



NATIONAL ASSEMBLY Report N° 767 - SÉNATE

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Summary

- *Nutritional imbalance is one of the main causes of the chronic disease epidemic observed in France, with serious consequences in terms of mortality and morbidity.*
- *While there is room for improvement, the concept of ultra-processed food seems relevant and complementary to the nutritional aspect of food.*
- *Although there is still research to be done on the impacts of ultra-processed foods and their underlying mechanisms, the current state of knowledge calls for the implementation of initial preventive public health actions.*

Angèle Prévile, Senator

■ Nutrition: a major health determinant

Studies have revealed that 5.02 and 7.94 million deaths worldwide in 2019 were attributable to being **overweight** and **unhealthy eating**.¹ In addition to this considerable impact on mortality, diet-related diseases represent a significant burden in terms of morbidity, leading to a significant decrease in healthy life expectancy and high costs for health systems.

Although French culinary culture allows us to maintain a relatively varied and balanced diet in our country,² increased consumption of fatty, salty and sugary products in recent years has led to **an increase in the number of overweight and obese people**, amounting to 32% and 17% respectively among the adult population and 13% and 4% among children aged 6 to 17 years.³ In France, 11% of deaths and 6% of healthy life years lost are attributable to diet,² which makes it the **main risk factor** for the loss of healthy life years, ahead of tobacco and alcohol.⁴

■ A new concept: “ultra-processed” food

Traditionally, foods are assessed and classified according to their **nutritional composition** (proteins, carbohydrates, fats, vitamins, etc.), which serves as a guide for dietary recommendations. However, considering that foods are not simply the sum of their nutrients, researchers have recently called for a **paradigm shift** by recommending that this vision be complemented by taking into account

the **transformations** undergone by foods,⁵ which affect both their physical structure and their chemical composition. Among the various classifications proposed for this purpose,⁶ the **NOVA classification**,⁷ developed by Brazilian academics in 2010, has become the most widely used among the scientific community. It divides foods into four groups according to the extent and purpose of the processing:⁸

- **raw or minimally processed foods:** foods that have only undergone processes to make them edible, safe and suitable for storage (fruit, vegetables, meat, eggs, milk, fish, etc.);
- **culinary ingredients:** ingredients that have been processed for the purpose of preparing and seasoning raw or minimally processed foods (oil, butter, sugar, salt, honey, etc.);
- **processed foods:** raw or minimally processed foods cooked using culinary ingredients in order to increase their shelf life or to modify their sensory qualities (breads, cheeses, preserved foods, fruits in syrup, etc.)
- **ultra-processed foods:** foods that have undergone **major processing** or whose composition contains **additives that are not necessary for the safety of the product** (colourings, emulsifiers, sweeteners, etc.) or **industrial substances** (hydrogenated oils, modified starches, maltodextrin, hydrolysed proteins, etc.) to imitate or improve the sensory

qualities of the food (sodas, dehydrated soups, reconstituted meat products, etc.).

This definition of ultra-processed foods distinguishes between processes that can be considered traditional and can be used domestically (salting, fermentation, drying, cooking, refrigeration, etc.) and more recent processes resulting from advances in food science and technology (extrusion, hydrogenation, etc.).⁹ The concept of ultra-processed food is therefore not the same as that of industrial food, but refers to a specific class of **new foods**, designed to be both **convenient** (ready-to-eat or easy-to-prepare, with a long shelf life) and **tasty**,¹⁰ allowing the industry to diversify and increase its offer.

Because of these characteristics, combined with **wide availability**,¹¹ **relative affordability**¹² and **strong marketing**, these foods tend to replace less processed foods¹³ and account for more than half of the total calorie intake in many high-income countries such as the United States and the United Kingdom.¹⁴ In France, it is estimated that between 30 and 35% of the calories consumed by adults come from ultra-processed foods.¹⁵

■ The consequences of consuming ultra-processed foods

● Impact on the risk of chronic diseases

Following the emergence of this new classification, several dozen **observational epidemiological studies** have explored the associations that may exist between ultra-processed foods and the risk of chronic diseases.¹⁶ These studies were conducted independently by several research teams using cohorts from several continents, and have been summarised in a number of recent literature reviews and meta-analyses.¹⁷

A number of consistent studies have found a significant association between consumption of ultra-processed foods and the risk of excess weight and obesity,¹⁸ type 2 diabetes,¹⁹ cardiovascular disease and associated mortality,²⁰ hypertension,²¹ depression²² and overall mortality.²³

Furthermore, individual studies have shown an association between the consumption of ultra-processed foods and the risk of breast cancer and cancer in general,²⁴ inflammatory bowel disease²⁵ and, more specifically, Crohn's disease,²⁶ hyperuricaemia²⁷ and non-alcoholic fatty liver disease.²⁸ Finally, an association with risk of dyslipidaemia,²⁹ kidney disease,³⁰ frailty³¹ and reduced grip strength³² was also found among the elderly.

