Eat Mindfully

A practical guide to food additives

With **E-Codes Reader** for Android

faustobe

faustobe.it

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Version 1.0

Website: https://faustobe.it

App: E-Codes Reader on Google Play
https://play.google.com/store/apps/details?id=it.faustobe.ecodes

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Chapter 1

How to use the app for conscious grocery shopping

Learn to recognise the most processed foods and choose truly simple, natural ones — in just a few minutes, without becoming an additives expert.

1.1. Before scanning, do three quick checks

Examine the packaging before opening the app. Front-of-pack labels are often designed to make products appear healthier than they really are.

Look at the front of the pack

Watch for misleading claims like *"sugar-free with sweeteners"*, *"fat-free with emulsifiers"*, *"extra flavour"* or *"flavoured"*. These often signal that the product has been heavily modified.

Open the app and scan the product

Use the camera to scan the barcode or photograph the label. The app will immediately show you the ingredient list and additives.

Check three key points

How many additives appear (especially E codes)? How long and complex is the ingredient list? How much sugar, salt and fat are declared?

If you answer *"many"* or *"long/complicated"* to more than one question, you are probably looking at a highly processed food.

1.2. Three rules to quickly spot an over-processed food

Fewer ingredients = better

Short lists with familiar names — "flour, water, salt, oil" — indicate minimal processing and greater trustworthiness.

Many unpronounceable ingredients

Terms like *"modified starches"*, *"isolated proteins"*, *"mono- and diglycerides of fatty acids"*, *"flavour enhancers"* or *"complex flavourings"* clearly signal industrial processing.

Lots of E codes and additives

While not all E numbers are harmful, their abundance — colourants, preservatives, stabilisers, emulsifiers — demonstrates significant industrial transformation.

1.3. How to read the app's result

Every product receives a quick rating. Think of these levels as a food traffic light.

Minimally processed — go ahead

- Few ingredients, few or no E additives
- Moderate sugar and salt
- Great choice for everyday shopping

Moderately processed — use in moderation

- Some E numbers, natural flavourings or added sugars
- Not excessive amounts
- Fine occasionally, not as regular staples

Ultra-processed — limit or avoid

- Many additives, added sugars, complex flavourings
- Industrially processed fats
- Keep as a rare exception, especially for children

1.4. How to use the app practically while shopping

Follow these four steps the first time: they will soon become a natural habit.

1. **Start with the chilled and breakfast aisles.** Scan yogurts, bread, milk, drinks. Look for products with few ingredients and simple sugars (fruit, milk, cane sugar) rather than syrups and sweeteners.
2. **Then move on to sweets and snacks.** Check cakes, salty snacks, biscuits, packaged desserts. If the list is very long and full of E codes, the app will flag it red. Always choose the simpler alternative: fruit, wholegrain bread, nuts.
3. **Use the app to compare similar products.** Look at two products of the same type — Greek yogurt, bread, snacks — and compare their profiles. The one with

fewer ingredients is often only slightly less eye-catching on the shelf, but far more natural.

4. **Keep "reds" as exceptions, not the rule.** You don't need to eliminate all ultra-processed foods — just reduce them. Set a limit — for example, at most 1–2 "red" products per week — while keeping the rest of your shopping to simple foods.

1.5. Summary table

App result	What to do in practice
Few ingredients, few/no E codes	Favour as an everyday staple (plain yogurt, wholegrain bread, tomato passata).
Some E codes, moderate sugar	Use occasionally, not as a main food.
Many E codes, added sugars, complex flavourings	Limit or avoid: a rare exception only.

1.6. Why learning to read additives really makes a difference

Recognising highly processed foods is not "additive phobia" — it is attention to the quality of what we eat. Research suggests that reducing ultra-processed foods supports weight management, cardiovascular health and metabolic stability over the long term.

The app gives you a concrete tool: you don't need to memorise every E code, just learn to recognise the signs of excessive

processing and trust the quick rating. Think of it as a smart shopping assistant guiding you towards simpler choices, without obsessive label reading.

