



IV CONGRESO IBEROAMERICANO DE INGENIERÍA DE LOS ALIMENTOS

Los alimentos procesados pueden ser saludables. La paradoja del café

**María Dolores del Castillo Bilbao/
Instituto de Investigación en Ciencias de la Alimentación (CIAL, CSIC-
UAM)**

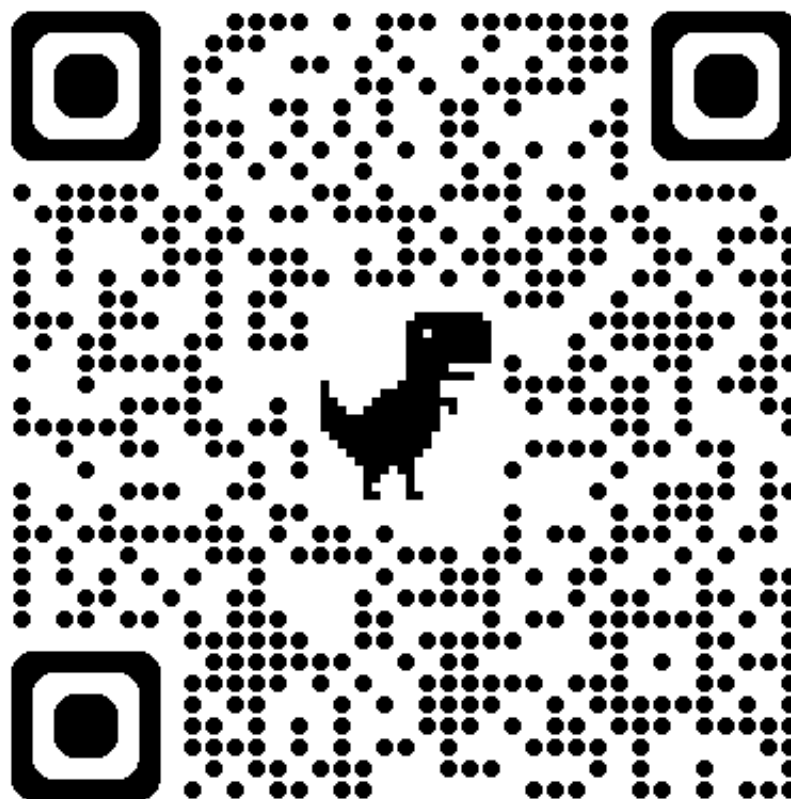
Organiza:



What is

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Alimentos ultraprocesados

B *I* U ↺ ✕

Qué sabemos de ultrprocesados los profesionales de Ciencias de los Alimentos

¿Qué criterio tienes de los alimentos ultrprocesados? *


- Saludables
- No saludables
- No tengo criterio
- Un disparate

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¿Qué son?

- Alimentos industriales
 - Alimentos en restauración
 - Alimentos hechos en casa
 - Muy tratados por diferentes procesos
 - Muy tratados y formulación inadecuada
 - Estoy confundid@
 - Ni idea
-
- 

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<https://www.youtube.com/shorts/ra01olaVjZQ?feature=share>

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TABLE 1 Methods used to process and package foods at home and/or during industrial production (3–5).

Processing Methods Used Both At Home and During Industrial Processing	Processing Methods Used Primarily in Industrial Processing
Heating	Irradiation
Peeling	Extrusion
	Milling
Cooling	Ultra-high temperature pasteurization
Freezing	
Fermenting	
Drying	
Smoking	
Materials used both at home and for industrial packaging	Materials used only for industrial packaging
Metal	Pouch
Glass	Recycled materials
Plastic	Bioplastics
Paper	

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TABLE 2 Food classification systems used to categorize processed food.

System	Category term	Number of categories	Description
Health Canada (7)	Highly processed	Not Applicable ^a	Add excess sodium, sugars or saturated fats to the diet
Nova (8)	Ultra-processed	Four	Formulations of industrial ingredients and substances derived from foods
UNC (9)	Highly processed	Four	Multi-ingredient industrially formulated mixtures; no longer recognizable
IARC (10)	Highly processed	Four	Industrially prepared, needing little domestic preparation
IFPRI (11)	Highly processed	Three	Secondary processing into readily edible forms, likely with high added sugars, fats, or salt
IFIC (12)	Ready-to eat processed	Five	Packaged and store-prepared, with high added and total sugars and low fiber

^aHealth Canada does not provide categories beyond the description that is provided here.

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TABLE 3 National-level dietary recommendations and statements related to processed or ultra-processed foods.

Organization	Statement or recommendation related to ultra-processed foods ^a
Health Canada (21)	“Limit highly processed foods. If you choose these foods, eat them less often and in small amounts.” ^b
UK Scientific Advisory Council on Nutrition (SACN) (22)	“Consumption of (ultra-) processed foods may be an indicator of other unhealthy dietary patterns and lifestyle behaviours. Diets high in (ultra-) processed foods are often energy dense, high in saturated fat, salt or free sugars, high in processed meat, and/or low in fruit and vegetables and fibre. It is unclear to what extent observed associations between (ultra-) processed foods and adverse health outcomes are explained by established nutritional relationships between nutritional factors and health outcomes on which SACN has undertaken robust risk assessments.”
Nordic Council of Ministries (23)	“Despite the observed association between ultra-processed foods as a category and health outcomes, the NNR2023 Committee decided not to formulate any specific recommendations on ultra-processed foods.”
US Dietary Guidelines for Americans (24)	“Common characteristics of dietary patterns associated with positive health outcomes include ... relatively lower consumption of red and processed meats, sugar-sweetened foods and beverages, and refined grains.”
Brazil (14)	“Avoid ultra-processed foods.” “Ultra-processed foods have an unbalanced nutritional composition.” “Ultra-processed foods promote excessive consumption of dietary energy.”
Uruguay (15)	“Base your diet on natural foods, and avoid the regular consumption of ultra-processed products with excessive contents of fat, sugar and salt.”
Chile (20)	“Avoid ultra-processed products with “HIGH IN” labelling.”
Peru (17)	“Protect your health avoiding the consumption of ultra-processed foods.”
Israel (18)	“The diet must be varied and based mainly upon ... unprocessed food or food that has undergone minimal processing.” “It is recommended to ... prefer preparing food at home from raw materials rather than ready-made food or ultra-processed food.” “It is recommended to reduce consumption of the following foods as much as possible ... ultra-processed foods containing large amounts of additives such as salt/sugar or their non-natural substitutes.”
Malaysia (19)	“Limit intake of processed and ultra-processed foods.”

^aIn cases where “ultra-processed foods” are not mentioned in the guidance, statements on processed foods are noted.

^b“Highly processed foods” are defined as “processed or prepared foods and drinks that add excess sodium, sugars, or saturated fat to the diets of Canadians”.

