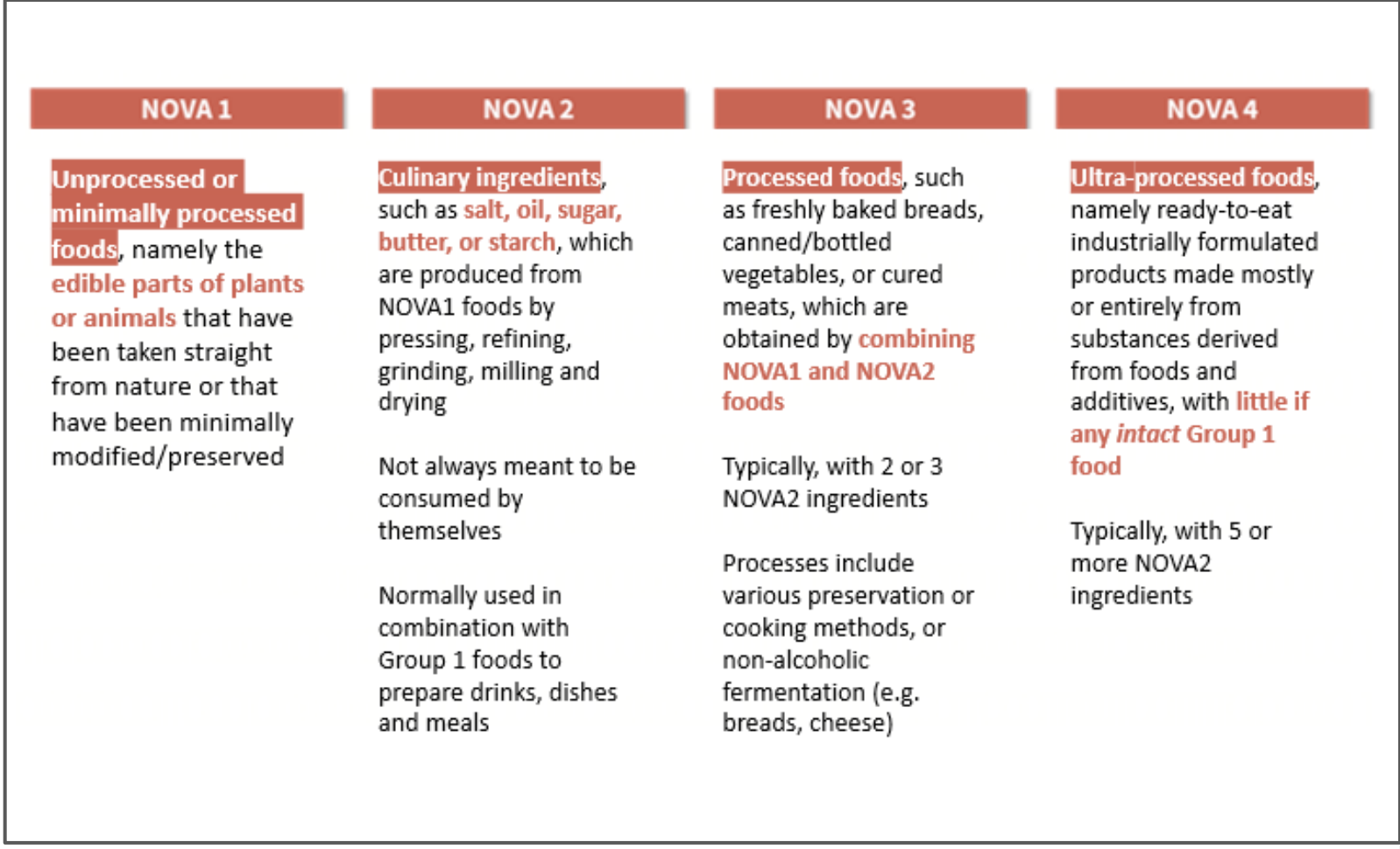


# Understanding the Nova Food Classification: From Unprocessed to Ultra-processed

# Introduction



Here's what you'll learn in this module:

- A new classification system
- Differs from traditional systems
- Why is it needed?
- Nova Group 1
- Nova Group 2
- Nova Group 3
- Nova Group 4
- Nova Food Classification System
- Nova Food Examples
- Additives in the Nova system

# Introduction (continued 1)



- The NOVA Classification System
- An example
- NOVA Example: Bread
- How reliable is the Nova system?
- Oversimplification
- Other factors to consider
- Grey areas
- A widely used tool
- Your key takeaways

# A new classification system



- To some extent, nearly all foods are processed.
- This may be minimal, like being washed, or more intensive, such as precooking or adding multiple additives.
- One system, called the Nova food classification system was developed to categorise foods based on the extent and purpose of their processing, rather than solely on their nutrient content.
- This approach aims to provide a clearer understanding of how different processing methods impact health and to assist consumers in making more informed dietary choices.

