d'oli és una elaboració gastronòmica d'...



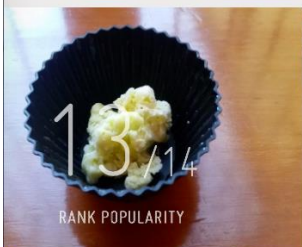
ENCAPSULATED OIL

L'encapsulació d'oli és un procediment per crear...



OIL POPCORN

Les crispetes d'oli són una elaboració d'oli...



OIL FOAM

L'escuma d'oli és una elaboració d'oli texturizat...



OIL DESTILLATE

El destil·lat d'oli és una elaboració...



OIL HONEY

La mel d'oli és una elaboració d'oli d'oliva...



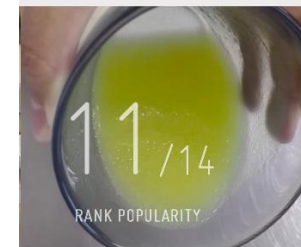
OIL CREAM CARAMEL

El flam d'oli és una elaboració d'oli d'oliva ...



SOPA D'OLI

La sopa d'oli és una elaboració d'oli d'oliva...



OIL POWDER

La pols d'oli, també anomenada oli polvoritzat o ...



ca-mel d'oli
ca-mel d'oli d'oliva
es- miel de aceite
es-miel de aceite de oliva
en-oil honey
en-olive oil honey
en-honey of oil
en-honey of olive oil
fr-miel d'huile
fr-miel d'huile d'olive
fr-miel à l'huile
fr-miel à l'huile d'olive



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Pàgina **Discussió**

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Mel d'oli

La **mel d'oli** és una elaboració d'oli d'oliva texturitzat, viscosa, dolça i groguenca, feta amb [aigua](#), [oli d'oliva](#) i agents texturitzants ([isomalt](#) i [sucre](#)), que li confereixen una textura untuosa semblant a la [mel](#).^[1]^[2]^[3]

Composició i procés d'elaboració [\[modifica \]](#) [\[modifica el codi \]](#)

Aquesta elaboració consisteix en una dissolució de sucres ([isomalt](#), [sucre en pols](#) i [glucosa](#)) en aigua. En dissoldre's en aigua (medi líquid), els sucres (sòlids) formen enllaços temporals, però forts, ja que les partícules sòlides són atretes per les líquides, que trenquen la seva estructura rígida. Així les partícules disgregades del sòlid es van situant en els espais buits que hi ha entre les partícules de líquid i formen la dissolució. Mentre que l'oli no té gaire poder de dissolució de sucres i no s'arribarien a dissoldre i integrar correctament.^[*cal citació*]

Durant la primera fase d'elaboració de la recepta, l'aigua, a més de la seva afinitat per dissoldre sucres, es fa servir per poder aplicar calor als sucres i evitar que es caramel·litzin. L'elaboració del xarop a una temperatura de 90 °C permet augmentar la solubilitat de l'aigua. A més, els xarops a baixa temperatura es formen cristalls petits i fins.^[*cal citació*]

Per fer aquesta elaboració s'utilitzen tres tipus de sucre:^[*cal citació*]

- **Sucre llustre**: sacarosa amb un poder edulcorant del 100 %, ja que és el sucre de referència per als graus de dolçor. S'utilitza sobretot per aportar dolçor a l'elaboració, i perquè és fàcil de dissoldre en aigua, ja que és el segon sucre més soluble en aquest medi.
- **Glucosa en pols**: sucre amb una capacitat edulcorant del 75 %. S'usa per la capacitat que té de prevenir la cristal·lització dels sucres i d'aportar elasticitat a les masses. A més, retarda la dessecació dels productes i és un anticristal·litzant de gelats (elaboracions amb un alt contingut



ca-mel d'oli
ca-mel d'oli d'oliva
es- miel de aceite
es-miel de aceite de oliva
en-oil honey
en-olive oil honey
en-honey of oil
en-honey of olive oil
fr-miel d'huile
fr-miel d'huile d'olive
fr-miel à l'huile
fr-miel à l'huile d'olive