It is important to note, however, that despite careful statistical adjustments for possible confounding factors, it is not possible to completely exclude the impact of factors that have not been measured or cannot be measured.³³ Thus, while these observational studies show associations between the consumption of ultra-processed foods and the risk of several chronic diseases, **not all of these**

associations are necessarily causal. However, the accumulation of epidemiological studies with identical results, as well as the plausibility of the biological mechanisms detailed below, provide **strong arguments for causality.**

● Proposed mechanisms

It is believed that several mechanisms are involved in linking the consumption of ultra-processed foods to the harmful consequences associated with them.

Firstly, ultra-processed foods are, on average, of **lower nutritional quality** than other foods:³⁴ they are higher in energy, saturated fat, sugar and salt,³⁵ while being lower in protein, fibre, vitamins and minerals.³⁶ One study, which analysed 220,522 ultra-processed foods, found that 79% of them had a Nutri-Score rating of C, D or E (with only 13% rated B and 8% rated A).³⁷ This unbalanced ratio of calorie density to nutrient density has led some nutritionists to refer to ultra-processed foods as "empty calories".

Furthermore, processing modifies the physical structure of the **food matrix**³⁸ and has an impact on the degree of mastication, leading to effects on the speed of ingestion and on the feeling of satiety.³⁹ These effects are intensified by the **use of flavourings** which, on the one hand, promote hedonic eating and override the homeostatic control of food intake and, on the other hand, contribute to altering our ability to assess the energy content of foods.⁴⁰ Also, because they are high in calories, not particularly filling, convenient to eat and very tasty, ultra-processed foods encourage **excessive energy intake**⁴¹ and are even associated with **"food addiction"**.⁴²

In addition, the extensive marketing associated with ultra-processed foods, their widespread presence in food shops and their relatively low price all encourage people to buy them and make it easier to over-consume them.

However, the poor nutritional composition of ultra-processed foods and their possible over-consumption are not sufficient to explain their effect on health. The associations identified by most of the above-mentioned epidemiological studies remain despite statistical adjustments to energy intake and the nutritional quality of the diet.⁴³ It would therefore seem that other mechanisms are involved, which justifies the relevance and usefulness of this new type of classification.

In addition to the physical impacts on food texture, transformations in the **food matrix**³⁸ are likely to affect the **digestibility and bioavailability of ingested nutrients**⁴⁴ and the possible synergies that may exist between different compounds⁴⁵.

Moreover, ultra-processed foods generally contain various **additives** (emulsifiers, colourings, flavour enhancers, sweeteners, etc.) whose impact on health may be detrimental in the long term. Studies suggest that some additives may disrupt the gut microbiota⁴⁶ or the endocrine system, or have carcinogenic or inflammatory

effects.⁴⁷ A number of recent experimental and epidemiological studies have shown that nitrites, titanium dioxide and certain sweeteners and emulsifiers can be harmful to health.

In addition to these additives, which are included in the list of ingredients, other potentially harmful compounds may be found in ultra-processed foods, which may contribute to their harmful nature. During processing, especially intense processing, some molecules may be broken down to form **new compounds**. Heat treatments are known to generate numerous molecules (acrylamide, acrolein, etc.) with carcinogenic, cardiometabolic and diabetogenic effects.⁴⁸ **Substances contained in food packaging** (such as bisphenol A and phthalates) can also contaminate these foods. While minimally processed packaged foods can also be affected by these substances, the long shelf life of ultra-processed foods - and therefore the long contact time with the packaging - increases the risk. It is also possible that the composition of ultra-processed foods plays a role in this contamination, as high-fat foods are known to increase the risk of substances migrating from the packaging. As a result, increased levels of some of these contaminants have been found in the urine of American children and adults who consume a significant amount of ultra-processed foods.⁴⁹ Finally, in some cases, residues of **processing aids**, used to assist or optimise processing, may remain in the finished products. These various molecules increase the risk of a **cocktail effect**, i.e. the effect of the interacting substances is greater than the sum of the individual effects.

- **Other impacts**

Ultra-processed foods are also suspected of having a **negative impact on the environment**,⁵⁰ but this has been less studied and requires further research. Because of the need for abundant and inexpensive raw materials, this type of diet may **change the way agriculture is practised**, encourage **extensive use of fertilisers and pesticides**, and lead to an **impoverishment of the diversity** of agricultural raw materials, both animal and plant. The plastic packaging in which they are often packed is also a major source of pollution.⁵¹

Moreover, by standardising the food supply on a global scale, ultra-processed food tends to threaten certain **culinary traditions**, which are an integral part of the national cultural heritage, and has an impact on all food professions.

■ Is the concept sufficiently mature?

As a new paradigm, the relevance of the concept of ultra-processed foods is **controversial** and **not fully accepted** by the scientific community.⁵²

The main criticism concerns **the way in which ultra-processed foods are defined** in the NOVA classification. Although it may seem simple, it is actually quite **complex** and **lacks robustness**, as studies have shown that it is difficult to classify certain foods accurately.⁵³ This classification is also **too broad**, as it groups all ultra-processed foods into a single category without specifically analysing the processing and additives used - all of which are presumed to be harmful.