# Did you know?



The Nova food classification system was developed by the Center for Epidemiological Studies in Health and Nutrition, School of Public Health at the University of São Paulo in Brazil.



Data: Nupens

# Differs from traditional systems



- Unlike traditional classification systems that focus on macronutrients (carbohydrates, fats, and proteins), Nova highlights how processing affects food quality, nutrient density, and health risks.
- Ultra-processed foods (UPFs) are linked to obesity, diabetes, cardiovascular disease, and other health issues.
- The system can be used by various groups, including consumers, health policymakers, food and disease researchers and more.

# Why is it needed?



- Distinguishing processed foods can be challenging due to the varying degrees and methods of processing.
- The Nova system addresses this by providing clear definitions and categories, helping consumers and health professionals identify the level of processing and make informed decisions.
- The challenge of distinguishing processed foods arises because food processing exists on a spectrum, from minimal changes to highly industrialized formulations.
- The Nova system helps clarify these distinctions by categorizing foods based on their level of processing.
- So let's dive right in to understand what the 4 Nova groups are.

# Nova Group 1



- Group 1 contains unprocessed or minimally processed foods, namely the edible parts of plants or animals that have been taken straight from nature or that have been minimally modified/preserved.
- Minimally processed foods are natural foods altered by methods that include the removal of inedible or unwanted parts and also processes that include drying, crushing, grinding, powdering, fractioning, filtering, roasting, boiling, non-alcoholic fermentation, pasteurisation, chilling, freezing, placing in containers, and vacuum packaging.
- These methods and processes are designed to preserve natural foods, to make them suitable for storage, or to make them safe or edible or more pleasant to consume.

# Nova Group 2



- Group 2 foods are derived from Group 1 foods or else from nature by processes such as pressing, refining, grinding, milling, and drying.
- The purpose of processing is to make products used in home and restaurant kitchens to prepare, season, and cook Group 1 foods.
- Group 2 foods are also used to create varied and enjoyable Group 3 handmade dishes, soups and broths, breads, preserves, salads, drinks, desserts, and other culinary preparations.
- Group 2 items are rarely consumed by themselves but rather are combined with Group 1 foods.

# Nova Group 3



- Group 3 foods are considered processed foods.
- The main purpose of the manufacture of processed foods is:
  - to increase the durability of Group 1 foods, or
  - to modify or enhance their sensory qualities
- Most processed foods have two or three ingredients and are recognisable as modified versions of Group 1 foods.
- They are generally produced to be consumed as part of meals or dishes and also may be consumed by themselves as snacks.
- Most are highly palatable.

# Nova Group 4



- Group 4 foods are those that are considered ultra-processed. Group 1 foods are minimally present or even absent from ultra-processed products.
- They contain substances extracted from foods like casein, lactose, whey, gluten, and further processing (e.g. hydrogenated or interesterified oils, hydrolysed proteins, soy protein isolate, maltodextrin, inverted sugar, high fructose corn syrup).
- Ultra-processing involves industrial techniques like extrusion, moulding, and pre-processing for frying, aiming to create products ready to eat, drink, or heat.
- These foods are known for their hyper-palatability and corporate branding.

# Nova Food Classification System



Below shows each of the 4 Nova groups with a short description of each.

| NOVA 1 | NOVA 2 | NOVA 3 | NOVA 4 |
|---|---|---|---|
| **Unprocessed or minimally processed foods**, namely the **edible parts of plants or animals** that have been taken straight from nature or that have been minimally modified/preserved | **Culinary ingredients**, such as **salt, oil, sugar, butter, or starch**, which are produced from Nova1 foods by pressing, refining, grinding, milling and drying<br><br>Not always meant to be consumed by themselves<br><br>Normally used in combination with Group 1 foods to prepare drinks, dishes and meals | **Processed foods**, such as freshly baked breads, canned/bottled vegetables, or cured meats, which are obtained by **combining Nova1 and NOVA2 foods**<br><br>Typically, with 2 or 3 Nova2 ingredients<br><br>Processes include various preservation or cooking methods, or non-alcoholic fermentation (e.g. breads, cheese) | **Ultra-processed foods**, namely ready-to-eat industrially formulated products made mostly or entirely from substances derived from foods and additives, with **little if any *intact* Group 1 food**<br><br>Typically, with 5 or more Nova2 ingredients |