EN

OIL CREAM

POPULARITY

1 / 12

RANK

6
MENTIONS

OLIVE OIL
CREAM

POPULARITY

6 / 12

RANK

0
MENTIONS

CREAM OF OIL

POPULARITY

11 / 12

RANK

0
MENTIONS

CREAM OF OLIVE
OIL

POPULARITY

12 / 12

RANK

0
MENTIONS

EN

OIL DUST

POPULARITY

1 / 19

RANK

1
MENTIONS

OIL POWDER

POPULARITY

2 / 19

RANK

1
MENTIONS

OLIVE OIL
POWDER

POPULARITY

15 / 19

RANK

0
MENTIONS

OIL SOIL

POPULARITY

16 / 19

RANK

0
MENTIONS

OILE OIL SOIL

POPULARITY

17 / 19

RANK

0
MENTIONS

2
MENTIONS

Terminology from the Past to the Future

April 25, 2017 11:59 am



A box of cards

At a very young age I had the good luck and privilege of joining the **translation service** of an **international organisation**. I was fascinated by the **multilingual environment** which allowed me to use and practice all the languages I had studied, and also by the extremely interesting texts I had to translate in the European Parliament – for instance, the first Treaty of the European Union, high quality political speeches, reports in every field of the European legislation. It was easy to fall in love with my job, to fall in love with every single text that I was creating as my own new original in the target language. To always try to find the exact equivalent of the initial idea of the author, of the concept, and to transmit it to my reader with the **best terms** available. Because translating is a permanent exercise in **terminology**, and producing **quality translation** depends on the success of this exercise.



Terminology [...] provides the methodology for analysing and organising the semantic web, structuring big data, and streamlining philosophical thinking through the ontologies that connect related concepts. Thus we can say that terminology studies provide a new way of thinking and dealing with the semantic web.









Foam



Oil air



Oil foam

Computational
gastronomy

The diagram consists of three circles. A yellow circle at the top right is labeled 'Computational gastronomy'. Below it, on the left, are two overlapping circles: an orange one labeled 'Classification' and a green one labeled 'Terminology'. The orange and green circles overlap in the center, and the yellow circle is positioned to the right of this pair.