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Most of the people call coffee the roasted seed (beans) coming from its fruit

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A seed inside a fruit known as a coffee cherry

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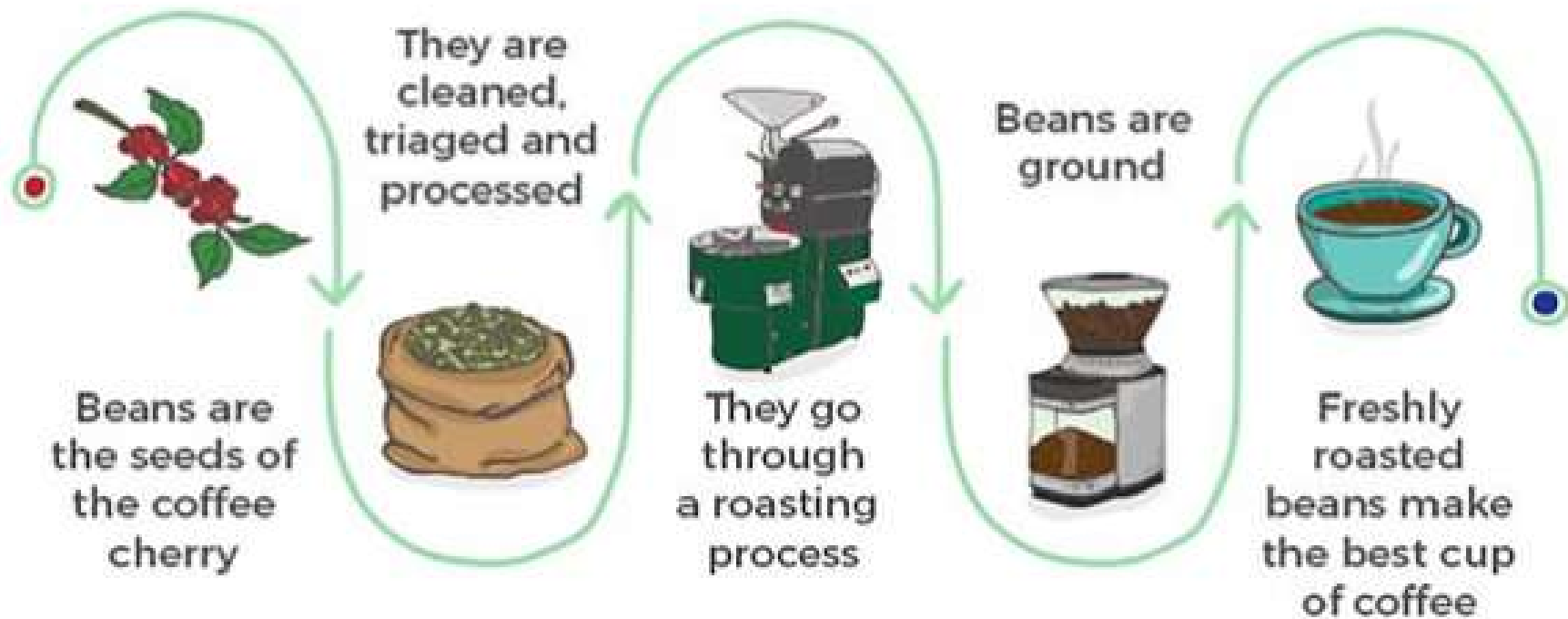
One of the most popular beverage of the world

Coffee is technically food because of its nutritional components.

How Do Coffee Beans become a beverage?

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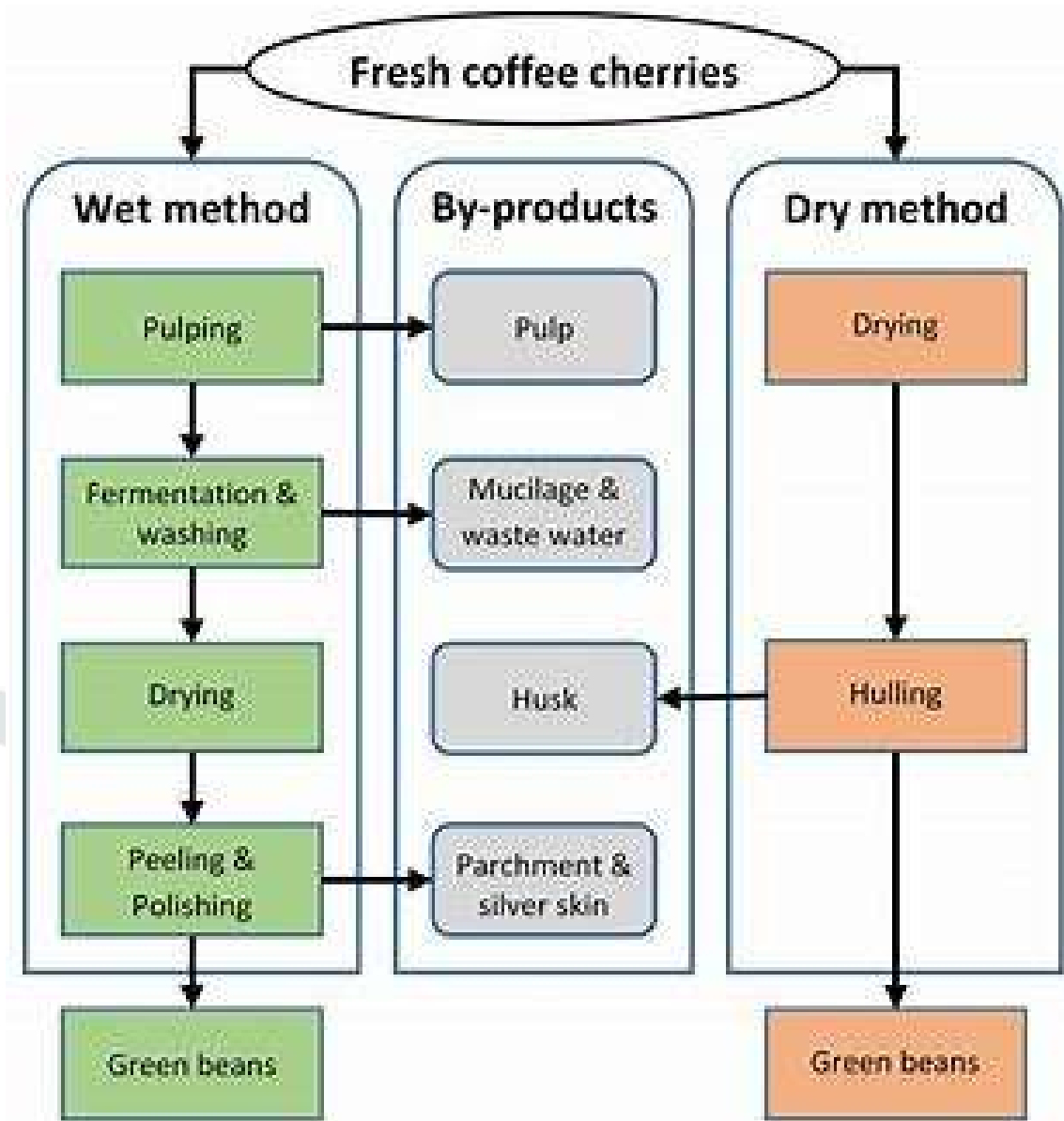
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How Do Coffee Beans become a beverage?

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How Do Coffee Beans become a beverage?

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Coffee Grinding Guide



<https://blog.mistobox.com/the-science-of-brewing-coffee/>





Review

Effects of Coffee and Its Components on the Gastrointestinal Tract and the Brain–Gut Axis

Amaia Iriondo-DeHond ¹, José Antonio Uranga ², Maria Dolores del Castillo ¹ and Raquel Abalo ^{2,3,*}

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² High Performance Research Group in Physiopathology and Pharmacology of the Digestive System NeuGut-URJC, Department of Basic Health Sciences, Faculty of Health Sciences, Campus de Alcorcón, Universidad Rey Juan Carlos (URJC), Avda. de Atenas s/n, 28022 Madrid, Spain; jose.uranga@urjc.es

³ Associated Unit to Institute of Medicinal Chemistry (Unidad Asociada I+D+i del Instituto de Química Médica, IQM), Spanish National Research Council (Consejo Superior de Investigaciones Científicas, CSIC), 28006 Madrid, Spain

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Table 1. Chemical composition of Arabica green, roasted, filtered, and cold brew coffee.