# Nova Food Examples



## NOVA 1

**Examples include:**

- Fresh, squeezed, chilled, frozen, or dried fruits and leafy and root vegetables
- Grains such as brown, parboiled or white rice, corn cob or kernel, wheat berry or grain
- Legumes such as beans of all types, lentils, chickpeas
- Starchy roots and tubers such as potatoes and cassava, in bulk or packaged
- Fungi such as fresh or dried mushrooms
- Meat, poultry, fish and seafood, whole or in the form of steaks, fillets and other cuts, or chilled or frozen
- Eggs
- Milk, pasteurised or powdered
- Fresh or pasteurised fruit or vegetable juices without added sugar, sweeteners, or flavours
- Grits, flakes, or flour made from corn, wheat, oats, or cassava
- Pasta, couscous, and polenta made with flours, flakes, or grits and water
- Tree and ground nuts and other oil seeds without added salt or sugar
- Spices such as pepper, cloves, and cinnamon
- Herbs such as thyme and mint, fresh or dried
- Plain yogurt with no added sugar or artificial sweeteners
- Tea, coffee, drinking water
- Foods made up from two or more items in this group, such as dried mixed fruits, granola made from cereals, nuts and dried fruits with no added sugar, honey, or oil
- Foods with vitamins and minerals added generally to replace nutrients lost during processing, such as wheat or corn flour fortified with iron or folic acid

## NOVA 2

- The purpose of processing is to make products used in home and restaurant kitchens to prepare, season, and cook NOVA1 foods, and to create varied and enjoyable NOVA3 handmade dishes, soups and broths, breads, preserves, salads, drinks, desserts, and other culinary preparations
- NOVA2 items are rarely consumed without NOVA1 foods
- **Examples include:**
  - Salt mined or sourced from seawater
  - Sugar and molasses obtained from cane or beet
  - Honey extracted from combs and syrup from maple trees
  - Vegetable oils crushed from olives or seeds
  - Butter and lard obtained from milk and pork
  - Starches extracted from corn and other plants
  - Products consisting of two NOVA2 items, such as salted butter
  - NOVA2 items with added vitamins or minerals, such as iodized salt
  - Vinegar made by acetic fermentation of wine or other alcoholic drinks are included in this group

## NOVA 3

- The main purpose of the manufacture of processed foods is:
  - to increase the durability of NOVA1 foods, or
  - to modify or enhance their sensory qualities
- **Typical examples of NOVA3 processed foods include:**
  - Canned or bottled vegetables, fruits, and legumes
  - Salted or sugared nuts and seeds
  - Salted, cured, or smoked meats
  - Canned fish
  - Fruits in syrup
  - Cheeses and unpackaged freshly made breads
- When alcoholic drinks are identified as foods, those produced by fermentation of NOVA1 foods such as beer, cider, and wine, are classified in NOVA3

## NOVA 4

- **NOVA1 foods are minimally present or even absent from ultra-processed products**
- Contain substances extracted from foods like casein, lactose, whey, gluten, and further processing e.g. hydrogenated or interesterified oils, hydrolysed proteins, soy protein isolate, maltodextrin, invert sugar, high fructose corn syrup
- Ultra-processing involves industrial techniques like extrusion, moulding, and pre-processing for frying, aiming to create products ready to eat, drink, or heat
- Known for their hyper-palatability, health claims, and corporate branding. Examples:
  - Carbonated drinks
  - Packaged snacks
  - Ice cream
  - Confectionery
  - Mass-produced breads
  - Cookies
  - Pastries
  - Breakfast cereals
  - 'Energy' bars and drinks
  - Flavoured milk and yogurts
  - Meat extracts
  - Infant formulas
  - Meal substitutes
  - Ready-to-heat items like pies, pizzas, and instant noodles
  - Products made solely of NOVA1 or NOVA3 foods but containing cosmetic or sensory-intensifying additives (e.g., plain yogurt with artificial sweeteners, breads with added emulsifiers)
  - Alcohol via distillation (whisky, vodka)

# Additives in the Nova system



- While we tend to think of additives only being in processed or ultra-processed foods, food additives can also be found within items in Group 1.
- For example, Group 1 items may infrequently contain additives used to preserve the properties of the original food (e.g. vacuum-packed vegetables with added antioxidants).
- On the other hand, Group 4 items include additives such as dyes and other colours, colour stabilisers, flavours, non-sugar sweeteners, processing aids and more. These additives are not found in items in the other Nova Groups.