Classification

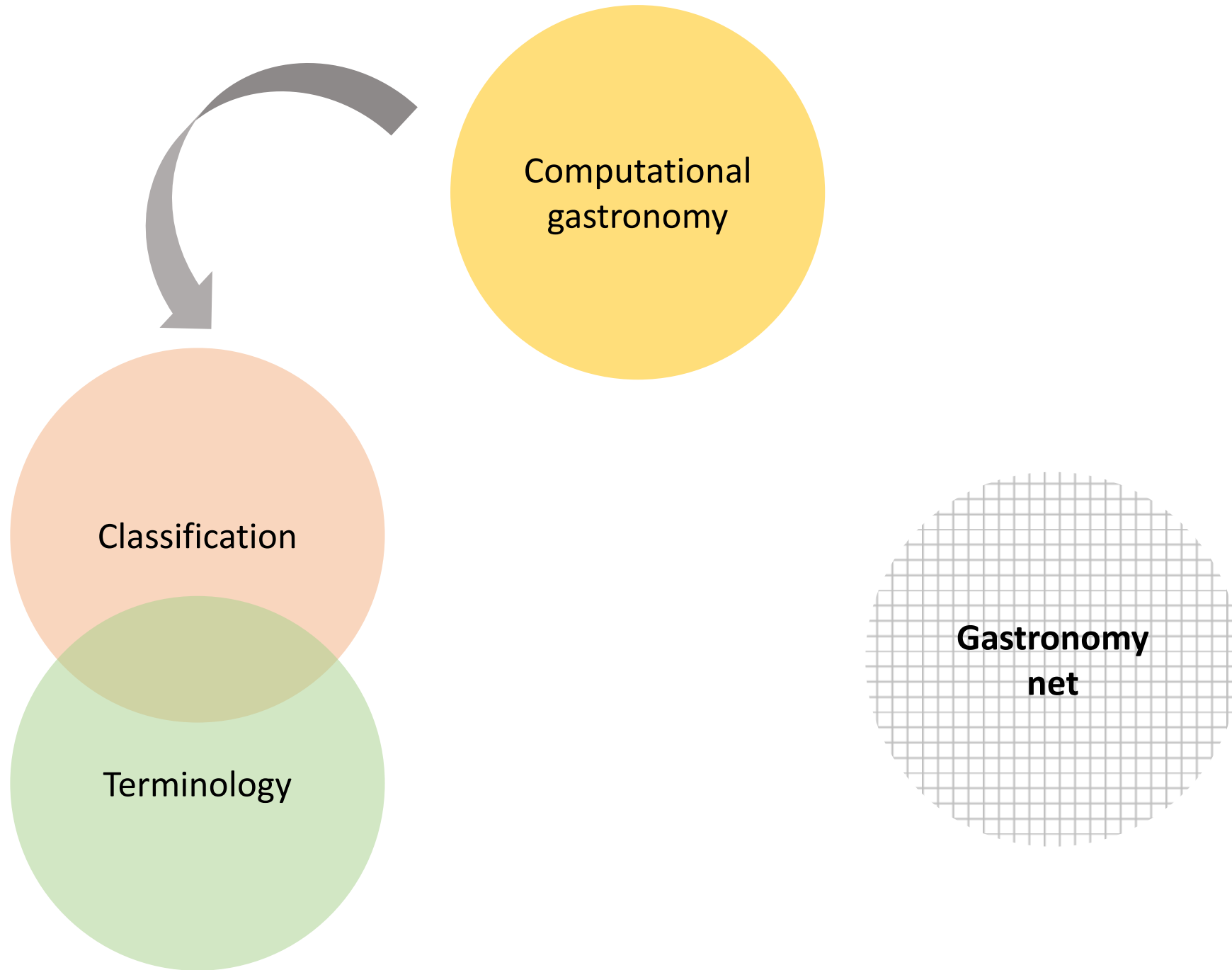
Terminology

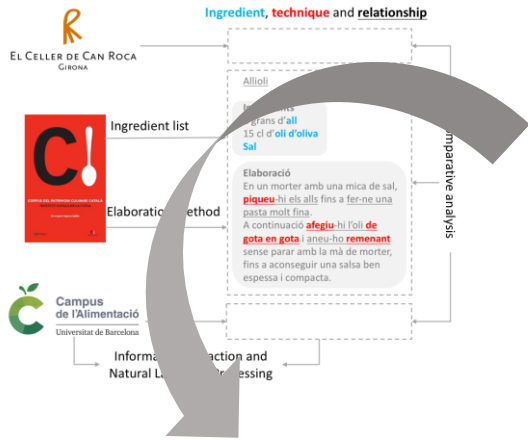
Computational
gastronomy

Classification

Terminology

**Gastronomy
net**



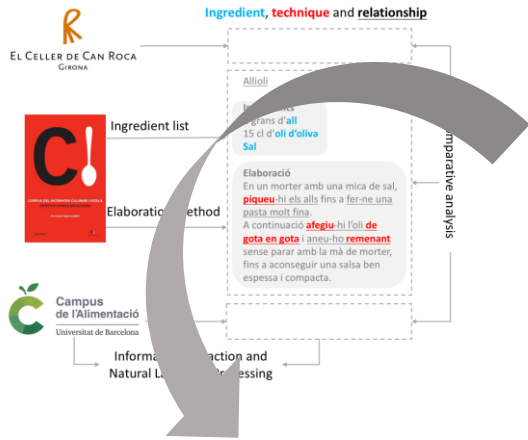


Computational gastronomy

Classification

Terminology

Gastronomy net