Chapter 2

How to read a nutrition label

Ingredients, calories, hidden salt: learn to decode a label in under a minute and stop buying products that look healthy but aren't.

2.1. The ingredients list: where to look first

By law, ingredients appear in descending order by weight: the first item is present in the largest quantity. This is the most important starting point on any label.

The first ingredient matters most

If the first ingredient is *"sugar"*, *"glucose syrup"* or *"palm oil"*, the product is fundamentally built around that element. Chocolate biscuits often list chocolate only in fourth or fifth position.

List length = degree of processing

Homemade bread: flour, water, salt, yeast — four ingredients. Industrial supermarket bread can have fifteen or more. A long list is not a crime in itself, but it is always a signal worth noting.

Look for names that are hard to pronounce

Terms like *"modified starch"*, *"mono- and diglycerides of fatty acids"*, *"carboxymethylcellulose"* or *"hydrogenated"* indicate industrial origins, typically absent from home cooking.

Practical rule

If you couldn't find all the ingredients at a regular grocery store, the product is probably highly processed.

2.2. The nutrition table: what to look at

The nutrition table is mandatory on almost all packaged products. Three values are enough to get the full picture.

Sugars: below 5 g per 100 g

Below 5 g/100 g means low sugar. Between 5 and 22.5 g is medium; above 22.5 g is high. For beverages the "low" threshold is 2.5 g/100 ml.

Salt: below 0.3 g per 100 g

Below 0.3 g/100 g is low; above 1.5 g/100 g is high. Many savory items like crackers, cheeses and cured meats easily exceed 1 g/100 g. Note: multiply sodium values by 2.5 to get the salt content.

Saturated fat: below 1.5 g per 100 g

The fat type to monitor most carefully. Values above 5 g/100 g are considered high. Industrial baked goods, snack cakes and ready meals frequently exceed this significantly.

2.3. Servings vs 100 g: the trick that confuses everyone

Nutritional values appear both per 100 g and "per serving". Companies tend to highlight per-serving values, which look smaller — but stated servings are often underestimates.

Breakfast cereals: stated serving 30 g, but you eat 60

If the pack declares 10 g of sugar per serving (30 g) and you eat a 60 g bowl, you are consuming 20 g of sugar — nearly half the recommended daily allowance.

Always use per-100 g values to compare

Want to find the better pasta between two brands? Compare per-100 g values, not per serving (which varies by brand). It is the only fair comparison.

Calculate your actual serving

Check how many servings are in the pack. If a bag of crisps contains "3.5 servings" and you eat it all, multiply every value by 3.5.

2.4. Hidden salt: where it really lurks

Salt does not only appear in savoury products. Many apparently sweet foods — biscuits, cereals, bread — have a surprisingly high salt content.

Bread and baked goods

Two slices of industrial bread can contain 0.5–0.8 g of salt. Multiplied across four meals a day, that is already half the recommended daily limit (5 g).

Sauces, condiments and dressings

Ready-made tomato sauce, mayonnaise, and salad dressings can contain 1–3 g of salt per 100 g. One of the strongest cases for cooking from scratch.

Note

In labels you may find "sodium" instead of "salt". To convert: salt = sodium × 2.5.

2.5. Nutrition claims: what they really mean

Claims like *"fat-free"*, *"light"*, *"high in fibre"* or *"0% sugar"* are regulated by law, but can still mislead.

"No added sugars": does not mean sugar-free (naturally occurring sugars such as fructose and lactose may still be present); may contain artificial sweeteners or polyols; does not mean "healthy" or "suitable for diabetics".

"Light" or "reduced": means 30% less than the reference product. If the original was high in calories, the light version still is. Fat that is removed is often replaced with sugar or thickeners.

"High in fibre" or "source of protein": meets minimum legal thresholds but says nothing about other ingredients. A "high-fibre" biscuit can still contain a lot of sugar. Always read the ingredient list, not just the claim.

