



# HEALTH INGREDIENTS

**GOING  
FURTHER**

All the answers to your questions



## Eating better is a shared objective

### The key role of health ingredients

In many countries, public health policies aim to improve the health status of the population by promoting healthy eating habits and increased physical activity. To this end, the diet must be varied, balanced and adapted to cover the nutritional needs of each person, from infants to the elderly.

In the European Union, several Member States have launched campaigns to promote the increased consumption of fruits & vegetables (i.e. "5 a day") or to promote the reformulation of food products with less salt, sugar and fat.

However, in spite of the healthy eating campaigns, limited changes in eating habits are observed. For instance, in France, food consumption studies (INCA 3 – 2017) show that nutritional goals are not always met and nutritional intakes for vitamin D and fibre (20g per day for adults and 15g for children versus 30g per day recommended) remain insufficient.

Health ingredients find their applications in this context as a way to rebalance nutritional intake and provide specific health benefits.

There are several categories of health ingredients: probiotics, dietary fiber, plant extracts and derivatives (carotenoids, phytosterols ...), omega-3, proteins, vitamins & minerals...

They are used in various types of consumer goods such as breakfast cereal or in foods for population groups with specific nutritional needs (infants, young children, elderly, athletes, people suffering from certain diseases). They can also be found in the form of food supplements.



Food supplements



## Key dates

### Ancient times

the physician Hippocrates: "Let food be your medicine, and medicine be your food".

Persia: the Medical Poem of Avicenna (Ibn Sina) refers to a dietary regimen according to the seasons.

Work with vitamins awarded with numerous Nobel Prizes.

Europe: first addition of nutrients to baby milk (infant formula)

650's

1020's

1860's

1929  
1964

1933

1960's

1980's

The Chinese physician Sun Simiao refers to "food therapy"

Development of milk flour to combat infant mortality by the Swiss pharmacist Henri Nestlé when breastfeeding is not possible.

Production of vitamin C using glucose as a starting material by the Polish- Swiss scientist Tadeusz Reichstein

Europe: new on the market: foods low in sugar and fat



## On-going research

In response to the aging population and the associated foreseeable increase in health expenditure, research on “healthy aging” has expanded. Specific research focuses on the reduction of risk factors associated with diseases (age-related macular degeneration, memory loss, osteoporosis, joint diseases ...) or the fight against undernutrition through the pleasure of eating well. In the battle against food allergies, new approaches are emerging to propose ingredients that can replace wheat flour. These innovations are based on synergy between ingredients: prebiotics, probiotics and alternative sources of protein.



## Key dates

Europe: First food supplements on the market

End  
1980's

Europe: First directive on food supplements

1991

1992

Japan: First regulation on food for specified health use (FoSHU)

1997

Europe: First regulation on novel food

Europe: first addition of omega-3 to food

2000's

Europe: regulation on nutritional and health claims + regulation on addition of vitamins and minerals to food.

2006

Europe: new regulations on foods for specific groups.

Since  
2013



## The ABC's of Health Ingredients

### *Definitions and uses*

## *Amino acids*

Amino acids are the constituents of peptides and proteins. The sequence of amino acids gives the proteins specific chemical properties and a precise function in the organism. They are essential for cell regeneration and many biological processes. There are 20 amino acids, among which in adults 12 can be synthesized by the body (aspartic acid, glutamic acid, alanine, arginine, asparagine, cystine, glutamine, glycine, histidine, proline, serine, tyrosine) and 8 are essential (isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, valine). For children, histidine is also an essential amino acid.

## *Carotenoids*

This wide family of pigments, named after the carrot, contains some well-known compounds such as beta-carotene. In addition to its role as an antioxidant, beta-carotene is a precursor of vitamin A and thus contributes to the intake of this vitamin. Three other carotenoids play an important role: lutein and zeaxanthin stored primarily in the retina where they filter blue light and may participate in the prevention of age-related macular degeneration and lycopene contained in tomatoes which has antioxidant properties.

## *Essential*

For nutrients, the term “essential” is used when the body cannot synthesize them in sufficient quantity while they are essential for the proper functioning of the body. They must therefore be provided by foods, fortified foods or food supplements.





Food cultures

## Fibers

Fibers are carbohydrate polymers which are neither digested nor absorbed in the small intestine and arrive intact in the colon. These fibers can be naturally occurring in foods, such as pulses, whole grains and fruits & vegetables, or obtained from diverse raw materials such as acacia gum, cereals, yeasts, sugar beets, apples, citrus, algae... They have a demonstrated beneficial physiological effect notably on transit or on the reduction of blood cholesterol.