For some researchers, the uncertainties caused by these definitional flaws also **undermine the reliability of epidemiological studies** on ultra-processed foods; the concept itself is **not sufficiently mature** and its use as a public policy tool is therefore **premature**.⁵⁴ This is the position taken by the Spanish Agency for Nutrition and Food Safety, which believes that the health effects associated with the consumption of ultra-processed foods are the result of a diet of poor nutritional quality rather than evidence of the harmful effects of the degree of processing.⁵⁵

However, according to the available data, **dietary recommendations** from several countries such as Brazil,⁵⁶ Ecuador,⁵⁷ Peru,⁵⁸ Uruguay,⁵⁹ Malaysia⁶⁰ and Israel,⁶¹ scientific societies such as the American Heart Association⁶² and the European Association for the Study of the Liver,⁶³ and the Food and Agriculture Organisation of the United Nations,⁶⁴ **encourage the choice of minimally processed foods** rather than ultra-processed foods. In France, the fourth National Nutrition and Health Programme (PNNS - Programme national nutrition santé) also set a target to *"reduce the consumption of ultra-processed products by 20% between 2018 and 2021"*.⁶⁵

■ Conclusion and recommendations

The consumption of ultra-processed foods appears to be associated with **several adverse health effects**, and not only because of their nutritional composition or excessive calorie intake. This new approach therefore provides a **complementary dimension to the nutritional aspect of food**. Although the mechanisms linking ultra-processed foods to the risk of chronic diseases are not fully understood, the large proportion of these foods in our diets calls for special attention to be paid to them.

- **Further research is needed**

In order to fill the current knowledge gaps, it is essential to **intensify public research** on the effects of ultra-processed foods and their components (additives, etc.), as well as on the underlying mechanisms. Epidemiological, experimental (both *in vitro* and *in vivo*) and, where ethically feasible, short-term randomised human trials based on the observation of biological markers should be conducted to demonstrate the suspected causal link

between the consumption of ultra-processed foods and the health risks mentioned above.

The results should be used to develop a **consensual and scientific definition** of ultra-processed foods that is robust enough to be used as a public policy tool.

- **Actions needed in the short term**

This need for further studies should not lead to a short-term status quo. Current knowledge already calls for the implementation of measures to **reduce the consumption** of these foods, an objective set by the National Nutrition and Health Programme.⁶⁵

To this end, **health and social marketing programmes** should highlight the potential risks of ultra-processed foods and encourage consumers to choose minimally processed products whenever possible. But these campaigns (targeting the behavioural patterns of individuals - with a social and cultural dimension) will need to be accompanied by **public policies targeting the systemic and environmental factors** of this issue, which are likely to have a greater impact.⁶⁶

Building on the use of the Nutri-Score,⁶⁷ **ambitious measures need to be implemented to target products containing too much fat, salt and sugar**, for which the evidence of their harmful effects is incontrovertible and widely accepted. According to the OECD, a 20% reduction in calorie intake from foods high in sugar, salt, calories and saturated fat could prevent 582,000 cases of non-communicable diseases in France by 2050.⁶⁸ This would also allow us to **reduce the amount of ultra-processed foods consumed** - without directly targeting them - as

most of the foods rated C, D or E on the Nutri-Score are ultra-processed.⁶⁹

There is also a need for **public policies aimed specifically at children**, who consume a particularly high proportion of ultra-processed foods⁷⁰ and develop their food preferences around them. The national education system could play an important role in this by reintroducing what used to exist: **cooking classes** based on manual activities with a **nutritional dimension** (balanced meals, taste of natural foods, matching of flavours, culinary know-how, etc.), which would also make it possible to **promote French culinary culture** by bringing to life our gastronomic heritage, which is part of the intangible cultural heritage of humanity.⁷¹ **Ambitious food marketing rules** are also needed. The "Gattolin Law"⁷² concerning the abolition of commercial advertising during youth programmes broadcast on French public television must be extended to all programmes, as children are exposed to advertising at all hours, and especially during prime time when they are most likely to watch TV with their parents.⁷³

Finally, with an established definition of ultra-processed foods, consideration could be given to introducing **tax incentives** by making these foods subject to a specific tax, while making healthier foods more affordable. These measures should be accompanied by precautions to ensure that people on lower incomes are not made vulnerable,⁷⁴ so that diet-related social inequalities in health are reduced rather than increased.

The Office's websites:

<http://www.assemblee-nationale.fr/commissions/opepst-index.asp>

<http://www.senat.fr/opepst>

Persons consulted

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⁷² Law N° 2016-1771 of 20 December 2016 concerning the abolition of commercial advertising during youth programmes broadcast on French public television (<https://www.legifrance.gouv.fr/loda/id/JORFTEXT000033658678>).

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⁷⁴ As Professor Poulain pointed out at the public hearing, households with the lowest incomes are also the biggest consumers of ultra-processed foods. It is therefore important to avoid a situation where these households, who are already faced with an increase in the proportion of pre-committed expenditure and for whom food expenditure is already an adjustment variable, are penalised twice. See: P.-Y. Cusset et al., *La Note d'analyse* (commentary) N°102, 2021 (<https://www.strategie.gouv.fr/publications/depenses-pre-engagees-pres-dun-tiers-depenses-menages-2017>).