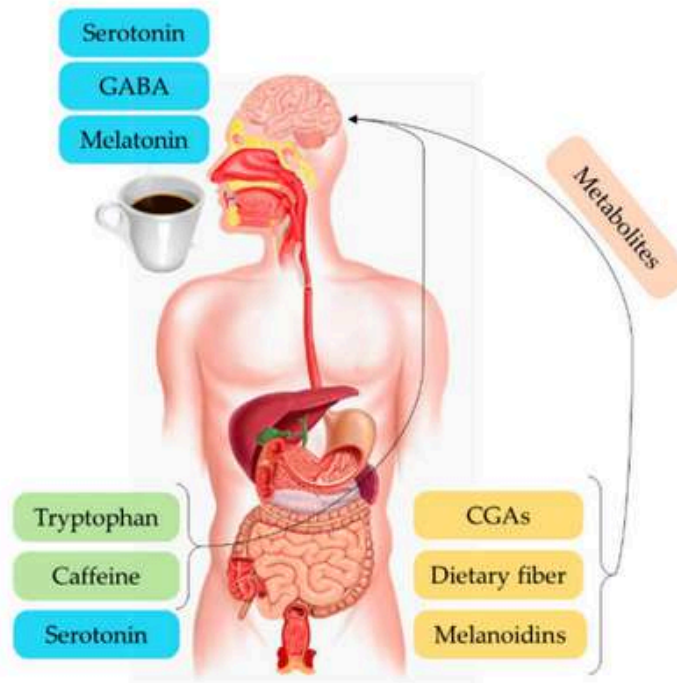
Constituent	Green Coffee Beans (100 g)	Roasted Coffee Beans (100 g)	Filtered Coffee Brew (330 mL)	Cold Brew Coffee (330 mL)
Carbohydrates	9–12.5 g	38 g	0 g	0.1 g
Fiber	46–53 g	31–38 g	1.2 g	0 g
Lipids	15–18 g	17 g	0.1 g	0 g
Proteins	8.5–12 g	7.5–10 g	0.1 g	0.1 g
Free amino acids	0.2–0.8 g	ND	NR	NR
Tryptophan	0.14 g	NR	0.028 g	NR
GABA	0.11 g	NR	NR	NR
Caffeine	0.8–1.4 g	1.3 g	0.244 g	0.412 g
Melatonin	0.7 mg	0.9 mg	0.026 mg	NR
Serotonin	1.3 mg	0.9 mg	0.048 mg	NR
Trigonelline	0.6–2.0 g	1 g	0.026 g	NR
Chlorogenic acids	4.1–9.2 g	1.9–2.7 g	0.009 g	13.2 g
Melanoidins	0 g	23 g	0.6 g	NR
Acrylamide	0 µg	24.4 µg	0.6–8.5 µg	1.4–1.8 µg
Ash	3–5.4 g	4.5 g	0.1 g	0 g
References	[9,12–16]	[9,12,14,17]	[12,13,17–26]	[19,21,27–29]

GABA, γ -aminobutyric acid; ND, not detected; NR, not reported.

Main facts affecting composition and health effects: Type of bean, type of roasting, type of grind, type of brewing.... Botanical origin and processing conditions...

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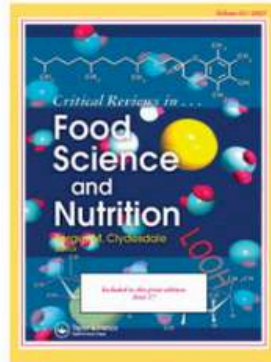


Dietary neurotransmitters

Dietary + synthesized neurotransmitters

Dietary compounds with effect on gut

Figure 4. Effect of coffee compounds on the brain-gut axis. Abbreviations: CGAs, chlorogenic acids; GABA, γ -amino butyric acid.



Critical Reviews in Food Science and Nutrition



ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/bfsn20>

Mechanisms of action of coffee bioactive compounds – a key to unveil the coffee paradox

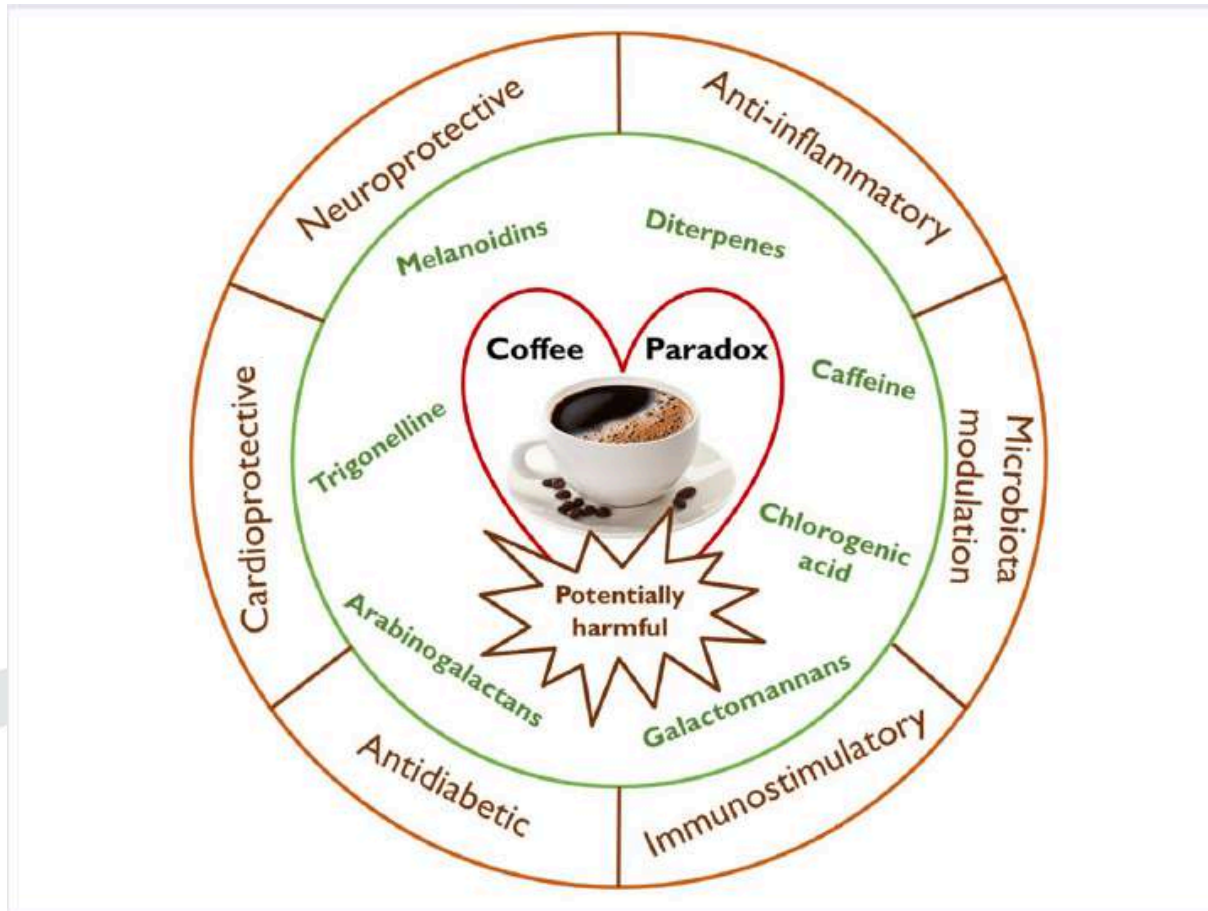
Fernanda Machado, Manuel A. Coimbra, Maria Dolores del Castillo & Filipe Coreta-Gomes