2.6. Quick checklist to use at the supermarket

1. **Check the first ingredient.** Is it a real food (flour, milk, tomato, oil)? Good. Is it a sugar, syrup or processed fat? Consider whether there is an alternative.
2. **Count the ingredients.** Under five: excellent. Over 10–12: examine carefully.
3. **Check the E codes.** Few or none: good. Many — especially colourants, sweeteners, preservatives: highly

processed.

4. **Check salt and sugars per 100 g.** Salt above 1.5 g = high. Sugars above 22.5 g = high. Saturated fat above 5 g = high.
5. **Ignore the big claims on the front.** "Wholegrain", "natural", "0% fat" rarely mean what they appear to. Trust the ingredient list, not the marketing.

The simplest trick of all

If you recognise every ingredient and could cook with them at home, you are on the right track. If not, you have found an ultra-processed product.

Chapter 3

Additives vs ultra-processed foods: what's the difference?

Is a product with many additives necessarily bad? And is an ultra-processed food always packed with additives? The answer may surprise you.

3.1. What food additives are

Food additives are substances intentionally added to foods to perform a technological function: preserving, colouring, thickening, emulsifying, stabilising or enhancing flavour. In Europe, every approved additive receives an **E code** (E100, E200, E300...) and must pass a safety assessment by EFSA.

Not all additives are synthetic

Citric acid (E330), curcumin (E100), soy lecithin (E322) and ascorbic acid (E300, vitamin C) are additives of natural origin, found in many unprocessed foods.

Some additives deserve closer attention

Azo dyes (E102, E110, E122, E124, E129), nitrate preservatives (E249–E252), and intense sweeteners (E950–E962): these categories have more consistent risk evidence, especially for children.

3.2. What ultra-processed foods are

The term comes from the **NOVA classification**, developed at the University of Sao Paulo. It focuses not on nutrients but on the *industrial process* that produced the food.

A food is ultra-processed (NOVA 4) when it contains ingredients not found in a home kitchen: isolated proteins, modified starches, protein hydrolysates, glucose-fructose syrups, "nature-identical" flavourings, emulsifiers, colourants, and stabilisers — often in complex combinations.

Common ultra-processed examples: snack cakes, packaged snacks, sugary breakfast cereals, carbonated drinks, reconstructed hot dogs, frozen ready meals, flavoured yogurts with thickeners, industrial sandwich bread.

NOT ultra-processed: aged cheeses, quality whole cured meats, artisan bread, traditional dried pasta, additive-free tomato preserves, vinegar, extra-virgin olive oil.

3.3. When they overlap — and when they don't

The overlap between "contains additives" and "ultra-processed" is not total.

Additives but NOT ultra-processed: cheese with E252 (potassium nitrate), wine with sulphites (E220), oil with vitamin E (E306) as an antioxidant.

Ultra-processed with FEW E codes: toast bread with modified starch and flavourings (few E codes but NOVA 4), protein bars with isolated proteins and rice syrup, surimi (almost no E codes but made from reconstructed fish proteins).

Ultra-processed AND many additives (the worst case):

snack cakes (modified starches + colourants + emulsifiers + flavourings + sweeteners), industrial sauces, energy drinks.

3.4. The double problem: why both matter

Risks from specific additives: azo dyes and hyperactivity in children (EFSA 2007), nitrates and carcinogenic nitrosamines, intense sweeteners and potential gut microbiome disruption.

Risks from ultra-processing itself: large-scale studies (NutriNet-Santé, UK Biobank) link high NOVA 4 consumption to increased risks of obesity, type 2 diabetes, cardiovascular disease, and certain cancers — independent of nutritional quality.

The combination effect: additive studies almost always test one substance at a time, but in real life we consume combinations of 10–20 different additives in one meal. Synergistic effects are still poorly understood.