**Prebiotic fibers:** these fibers selectively promote the multiplication of certain bacteria found in the digestive tract and thus induce scientifically demonstrated beneficial effects on the balance of the gut flora and on the immune defense. According to recent studies, prebiotic fibers could play a role on weight maintenance/management.

## Food cultures

Food cultures refers to living microorganisms capable of fermentation such as bacteria (*Lactobacillus*, *Bifidobacterium*, ...), mould and yeasts.

Micro-organisms are naturally occurring in the digestive systems as well as in milk and plants. They have been traditionally used for centuries for their technological role on foods (bread, yoghurt...). Thanks to micro-organisms, mankind has been able to preserve milk, in the form of lassi, kefir, cheeses, yoghurts.

**Probiotics:** These micro-organisms have documented health benefits on the hosts, such as balancing the intestinal flora and immune defence.

Acacia gum





*Production of microalgae*

## Lactase

People intolerant to lactose cannot digest this sugar present in milk, as the enzyme allowing it, lactase, is absent or in insufficient quantity in their intestine.

The use of lactase during dairy milk processing allows the production of lactose free milk or to reduce the amount of lactose in milk.

Food supplements with lactase help to improve lactose digestion in individuals who have difficulty digesting lactose.



## Microalgae

Appearing on Earth more than 2,5 billion years ago, microalgae are at the origin of life. More than 30 000 species have been identified, but only a few dozen are industrially produced. Sustainable vegetal resource, microalgae are recognized for their nutritional composition: proteins, lipids including omega-3, wide variety of vitamins and minerals, various pigments (carotenoids, chlorophylls...).

## Minerals

Minerals form a wide family of inorganic elements that are found in our diet and are, for some of them, "essential". Amongst these substances, we can distinguish macro-elements or major mineral elements (sodium, potassium, chloride, calcium, phosphorus, magnesium) from oligo-elements or trace elements (iron, zinc, copper, selenium, iodine...). They intervene in numerous vital processes and some of them have a recognized role in the decrease of risk factors for some diseases.



## Omega-3

Sub-family of lipids, the long chain poly-unsaturated fatty acids are “essential”. They can be found in fatty fish and can also be produced by microalgae. Omega-3 are part of cell membranes and notably confer their elasticity. They play a fundamental role in the development of the infant’s brain and eyes as well as in the normal functioning of the heart.

## Peptides

A peptide is formed by two or more amino acids. When the number of amino acids is important, they are called proteins. The 20 amino acids can be combined in multiple manners, forming a large diversity of peptides. Some of them could play a beneficial role on human health (effect on obesity, stress, blood pressure, recovery after exercise for sportspeople...)

*«This brochure does not intend to cover all health ingredients. Nature is a source of unlimited inspiration and innovation. The producers of specialty ingredients bring their expertise to the service of the food industry to meet the challenges of nutrition and health.»*

## Sweeteners

Sweeteners are one of the solutions to control calorie intake. Indeed, they bring little or no calories and reduce the amount of sugar in the recipes. Products containing these sugar substitutes can help people with diabetes and those following a specific diet. The main sweeteners are saccharin, aspartame, acesulfame-K, sucralose, stevia extracts and polyols (sorbitol, mannitol, xylitol ...).

## Vitamins

These 13 micronutrients (vitamins A, D, E and K as well as the 8 B-vitamins and vitamin C) are “essential”. Contrary to stereotypes, vitamins are found in various foods, from both animal and vegetal origin. However, no food contains them all. For this reason, a well-balanced diet is recommended. Vitamins are part of a large number of vital processes and some of them have a recognized role in decreasing the risk factors of some diseases.



## Answers to key questions



VALEURS NUTRITIONNELLES ET ÉNERGÉTIQUES MOYENNES POUR 100 g	
Valeur énergétique	129 kJ (30,8 kcal)
Protéines	

### + *How to communicate the benefits on health ingredients?*

Any statement on a relationship between food and health is known as a health claim.

At international level, the *Codex Alimentarius* provides a standard on health claims. Several countries have adopted regulations on health claims. In the European Union, they are strictly regulated since 2006 (Regulation n°1924/2006). To be used on the labels or in advertisement, health claims must be authorized on the basis of a scientific dossier and be used in compliance with the Regulation, in particular include a statement on the importance of a varied and balanced diet and a healthy lifestyle. Health claims referring to the prevention or treatment of a disease are strictly forbidden.

### + *Which health claims are authorized in the European Union?*

Nutrition claims are made on the content of foods (e.g. rich in Omega-3, source of fibers...). Health claims describe the role of ingredients on a function of the organism (e.g. "Calcium is necessary for the maintenance of normal bones") or on the development and growth of children (e.g. "DHA intake contributes to the normal visual development of infants up to 12 months of age"), or on the decrease of a disease risk factor (e.g. "Oat beta-glucan has been shown to lower/reduce blood cholesterol. High cholesterol is a risk factor in the development of coronary heart disease").