To cite this article: Fernanda Machado, Manuel A. Coimbra, Maria Dolores del Castillo & Filipe Coreta-Gomes (2023): Mechanisms of action of coffee bioactive compounds – a key to unveil the coffee paradox, *Critical Reviews in Food Science and Nutrition*, DOI: [10.1080/10408398.2023.2221734](https://doi.org/10.1080/10408398.2023.2221734)

To link to this article: <https://doi.org/10.1080/10408398.2023.2221734>

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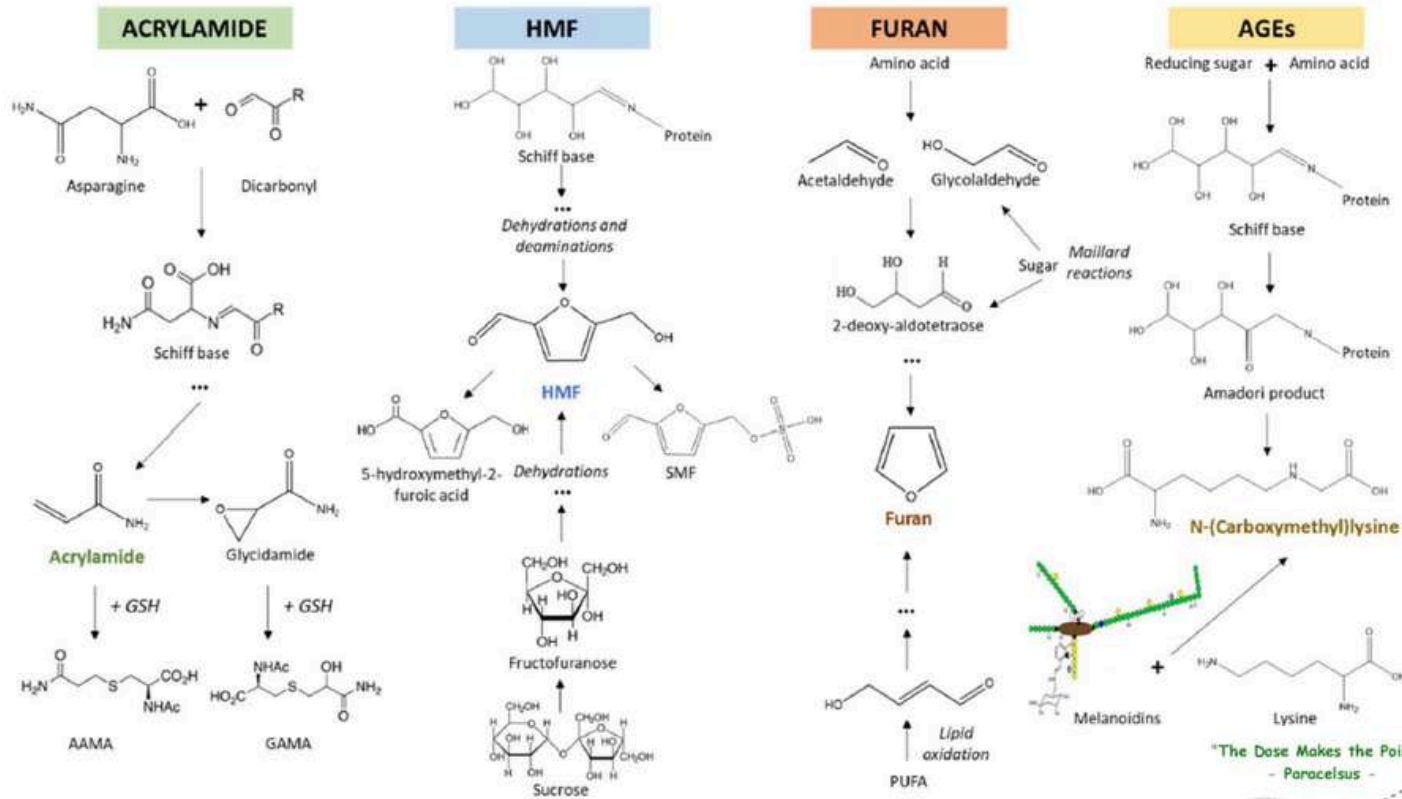
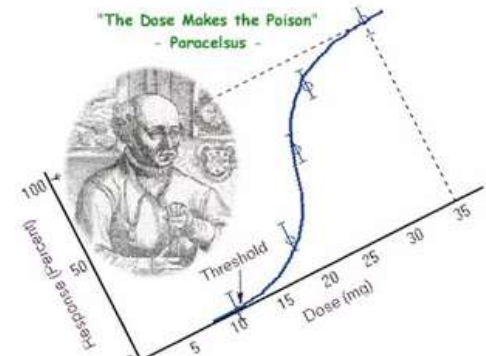


Figure 8. Maillard reaction products formation during coffee roasting.

Accumulating research suggests that when consumed in moderation, coffee can be considered a healthy beverage.



So, the Paradox is – Coffee contains many animal carcinogens at trace levels but actually reduces some cancer risks without raising others.



It results from doing “**Benefit-Risk**” evaluation using the “**Holistic Approach**”.

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In 1991 coffee was included in a list of possible carcinogens by the World Health Organization.

International Agency for Research on Cancer



PRESS RELEASE
N° 244

15 June 2016

IARC Monographs evaluate drinking coffee, maté, and very hot beverages

Lyon, France, 15 June 2016 – An international Working Group of 23 scientists convened by the International Agency for Research on Cancer (IARC), the cancer agency of the World Health Organization (WHO), has evaluated the carcinogenicity of drinking coffee, maté,¹ and very hot beverages.

A summary of the final evaluations is published today in [The Lancet Oncology](#), and the detailed assessments will be published as Volume 116 of the IARC Monographs.

The Working Group found no conclusive evidence for a carcinogenic effect of drinking coffee. However, the experts did find that drinking very hot² beverages probably causes cancer of the oesophagus in humans. No conclusive evidence was found for drinking maté at temperatures that are not very hot.