3.5. How to spot them in practice: the double read

1. **Look for "lab-derived" ingredients.** Modified starches, isolated proteins, hydrolysates, glucose-fructose syrups, "nature-identical" flavourings, partially hydrogenated oils: the main signal of ultra-processing even without many E codes.
2. **Count E codes and identify critical categories.** A natural antioxidant (E306) is very different from an azo dye (E102) or an intense sweetener (E951).
3. **Consider the meal context.** The problem arises when ultra-processed foods become the basis of the daily diet.
4. **Use the app as a guide, not a final verdict.** The

goal is to reduce ultra-processed foods over time, not eliminate them all in one day.

Conclusion

A product with one natural E code is not a problem. A product with 15 industrial ingredients and no E codes at all is still ultra-processed. Look at both things.

Chapter 4

NOVA classification: what it is and how to use it

NOVA doesn't measure nutrients — it measures the degree of industrial transformation. Understanding the 4 groups changes how you shop.

4.1. What the NOVA classification is

NOVA is a framework developed by Professor Carlos Monteiro at the University of Sao Paulo (Brazil), adopted by WHO and FAO. Unlike nutrient-based systems such as the Nutri-Score, NOVA classifies foods according to their *degree of industrial processing*.

Industrial processes can alter fibre structure, nutrient bioavailability and satiety hormones — independent of the final nutritional composition. NOVA divides foods into 4 distinct categories, not a continuous scale.

4.2. Group 1 — Unprocessed or minimally processed foods

Foods that have not undergone significant industrial transformation, only minimal physical processes such as drying, milling, chilling or pasteurisation.

Examples: fresh or frozen fruit and vegetables, fresh un-

adorned meat and fish, eggs, dried legumes, whole grains, wholemeal flour, pasteurised milk, plain yogurt, tea, coffee, water.

Practical goal

Group 1 foods should make up the largest part of every meal and form the foundation of your diet.

4.3. Group 2 — Processed culinary ingredients

Substances extracted from Group 1 foods or natural sources, used for cooking and food preparation. Not consumed on their own.

Examples: olive oil, butter, vinegar, salt, sugar, honey, plain flour, cornstarch, maple syrup, powdered milk, traditionally aged cheeses.

Usage guideline

Not inherently problematic, but excessive amounts of sugar, salt and saturated fat remain unfavourable regardless of their Group 2 status.

4.4. Group 3 — Processed foods

Products made by combining Group 2 ingredients with Group 1 foods using preservation methods such as salting, smoking, fermentation or ageing. They typically contain two to three ingredients.

Examples: canned vegetables and legumes, tinned fish, quality cured meats, traditional cheeses, artisan bread, wine, craft

beer.

Dietary role

Group 3 foods should not be avoided. Many traditional foods belong to this group.

4.5. Group 4 — Ultra-processed foods

Industrial formulations containing no whole food ingredients, or using them only minimally. Built from extracted, purified or chemically modified components plus numerous technological additives.

Key signal: they contain ingredients not found in a home kitchen.

Typical Group 4 ingredients: hydrolysed proteins, modified starches, glucose-fructose syrup, hydrogenated oils, nature-identical flavourings, synthetic colourants, intense sweeteners, emulsifiers, stabilisers.

Common examples: industrial snack cakes, sugary cereals, carbonated drinks, additive-laden sandwich bread, hot dogs, nuggets, flavoured yogurts, frozen ready meals, industrial pizza, packet sauces, stock cubes.

Key data

Italy derives 14–18% of daily calories from ultra-processed foods; the UK and USA exceed 50–60%. Consuming more than 20% of daily calories from Group 4 is associated with health risks.

4.6. NOVA in everyday shopping

1. **"Could I make this at home with normal ingredients?"** If the answer is no because ingredients are unavailable in ordinary shops, it is almost certainly Group 4.
2. **Look for trigger words:** "modified starch", "isolated proteins", "maltodextrins", "syrup of", "complex flavourings", "hydrogenated oil", "sodium caseinate".
3. **Practical rule:** more than half your plate from Group 1. Vegetables, legumes, whole grains, eggs and unprocessed proteins should form the basis of main meals.