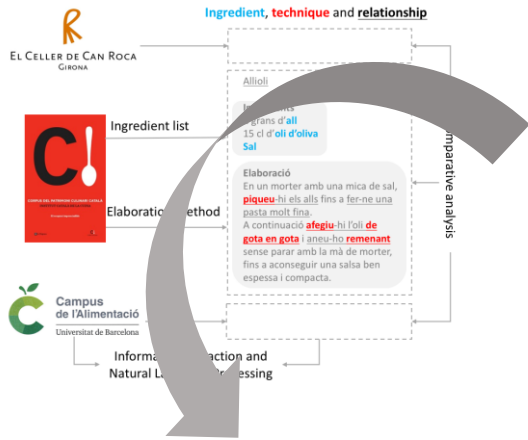


Computational gastronomy

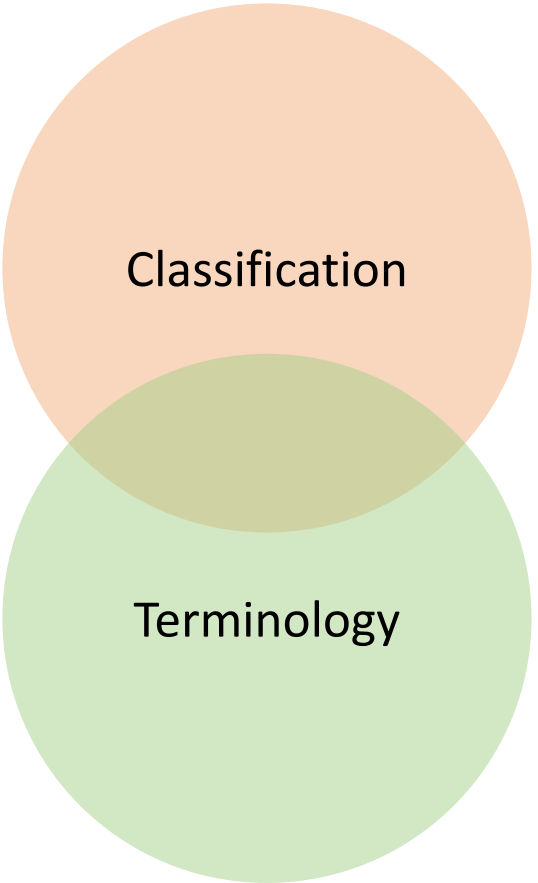
Classification

Terminology



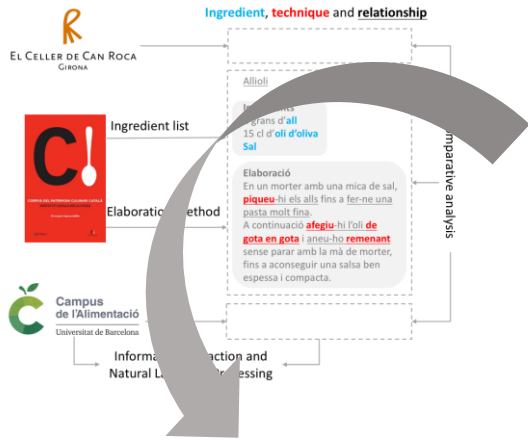


Computational gastronomy

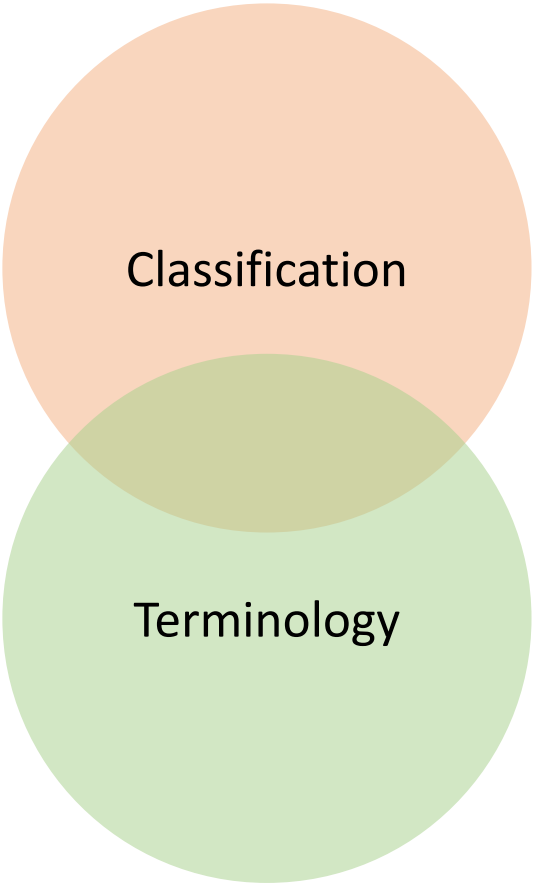


Computational gastronomy: a novel view to bridging the gap between science and the kitchen