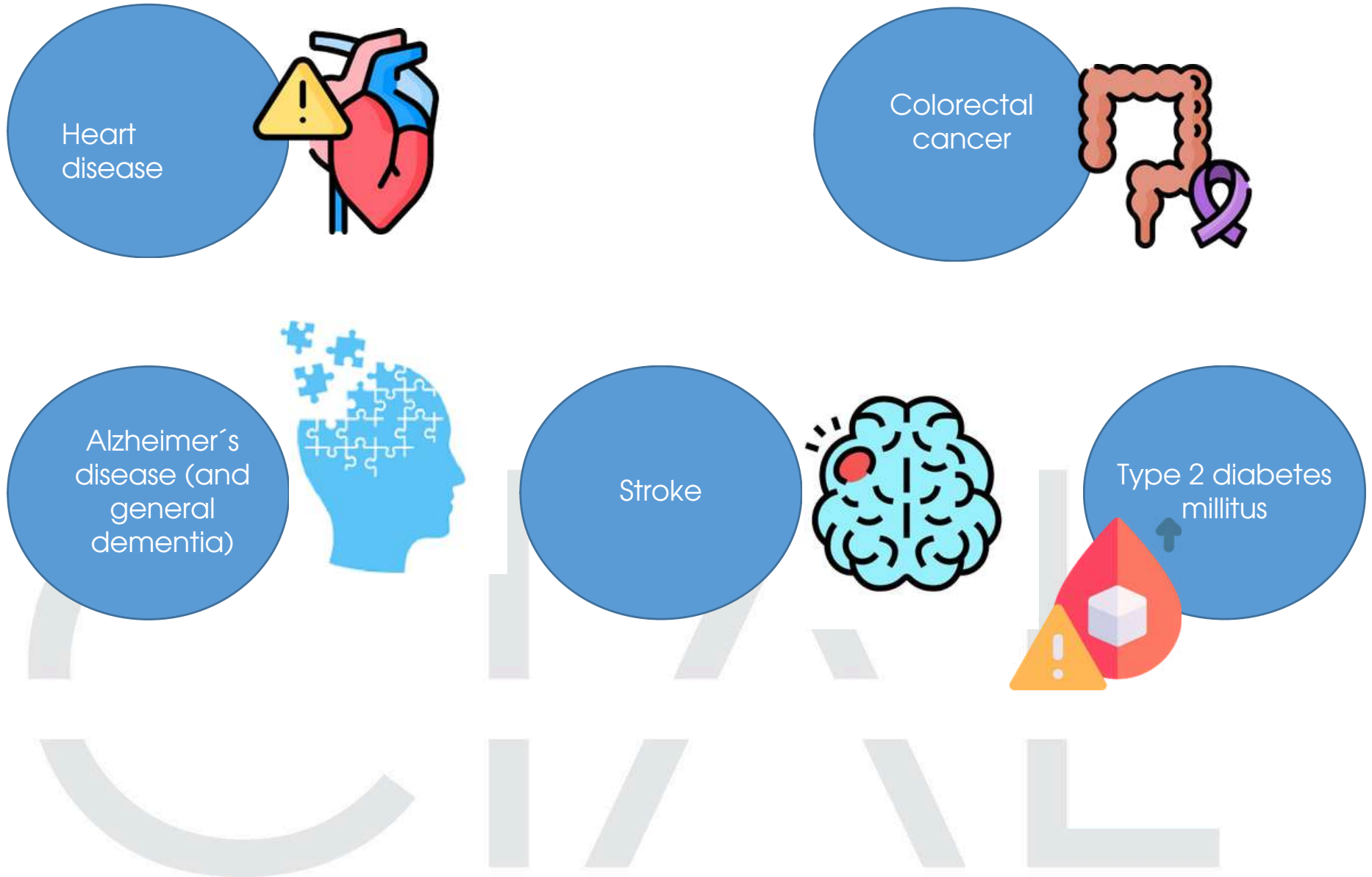
"These results suggest that drinking very hot beverages is one probable cause of oesophageal cancer and that it is the temperature, rather than the drinks themselves, that appears to be responsible," says Dr Christopher Wild, IARC Director.



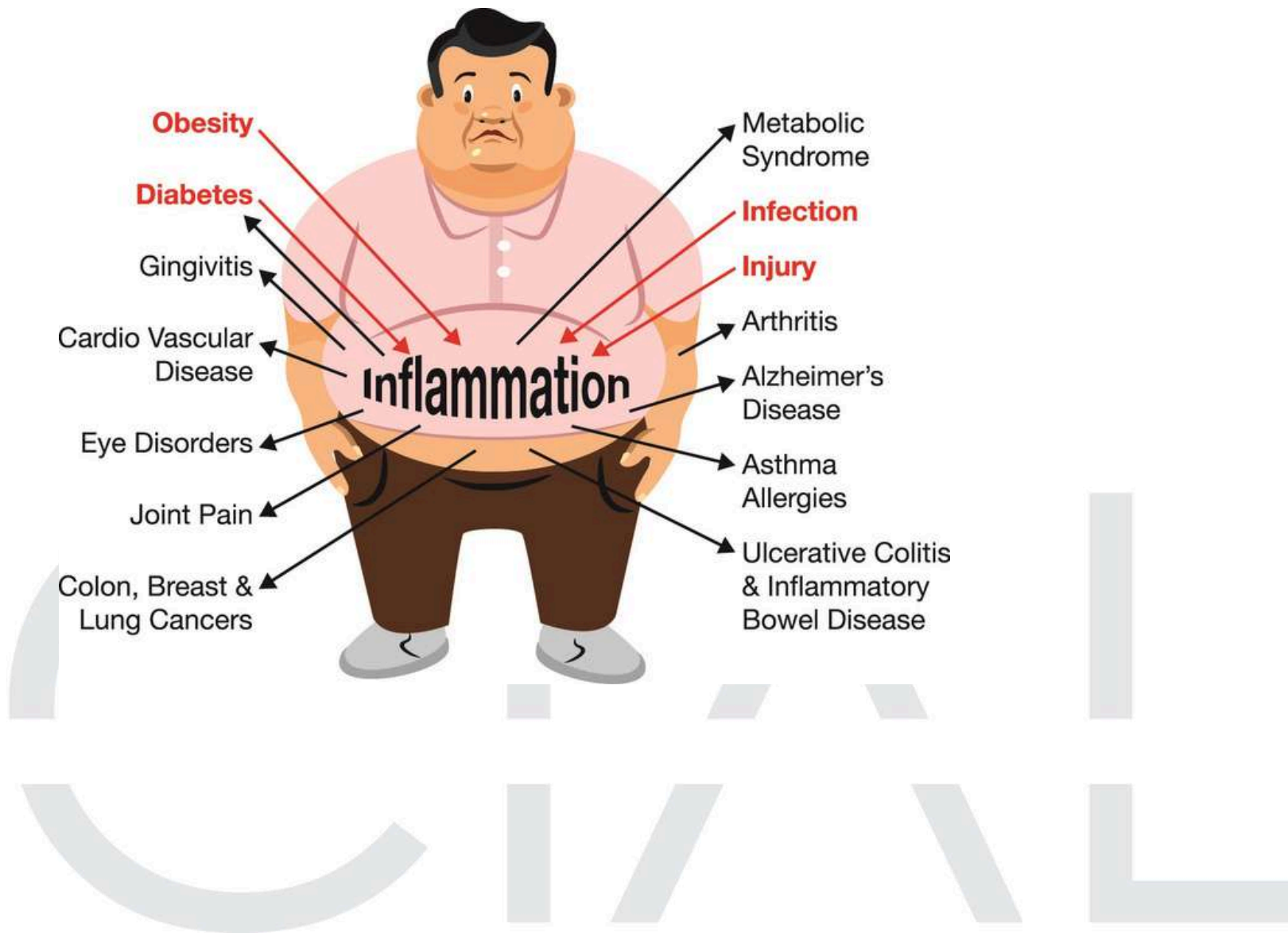
By 2016 it was exonerated

The beverage was associated with a decreased risk of certain cancers among those who drink coffee regularly once smoking history was properly accounted for.

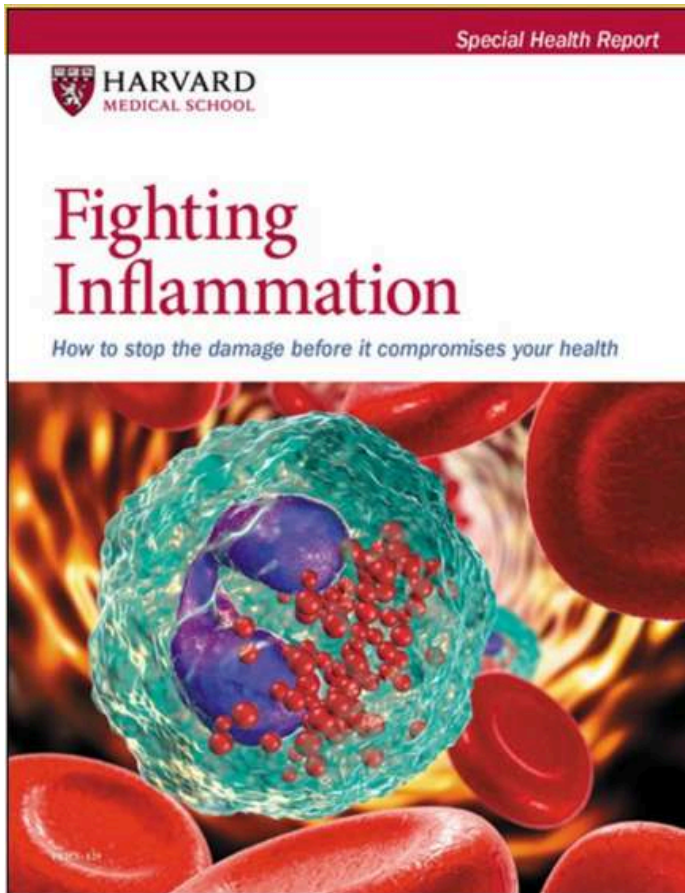
What are the five priority NCDs defined by EITFOOD ?