Group	Definition	Examples	In diet
NOVA 1	Unprocessed/minimally processed	Fruit, veg, eggs, fresh meat, whole grains	Foundation
NOVA 2	Culinary ingredients	Oil, salt, sugar, flour, butter	Moderation
NOVA 3	Traditionally processed	Preserves, cheeses, cured ham, artisan bread	Acceptable
NOVA 4	Ultra-processed	Snack cakes, hot dogs, sugary cereals, ready meals	Limit

Chapter 5

Ingredients to watch out for on labels

You don't need to read every label like a chemist. A few key terms are enough to avoid the most problematic products and make better choices in seconds.

5.1. Sugars: the 10 hidden names on labels

Sugar appears under many aliases. The ten most common:

- Glucose-fructose syrup
- Maltodextrins
- Dextrose, fructose
- Concentrated cane juice
- Corn syrup, rice syrup
- Dehydrated honey
- Coconut sugar
- Agave nectar

The "no added sugars" trap

A "100% fruit, no added sugars" juice can contain 10–12 g of sugars per 100 ml — more than a standard carbonated drink (approx. 10.6 g/100 ml). Fruc-

tose from concentrated juice is chemically identical to added sugar.

The WHO recommends keeping free sugars below 10% of daily calories (roughly 50 g per day for a 2000 kcal adult), ideally below 5% (25 g).

5.2. Fats to avoid: hydrogenated and trans fats

Hydrogenated and partially hydrogenated fats: look for "partially hydrogenated vegetable oil", "hydrogenated vegetable fat", "shortening". Banned above 2 g/100 g of fat in Europe since 2021.

Palm oil: saturated but not hydrogenated. Potentially carcinogenic compounds (3-MCPD, glycidol) can form during high-temperature refining.

Recommended fats: extra-virgin olive oil, linseed oil, nuts, seeds, avocado, oily fish — monounsaturated fatty acids and omega-3s with protective effects.

5.3. Controversial additives: the E codes to know

Azo dyes: E102 (Tartrazine), E104 (Quinoline Yellow), E110 (Sunset Yellow), E122 (Carmoisine), E124 (Ponceau 4R), E129 (Allura Red). EFSA 2007 study: correlation with hyperactivity in children. Europe mandates a warning label on products containing these dyes.

Nitrates and nitrites: E249–E252, used as preservatives in cured meats, hot dogs, and bacon. They form nitrosamines classified as probable carcinogens (IARC Group 2A).

Intense sweeteners: E950 (Acesulfame K), E951 (Aspartame), E952 (Cyclamate), E954 (Saccharin), E955 (Sucralose). Safe at approved doses for adults, but recent studies suggest possible gut microbiome effects with chronic consumption.

5.4. Hidden sodium: beyond the salt shaker

Around 75% of dietary sodium in Western diets comes from packaged foods, not added during cooking.

Main sources: bread (the top source in many diets), cheeses, cured meats, ready meals, jarred sauces, stock cubes, soy sauce, ketchup, mayonnaise, salted snacks, breakfast cereals.

Conversion: salt = sodium × 2.5. Example: 0.6 g of sodium = 1.5 g of salt. WHO daily limit: 5 g of salt.

Sodium-containing additives: monosodium glutamate (E621), sodium benzoate (E211), sodium nitrite (E250), sodium bicarbonate, disodium phosphate.

5.5. The Rule of 5: the fastest filter

1. **More than 5 ingredients?** Start reading carefully. Most simple products stay below 5 ingredients.
2. **Sugars above 5 g/100 g?** Check whether it is the first or second ingredient. 5 g/100 g is the EU "low sugar" threshold.
3. **Salt above 0.5 g/100 g in a sweet product?** A signal of ultra-processing.
4. **More than 5 E additives?** The product is probably ultra-processed. Count the total number of additives.
5. **Don't recognise 5 or more ingredients?** If terms like "maltodextrins", "calcium caseinate", "modified

starch", "E471" and "nature-identical flavourings" are unfamiliar, you have found an ultra-processed product to limit.

Final note

The Rule of 5 is a guide, not an absolute verdict. Use it as a quick filter, then dig deeper with the app if you have doubts.