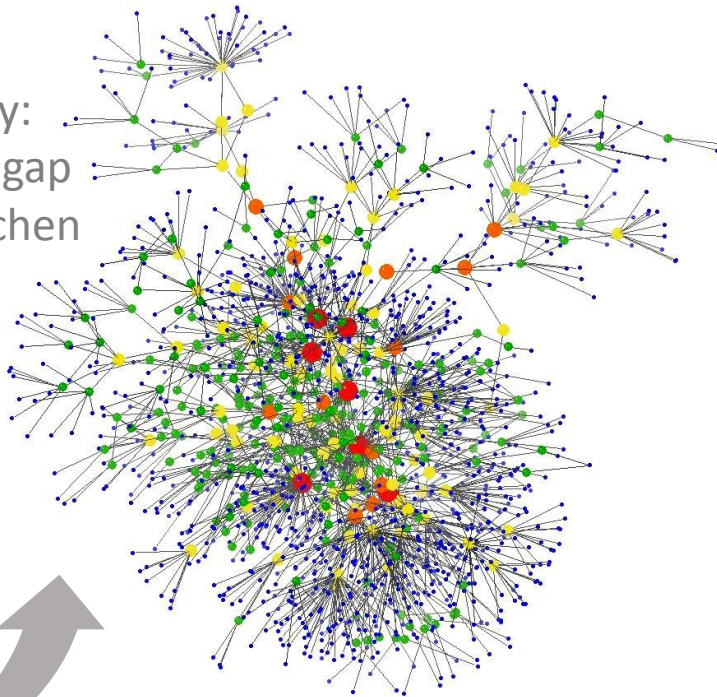


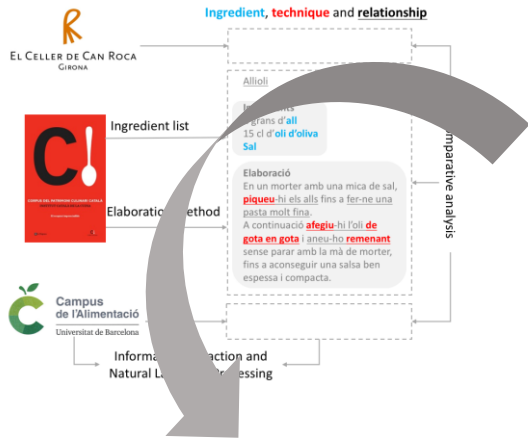


Computational gastronomy

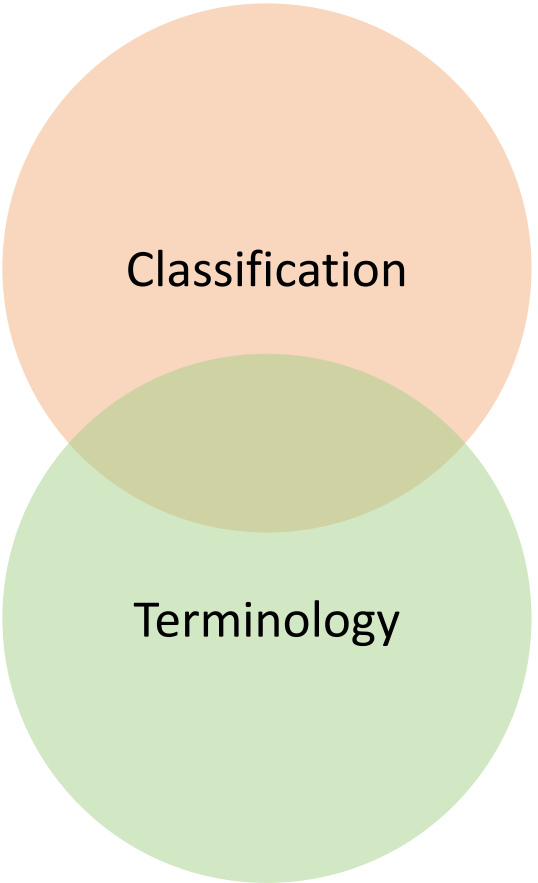


Computational gastronomy: a novel view to bridging the gap between science and the kitchen