What do they have in common?



Can we stop the damage before its comprise your health?



Step #1: Eat to beat inflammation.

Step #2: Get moving!

Step #3: Manage your weight.

Step #4: Get enough sleep.

Step #5: Stop smoking.

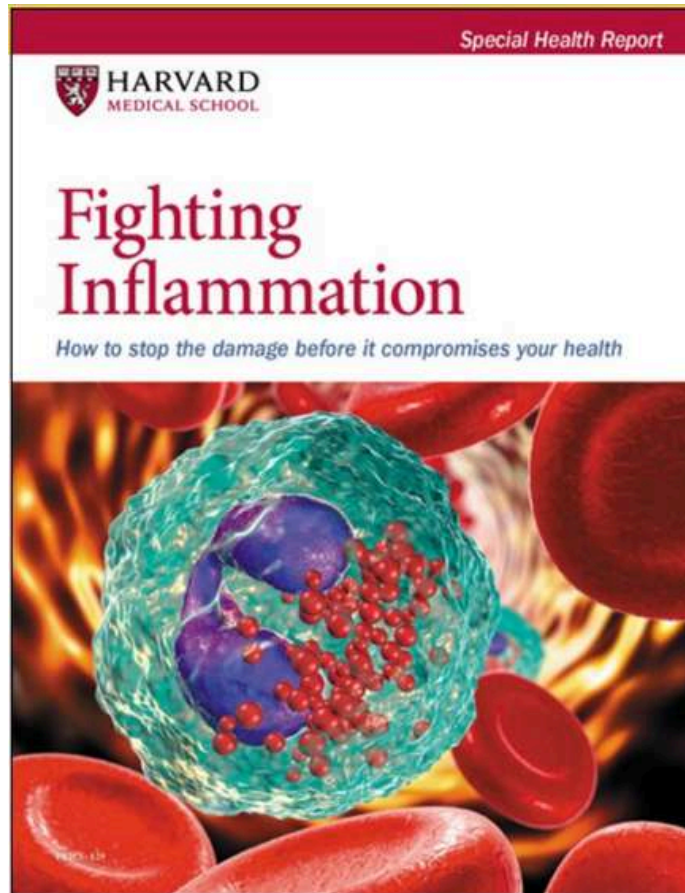
Step #6: Limit alcohol use.

Step #7: Conquer chronic stress.

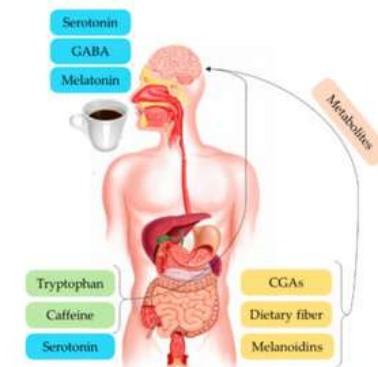
[https://www.health.harvard.edu/promotions/harvard-health-publications/fighting-inflammation?](https://www.health.harvard.edu/promotions/harvard-health-publications/fighting-inflammation?utm_source=delivra&utm_medium=email&utm_campaign=A%2FB%20Test%206677%20Part%2079131%3A%20HB20240414-Inflammation_6677&utm_id=6853912&dlv-emuid=5d886f05-9960-4629-991c-f84eb4737e00&dlv-mlid=6853912)

[utm_source=delivra&utm_medium=email&utm_campaign=A%2FB%20Test%206677%20Part%2079131%3A%20HB20240414-Inflammation_6677&utm_id=6853912&dlv-emuid=5d886f05-9960-4629-991c-f84eb4737e00&dlv-mlid=6853912](https://www.health.harvard.edu/promotions/harvard-health-publications/fighting-inflammation?utm_source=delivra&utm_medium=email&utm_campaign=A%2FB%20Test%206677%20Part%2079131%3A%20HB20240414-Inflammation_6677&utm_id=6853912&dlv-emuid=5d886f05-9960-4629-991c-f84eb4737e00&dlv-mlid=6853912)

Foods you should eat to fight inflammation



- Fruits and vegetables.
- Nuts and seeds.
- Some oils and fatty fish.
- Coffee, cocoa and green tea.