Chapter 6

Recommended foods: the healthiest options at the supermarket

It's not about being perfect or eating only salad. It's about knowing which products, at the same level of convenience, are genuinely better than others.

6.1. The core principle: substitute, don't eliminate

This is not about rigid diets or guilt every time you buy something packaged. It is about knowing the alternatives — and choosing them when they are as convenient as the products they replace.

Same effort, less processing: plain yogurt instead of flavoured yogurt with thickeners. Brown rice instead of microwave pouches. Canned legumes in water instead of a ready meal containing legumes. Almost the same convenience, very different quality.

The 80/20 principle: if 80% of what you eat falls into NOVA Groups 1–2, the remaining 20% of more processed products makes no meaningful difference. Food health is measured across the weekly average, not the single meal.

Recommended foods are not all organic or expensive

Canned chickpeas, eggs, wholemeal flour, plain yogurt, oats, lentils, seasonal vegetables, canned sardines — among the healthiest foods available, costing less than almost any equivalent packaged product.

6.2. Grains and carbohydrates: the best choices

Recommended grains: rolled oats (no added ingredients), brown or semi-wholegrain rice, spelt, pearl barley, buckwheat, wholegrain pasta made from semolina only, artisan wholegrain bread made from flour, water, salt, sourdough (maximum 4–5 ingredients).

To limit: sugary breakfast cereals (even "wholegrain" ones with syrup), sandwich bread with modified starches and preservatives, crackers with palm oil, microwave rice or pasta pouches with additives, industrial snack cakes and biscuits.

Tip for breakfast cereals

If sugar content exceeds 10 g/100 g, you are eating a dessert product — not a healthy breakfast.

6.3. Protein: the best sources

Fish and seafood: fresh or frozen fish without batter, sardines and mackerel in olive oil, tuna in water, salt-packed anchovies (rinsed). Oily fish is among the most economical and nutrient-dense protein sources available.

Eggs and dairy: whole eggs, plain Greek yogurt, ricotta, cot-

tage cheese, aged cheeses in moderation. Avoid "protein" yogurts with thickeners and sweeteners, processed cheese with phosphates.

Legumes: the most underrated plant protein: lentils, chickpeas, beans, peas, edamame. Canned in water, they are already cooked and ready in 30 seconds. Cheap, high in fibre, with an excellent amino acid profile when paired with grains.

6.4. Good fats: the easiest ones to add

Recommended sources: extra-virgin olive oil (raw or for brief cooking), raw linseed oil, walnuts, almonds, hazelnuts, flaxseeds, chia seeds, avocado, oily fish, whole eggs.

To avoid: margarines with partially hydrogenated fats, vegetable shortening, refined palm oil in industrial baked goods, plant-based creams with emulsifiers.

6.5. Smart snacks: what to always keep to hand

Replace industrial snack cakes and ultra-processed protein bars with:

- **Plain nuts**: walnuts, almonds, hazelnuts, unsalted cashews. A handful (30 g) provides protein, good fats and minerals.
- **Whole fresh fruit**: the fibre slows sugar absorption. Not fruit juice, which has lost almost all its fibre.
- **Plain Greek yogurt**: high protein, low glycaemic index, no additives. Add honey or fresh fruit for sweetness — you control the sugar.
- **Hard cheese + wholegrain crackers**: a little Parmesan or Pecorino on crackers with a short ingredient list

(wholemeal flour, oil, salt, yeast). Long-lasting satiety, simple ingredients.

6.6. Sample shopping list

Category	Recommended products
Grains	Rolled oats, brown rice, spelt, wholegrain pasta, artisan wholegrain bread
Legumes	Lentils, chickpeas, beans, peas (dried or canned in water)
Protein	Eggs, sardines in olive oil, tuna in water, plain Greek yogurt, ricotta
Vegetables	Seasonal fresh or frozen, no additives
Fats	Extra-virgin olive oil, walnuts, almonds, flaxseeds
Fruit	Whole seasonal fruit, frozen berries without sugar
Condiments	Apple cider vinegar, herbs and spices

The trolley test

Next time you go to the supermarket, count how many items in your basket have fewer than 5 ingredients. If more than half do, you are on the right track.