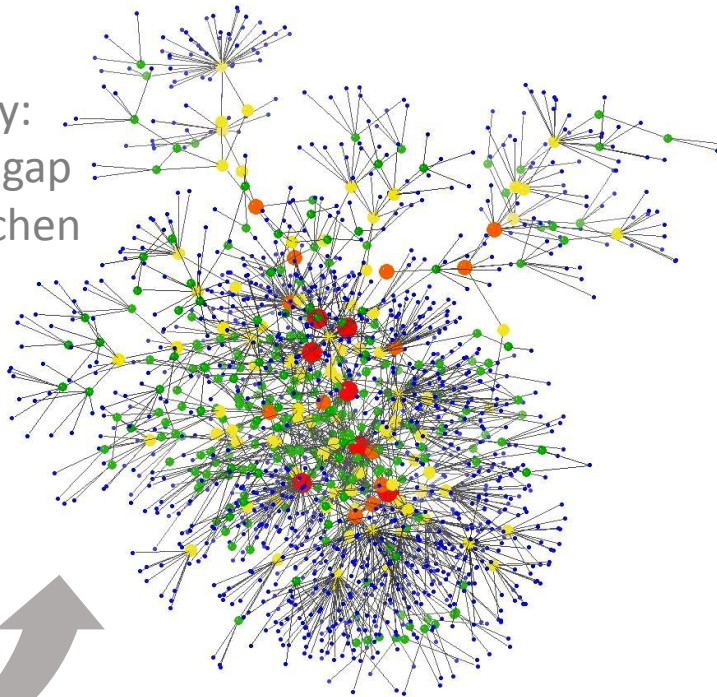


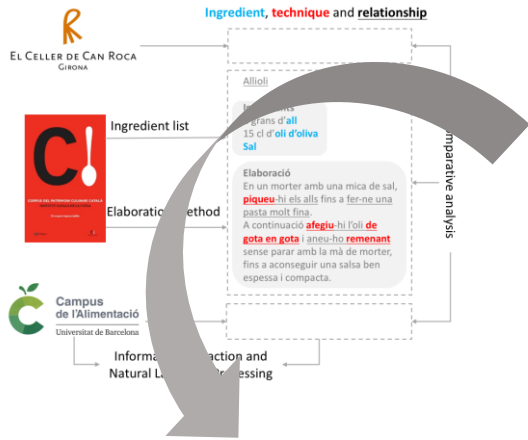


Computational gastronomy

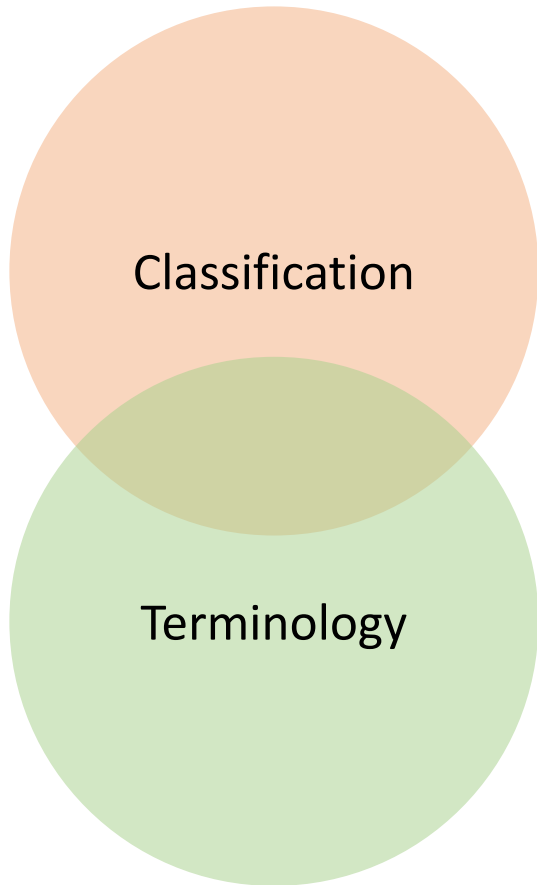


Computational gastronomy: a novel view to bridging the gap between science and the kitchen

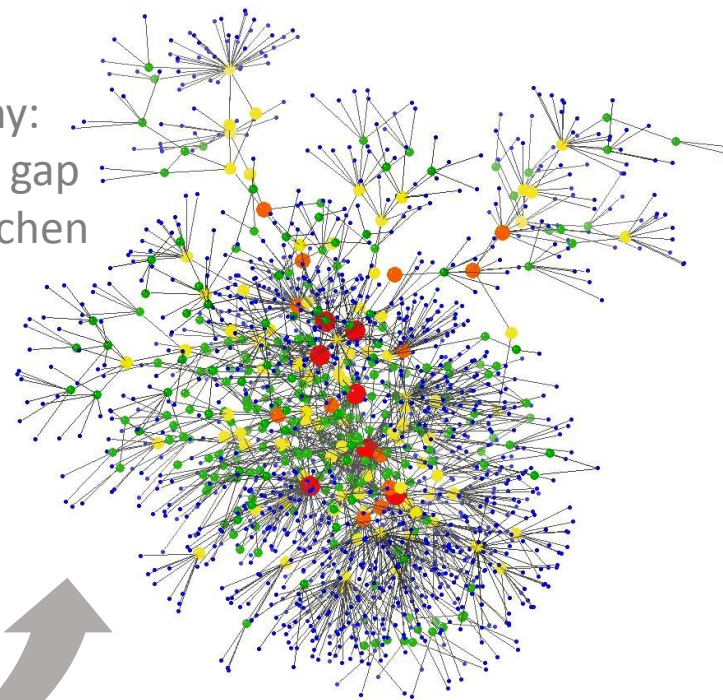




Computational gastronomy



Computational gastronomy: a novel view to bridging the gap between science and the kitchen



Watson was created by linguists, to understand language

“The limits of my language are the limits of my mind. All I know is what I have words for.”

Ludwig Wittgenstein – *Tractatus Logico-Philosophicus*



Thank you!

marta.vila@ub.edu