Dietary neurotransmitters

Dietary + synthesized neurotransmitters

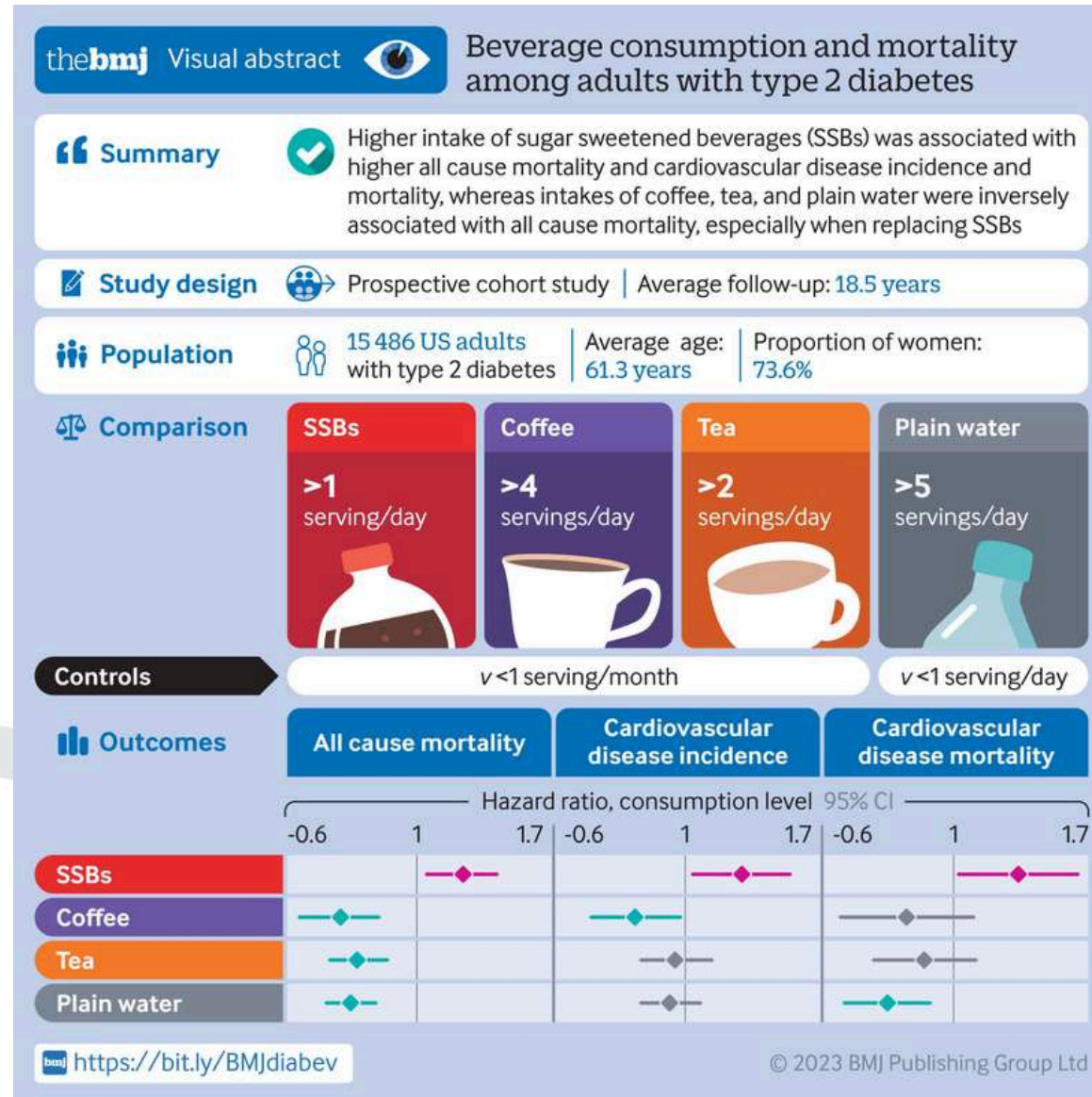
Dietary compounds with effect on gut

[Nutrients. 2021 Jan; 13\(1\): 88.](#)

Published online 2020 Dec 29. doi: [10.3390/nu13010088](https://doi.org/10.3390/nu13010088)

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BMJ 2023; 381 doi: <https://doi.org/10.1136/bmj-2022-073406>
(Published 19 April 2023)

New opportunities for coffee industry...The way to the sustainable coffee industry

Coffea spp.

Clear

Common Names

FI: Kahvi, BG: Kafe, NL: Koffie (boom), IT: Caffè, PT: Cafèeiro, cafézeiro, DK, NO, SE: Kaffe, DE: Kaffee (Pflanze), ES: Café, Cafeto, IS: Kaffi, EN: Coffee, GR: Kafea, PL: Kawa, FR: Caféier


Description

The entry concerns the seeds of *Coffea spp.* It also concerns the leaves and dried cherry pulp (cascara) of *Coffea arabica L.* and/or *Coffea canephora Pierre ex A. Froehner.*

Infusion from coffee leaves of *Coffea arabica L.* and/or *Coffea canephora Pierre ex A. Froehne*, and dried unroasted coffee cherry pulp (cascara) of *Coffea arabica L.* and/or *Coffea canephora Pierre ex A. Froehner* and its infusion are authorised novel foods.

STATUS

- Seeds of *Coffea spp.*

 **NOT NOVEL IN FOOD** - According to the information available to the Member States' competent authorities, this product was used for human consumption to a significant degree within the Union before 15 May 1997. Thus, it is not considered to be 'novel' according to the provisions of the Novel Food Regulation (EU) 2015/2283 and its access to the market is not subject to the pre-market authorisation in accordance with Regulation (EU) 2015/2283.


However, other legislation may restrict the placing on the market of this product as a food in the EU or in some Member States. Therefore, it is recommended to check with the competent authority(ies) of the Member State(s).

- Infusion from coffee leaves of *Coffea arabica L.* and/or *Coffea canephora Pierre ex A. Froehne*

 **AUTHORISED NOVEL FOOD** - This is an authorised novel food and it has been included in the Union list established by Commission Implementing Regulation (EU) 2017/2470.

Please see the authorisation for this novel food on the following link (https://ec.europa.eu/food/safety/novel_food/authorisations/union-list-novel-foods_en) to identify under what conditions of use (table 1) and specifications (table 2) this novel food can be placed on the EU market.

- Dried cherry pulp (cascara) and its infusion from *Coffea arabica L.* and/or *Coffea canephora Pierre ex A. Froehner*

 **AUTHORISED NOVEL FOOD** - This is an authorised novel food and it has been included in the Union list established by Commission Implementing Regulation (EU) 2017/2470.

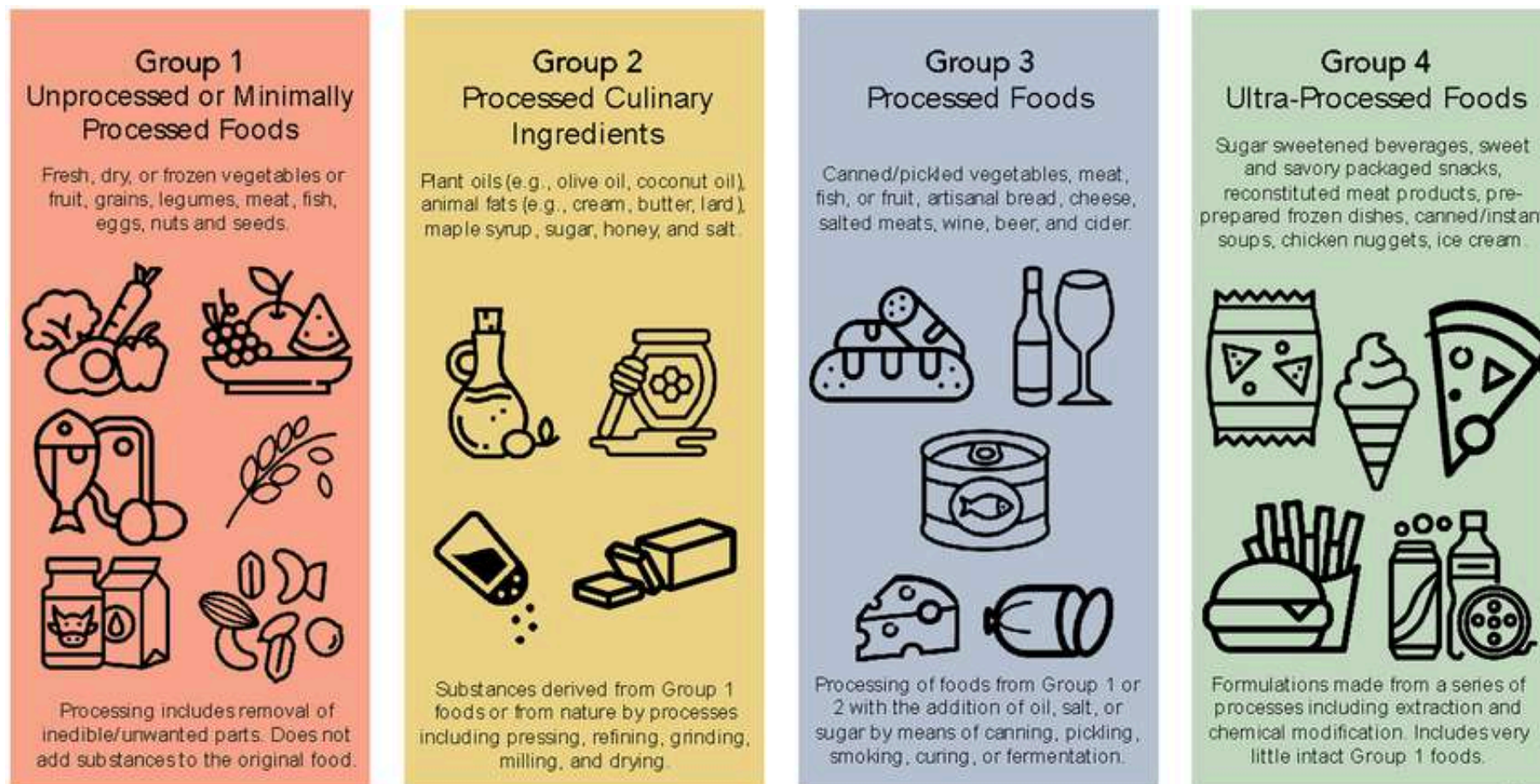
Please see the authorisation for this novel food on the following link (https://ec.europa.eu/food/safety/novel_food/authorisations/union-list-novel-foods_en) to identify under what conditions of use (table 1) and specifications (table 2) this novel food can be placed on the EU market.