Chapter 7

Why ultra-processed foods are bad for you

It is not just about calories or fat: ultra-processed foods interfere with satiety signals, disrupt the microbiome and trigger chronic inflammation. Here is what the research says.

7.1. Obesity and metabolic disruption

Ultra-processed foods cause weight gain through mechanisms that go beyond caloric content. They are engineered to be hyper-palatable and actively interfere with the body's natural satiety signals.

Kevin Hall study (NIH, 2019): in a controlled clinical trial, participants on an ultra-processed diet consumed on average 500 extra calories per day compared to those eating minimally processed foods — with equal food access and free choice. In just two weeks, the ultra-processed group gained nearly one kilogram.

High energy density: ultra-processed foods contain on average 2.15 kcal per gram — nearly double fresh foods. The same food volume delivers far more calories without corresponding fullness.

Excessive pleasure-centre stimulation: the industrial combination of sugar, salt, fat and flavourings activates dopamine

systems similarly to addictive substances, driving consumption even in the absence of real hunger.

Reduced peptide YY: ultra-processed foods lower levels of the gut hormone that signals fullness to the brain. People who eat many ultra-processed foods receive fewer "stop" signals after meals.

Key statistic

People following a high ultra-processed diet face a 41% greater risk of developing obesity or abdominal obesity compared to low consumers.

7.2. Inflammation and immune system dysfunction

Frequent ultra-processed food consumption is associated with increased inflammatory immune responses — an effect that goes well beyond simple nutritional profiles.

Emulsifiers such as carboxymethylcellulose (E466) and polysorbate 80 (E433) can alter gut microbiota and increase intestinal mucosa permeability (*leaky gut*), allowing pathogenic bacteria and harmful substances into the bloodstream and triggering chronic systemic inflammation.

Autoimmune diseases associated with high UPF consumption: coeliac disease, Hashimoto's thyroiditis, multiple sclerosis, systemic lupus erythematosus, type 1 diabetes. The link does not imply direct causation, but convergent evidence across multiple independent studies warrants clinical attention.

7.3. Gut health and microbiota

Industrial ultra-processing strips foods of dietary fibre and bioactive plant compounds (polyphenols, antioxidants) needed to feed beneficial gut bacteria. Added sugars, artificial sweeteners and additives instead promote *dysbiosis* — a microbiota imbalance.

An impoverished microbiota is associated with insulin resistance, chronic inflammation and greater vulnerability to infections and metabolic diseases. Crohn's disease and ulcerative colitis are rising sharply in countries with the highest ultra-processed food consumption.

7.4. A systemic risk: multiple reinforcing mechanisms

Mechanism	Effect	Consequence
Hyper-palatability	Excessive calorie intake	Obesity, type 2 diabetes
Fibre deficiency	Intestinal dysbiosis	Chronic inflammation
Emulsifier additives	Intestinal permeability	Autoimmune, cardiovascular
Sugars and sweeteners	Insulin resistance, dysbiosis	Type 2 diabetes, metabolic syndrome
Fresh food replacement	Micronutrient deficiency	Oxidative stress

Large epidemiological studies confirm the association: NutriNet-

Santé (France, 100,000+ participants) and UK Biobank (UK, 500,000+ participants) link high ultra-processed consumption with greater risks of cancer, cardiovascular disease, depression and all-cause mortality — independent of individual product nutritional quality.

7.5. What to do in practice

The evidence is solid, but the practical message is not "eliminate everything". It is: *reduce the share of ultra-processed foods in your daily diet* and replace them with simple alternatives where accessible.