Find out more: in the EU Register of nutrition and health claims made on foods.

### + *Are health ingredients safe?*

Any food ingredient marketed in the European Union must be safe for human health. This is the first requirement of the general food laws.

In the EU, since 1997, new food or new ingredient may be considered as a "novel food". In a nutshell, a novel food is a product from animal, vegetal, mineral origin, or from microalgae and micro-organisms origin, or obtained by a new process, or from outside the EU and whose consumption in the EU before May 1997 was insignificant. Therefore, as these ingredients are new for the European consumers, it is necessary to ensure that its safety is confirmed prior to its authorization. A dossier demonstrating safety must be submitted according a strict authorization procedure. Examples: wheat bran extract, bovine lactoferrin, yeast beta-glucans, or fermented black bean extract. As of 2019, insects are not yet authorized as novel foods in the EU.



## + How are health ingredients used?

Health ingredients are used in general food, in food supplements and in foods intended for people with specific nutritional needs such as infants.

In the EU, specific regulations frame each type of these products to ensure the safety to consumers:

- For vitamins and minerals, the EU has defined the forms that may be used. These must be bioavailable, i.e. the forms the organism can use. For example, selenium enriched yeast is an authorized form of selenium.
- In some Member States including France, Belgium and Italy, there are positive lists of plants, fungi and substances authorized in food supplements.
- For substances, the EU has a negative list, which means some substances are not permitted or are under scrutiny (Regulation n°1925/2006). As of 2019, two ingredients are prohibited: Ephedra herb and its preparations from *Ephedra species* and Yohimbe bark and its preparations originating from Yohimbe (*Pausinystalia yohimbe* (K. Schum) Pierre ex Beille).
- Some Member States also have positive lists of substances authorized in food supplements.

## + Why is the diet of pregnant women of importance?

It is well-known that the diet of infants and young children is essential to their proper growth and development. Research also highlights the impact of diet of pregnant women on the foetal development. A balanced and diversified diet is necessary but not always sufficient. In this case, the physician can recommend specific food supplements, such as folates (vitamin B9) and DHA or vitamin B12 for woman who does not consume food from animals.



## Did you know?

### *Eat yoghurt: a grandmother's advice figured out*

Why did our grandmothers recommend to us to eat yoghurt when taking antibiotics? In fact, antibiotics destroy the intestinal flora and can induce stomach pains. Yoghurt cultures are needed to promote the rebuilding of the intestinal flora. A grandmother's advice is still relevant!

### *Where does the term "Vitamin" come from?*

In the 1890's, Doctor Eijkmann, who was the physician at a prison in Java, noticed that the chickens in the courtyard presented with the same troubles as the prisoners (trouble walking). After mistakenly distributing unshelled rice to the chickens, he noticed the trouble had disappeared. After applying the change in the prisoners' diet, their health was also improved. His co-worker, Doctor Grinjs concluded that the rice hull contains an essential nutritive principle capable of treating neurologic disorders, later called beriberi. In 1911, Casimir Funk discovered an amine while analysing a rice cuticle extract: thiamine (vitamin B1). He used the term "vitamin", which means "essential to life".

Rice





## ***Inuits and the role of Omega-3 on the heart.***

In the 1950's, two scientists, Kromann and Green, compared two Inuit populations: the first one lived on ice floes and following a traditional way of life and the other one was established in Denmark. They observed the low rate of infarctus in the Inuit population living on ice floes. Later, Bang and Dyerberg made the link between the consumption of fish rich in omega-3 and the reduction of the triglycerides rate in blood contributing to cardiovascular health.

## ***The NASA, microalgae and DHA***

In the 1980's, NASA launched a program on the use of microalgae in food to find new sustainable natural resources. DHA is one ingredient that can be produced from microalgae. In 2013, after 30 years of research, the European Food Safety Authority (EFSA) confirmed the predominant role of DHA, and from 2020, in the EU, infant and follow-on formulas will compulsory contain DHA. Research in this area is multiple and covers many components of interest, always using the model of breast milk which is, and will remain, the ideal diet for infants.

## ***Do you know Chlorella?***

Thanks to development of the microscope, chlorella was discovered at the end of the 19th century by the biologist Beijerinck. After World War II, chlorella was identified as an ingredient rich in nutrient to solve malnutrition. Its industrial production began in 1955 in Japan, which remains today the main consumer country. Chlorella is not widely known in Europe but is gaining recognition.