<https://ec.europa.eu/food/food-feed-portal/screen/novel-food-catalogue/search>

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Increasing Level of Processing

<https://www.fao.org/3/ca5644en/ca5644en.pdf>

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Group 4. Ultra-processed foods. What do they include in this group?

Ultra-processed foods are ready to eat/drink/heat industrial formulations that are made with multiple industrial ingredients extracted from foods or synthesized in laboratories, while containing little whole foods. The processes for making ingredients or final products of ultra-processed foods may include hydrogenation and hydroxylation, extrusion and molding, and pre-processing for frying.



CIAL

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Group 4. Ultra-processed foods. What do they include in this group?



1. Snacks and Sweets
2. Sugar-sweetened and diet beverages
3. Ready to eat/heat mixed dishes
4. Industrial grain foods
5. Flavored dairy foods and dairy substitutes
6. Others



- Sugar sweetened and diet soft drinks
- Fruit drinks, sport/energy drinks, nutrition drinks



Livingston AS, et al. *bmjnph* 2021;0:1–8. doi: 10.1136/bmjnph-2021-000303

Monteiro, C.A., et al., Ultra-processed foods: what they are and how to identify them. *Public Health Nutr*, 2019. 22(5): p. 936–941.

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European Journal of Clinical Nutrition





www.nature.com/ejcn

ARTICLE **OPEN**

 Check for updates

Industry Research

Ultra-processed foods: how functional is the NOVA system?

Véronique Braesco ¹, Isabelle Souchon ², Patrick Sauvant^{3,4}, Typhaine Haurogné⁵, Matthieu Maillot ⁵, Catherine Féart ⁶✉ and Nicole Darmon⁷

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BACKGROUND: In the NOVA classification system, descriptive criteria are used to assign foods to one of four groups based on processing-related criteria. Although NOVA is widely used, its robustness and functionality remain largely unexplored. We determined whether this system leads to consistent food assignments by users.

METHODS: French food and nutrition specialists completed an online survey in which they assigned foods to NOVA groups. The survey comprised two lists: one with 120 marketed food products with ingredient information and one with 111 generic food items without ingredient information. We quantified assignment consistency among evaluators using Fleiss' κ (range: 0–1, where 1 = 100% agreement). Hierarchical clustering on principal components identified clusters of foods with similar distributions of NOVA assignments.

RESULTS: Fleiss' κ was 0.32 and 0.34 for the marketed foods ($n = 159$ evaluators) and generic foods ($n = 177$ evaluators), respectively. There were three clusters within the marketed foods: one contained 90 foods largely assigned to NOVA4 (91% of assignments), while the two others displayed greater assignment heterogeneity. There were four clusters within the generic foods: three clusters contained foods mostly assigned to a single NOVA group (69–79% of assignments), and the fourth cluster comprised 28 foods whose assignments were more evenly distributed across the four NOVA groups.

CONCLUSIONS: Although assignments were more consistent for some foods than others, overall consistency among evaluators was low, even when ingredient information was available. These results suggest current NOVA criteria do not allow for robust and functional food assignments.

European Journal of Clinical Nutrition (2022) 76:1245–1253; <https://doi.org/10.1038/s41430-022-01099-1>



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The concept of ultra-processed foods has certainly entered the consumer consciousness, NOVA criteria do not currently allow foods to be unequivocally defined as ultra-processed.



?

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“Some ultra-processed foods, such as confectionary, fried snacks, cakes and sugary drinks, are already recognized by nutrition professionals as foods to limit, however this does not mean that all processed foods should be demonized. Looking at food labels, in particular at sugar, salt and saturated fat content, can be valuable in helping us to make healthier choices”.

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In principle, coffee is not an ultra-processed food and it's a healthy beverage option. However, the travel from the plant to the cup involves many different processing steps with a dramatically change of chemical composition.

However, since ultra-processed foods include sugary beverages. Does it means the addition of sugar to your beverage converts its into ultra-processed one?. It is a matter of processing or composition?. Is a matter of the type of processing (culinary or industrial)?.

There are healthy and unhealthy foods for many reasons. Processed foods, even those thermally treated under high temperatures, as it is the case can be healthy.



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However, others have [criticised the usefulness](#) of the categorisation, and others have argued that the main system of which UPFs are categorised, the Nova Classification, is [more concerned](#) with the difference between industrial and home processing than processing per se.

By Augustus Bambridge-Sutton

20-Aug-2024 - Last updated on 20-Aug-2024 at 10:22 GMT

RELATED TAGS Ultra-Processed Food NOVA Classification

Nutrition Gut Health

Can an ultra-processed product be healthy? One company believes so, and aims to prove it with a new product.

Dra. Dolores del Castillo (mdolores.delcastillo@csic.es)

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**THE PROBLEM IS WHAT WE
PROCESS
“nutrient-poor products”
WRONG FORMULATIONS**

He suggested that people are focusing on the wrong issues. It's not food processing itself that's the problem; rather, it's *what* we process.

“The processing itself is not the issue, rather it is the nutrient-poor products that this system currently produces. The key problem is the motivation behind processing rather than the processing itself. For most of the food industry the primary motivation is to make food cheaply and drive sales by encouraging overconsumption.”

¿PUEDE SER SESGADA ESTA OPINIÓN ?

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Informe del Comité Científico de la Agencia Española de Seguridad Alimentaria y Nutrición (AESAN) sobre el impacto del consumo de alimentos “ultra-procesados” en la salud de los consumidores

El Comité científico considera que, para justificar la necesidad de una categoría diferenciada para los alimentos ultra-procesados o “alimentos procesados de composición compleja”, sería necesario realizar estudios epidemiológicos que comparen el impacto sobre la salud de dietas con alto consumo de alimentos procesados que contienen aquellos ingredientes que parece contribuir a la generación de problemas de salud, frente a dietas basadas en alimentos procesados que no presentan dichos ingredientes en su composición.

Número de referencia: AESAN-2020-003

Informe aprobado por el Comité Científico en su sesión plenaria de 4 de marzo de 2020

Grupo de trabajo

Pau Talens Oliag (Coordinador), Montaña Cámara Hurtado, Álvaro Daschner, Esther López García, Sonia Marín Sillué, José Alfredo Martínez Hernández y Francisco José Morales Navas

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**Para llevar a
casa....**

NO EXISTE UNA NORMA LEGAL QUE ESTABLESCA UNA
DEFINICIÓN

ESPECÍFICA PARA EL CONCEPTO DE ALIEMNTO

ULTRAPROCESADO

Dr. Gabriel Vinderola, AR

ULTRAFORMULADOS????

CON FORMULACIÓN NO RECOMENDADA??

PARA COMER EVENTUALMENTE?

HAY MÁS TRABAJO QUE HACER PARA LOGRAR UN
DEFINICIÓN ESPECÍFICA QUE RESPONDA A PROCESO

mdolores.delcastillo@csic.es



Dolores del Castillo Bilbao

CIAL-CSIC (Instituto de
Investigación en Ciencias de la
Alimentación)