1. **Identify your habitual ultra-processed foods.** Sugary breakfast cereals, packaged snacks, additive-containing sliced bread, ready meals, flavoured drinks — daily consumption matters, not the occasional ice cream.
2. **Substitute one at a time.** No revolution needed. Rolled oats instead of sweet cereals. Plain Greek yogurt instead of flavoured thickened yogurt. Artisan bread instead of preserved sliced bread.
3. **Increase fibre — it is the priority.** Legumes, vegetables, whole grains, whole fruit feed beneficial microbiota bacteria and directly counter many negative effects of ultra-processed foods.
4. **Use E-Codes Reader to identify hidden ultra-processed products.** Many apparently healthy items ("protein" bars, "0%" yogurt, "fruit" juices) are actually NOVA 4. A barcode scan shows the NOVA classification and additives instantly.
5. **Do not aim for perfection.** Even a 20–30% improvement in diet quality produces measurable health bene-

fits over the medium term.

Chapter 8

Food safety for children and the elderly

Children and older adults respond to additives and low-quality ingredients differently from healthy adults. Here is what to check before shopping for them.

8.1. Why children and the elderly are more vulnerable

Children: low body weight, immature systems

Acceptable daily intake for additives is measured per kilogram of body weight. A 15 kg child consuming a snack with azo dyes receives a proportionally higher dose — roughly 4–5 times more intense — than a 70 kg adult eating the same product. Young children's livers and kidneys also process certain substances more slowly.

The elderly: reduced kidney and liver function

With age, the body's capacity to eliminate certain substances diminishes. Multiple medications can interact with specific additives. Excess sodium has a greater impact on those with hypertension or kidney insufficiency.

Cumulative effects: regular intake of additives over time is more relevant than individual occasional meals.

8.2. Critical additives for children

Azo dyes

- E102, E104, E110, E122, E124, E129
- Mandatory EU warning label: "may have an adverse effect on activity and attention in children"
- Found in coloured sweets, orange/red carbonated drinks, jellies

Intense sweeteners

- Aspartame, Acesulfame K, Sucralose, Saccharin
- Not approved for infants and young children under EU regulations
- Found in light yogurts, zero-sugar drinks, sugar-free sweets

Caffeine

- Present in energy drinks and soft drinks
- EFSA recommends a maximum of 3 mg/kg/day for children
- A 250 ml energy drink can contain up to 80 mg of caffeine

8.3. What to limit for the elderly

Sodium: the main risk

Hypertension and kidney insufficiency are common in older adults, both worsened by excess sodium. Target: less than 5 g of salt per day, less for those with documented hypertension or kidney problems.

Phosphates (E338–E341, E450–E452)

Common in processed meats, processed cheese, canned products and ready meals. High phosphate intake from additives interferes with calcium absorption — a concern for osteoporosis risk.

Interactions with common medications

Vitamin K in leafy greens with warfarin, grapefruit with statins, cranberry juice with anticoagulants: consistent dietary habits and communication with physicians are essential when on these therapies.

8.4. "For children" products to look at closely

Breakfast cereals: often contain 25–35 g of sugars per 100 g, artificial colourants, complex flavourings, and vitamins added to compensate for poor base ingredient quality. Better alternative: rolled oats with fresh fruit and honey.

"Fruit juice" drinks: may contain only 10–30% actual juice; the rest is water, sugars, acidifiers and colourants. Always check the fruit percentage on the label.

"Children's" yogurts: often contain more sugar than standard yogurts and added thickeners (pectin, modified starch). Plain Greek yogurt with fresh fruit added is nutritionally superior and often less expensive.

8.5. A safe shopping guide

1. Choose products with few recognisable ingredients.
2. Less than 10 g of sugars per 100 g for breakfast items and snacks.
3. For the elderly: prefer products with less than 0.3 g of

salt per 100 g.

4. Use E-Codes Reader to check for critical additives.
5. Prioritise unprocessed foods: vegetables, legumes, eggs, fish, plain yogurt, whole fruit.

Additive/Ingredient	Children	Elderly
Azo dyes	Avoid	Limit
Intense sweeteners	Not for young children	Moderation
High sodium	Limit	Avoid
Phosphates	Moderation	Limit
Caffeine	Avoid <12 years	Caution
Nitrates/nitrites	Limit	Limit

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