# The NOVA Classification System



The image below shows the degree of additives in each of the Nova classification groups. Notice that while group 1 has few or no additives, group 4 items tend to have multiple additives.


None or few additives

- Lower risk of reactions
- Less difficult to pinpoint the exact offensive substance or combination of substances

Multiple additives

- Greater risk of reactions
- More difficult to pinpoint the exact offensive substance or combination of substances

# An example



- Let's look at an example to help us understand this system more.
- Bread is a good example.
- What Nova system do you think bread would fit into?
- Well, if your answer is "it depends" you are correct.
- Let's look at why.

# NOVA Example: Bread



Below is an example of looking at bread in the Nova classification system. Bread may fit into each of the 4 groups, depending on the type of bread and how it was produced.

| NOVA 1 | NOVA 2 | NOVA 3 | NOVA 4 |
|---|---|---|---|
| Unprocessed or minimally processed foods | Culinary ingredients | Processed foods | Ultra-processed foods |
| • Whole wheat grains, water, and salt used to make homemade whole grain bread with minimal ingredients. | • Wheat flour, yeast, and salt, which are commonly used in traditional bread recipes. | • Store-bought whole wheat bread with a few additional ingredients like preservatives to extend shelf life but still mostly made of recognizable ingredients. | • Packaged white sandwich bread with numerous additives, emulsifiers, artificial flavours, high fructose corn syrup, and preservatives to enhance texture, taste, and shelf stability. |

# How reliable is the Nova system?



- The Nova classification system is the most used system to classify "all foods according to nature, extent, and purposes of the industrial processes they undergo".
- As well it has been referenced by organisations such as the WHO, FAO, and UN reports, as well as used for hundreds of scientific publications.
- Plus, it's been used internationally providing a cost-effective approach for policymakers to monitor and regulate the UPFs in the global food supply.
- That being said, it has also been criticised as not being an ideal system with faults.
- Let's investigate why.

# Oversimplification



- The Nova food classification is based on food processing rather than nutrient content.
- This means that while there is a correlation that Group 4 foods are less healthy than Group 1 foods, this may not always be the case.
- For example, some subgroups of ultra-processed foods (e.g. whole-grain bread, yoghurt, and some dairy-based foods) may be considered "healthy" and lower disease disk.
- On the other hand, sugarcane would be categorised under Group 1, while white refined sugar and brown sugar would fall under Group 2. These sugars are known to increase blood sugar levels, increasing the risk of diseases such as diabetes.

# Other factors to consider



- The Nova system also focuses only on the degree of food processing and does not take into account how food is cooked, prepared, or consumed.
- This can lead to situations where homemade food is seen as healthier just because it isn't industrially processed, even though it might be equally (or more) unhealthy.
- For example, a homemade cake with white flour, butter, and sugar would be considered in Group 3, but a store-bought cake with the same ingredients but with emulsifiers and preservatives would be Group 4. But both items are high in sugar and fat, so health effects are similar.

# Grey areas



- One study which asked food and nutrition specialists to assess a list of marketed foods and a list of generic foods (with no ingredient information listed) commonly consumed in France.
- The researchers found that specialists sometimes classified foods differently.
- In addition, some of the foods that were classified as being in the Nova 4 ultra-processed group were of acceptable nutritional quality, suggesting that not all Nova 4 foods need to be avoided.
- That being said, there are many studies using the system which has shown high reproducibility.

# Important Note



The Nova system helps categorise foods based on their level of processing, but it does not determine whether a food is inherently good or bad. Not all Group 1 foods are healthy, and not all Group 4 foods should be avoided. Instead, the system serves as a guide to understanding food processing and making informed dietary choices.

# A widely used tool



- Despite its criticisms, the Nova classification system remains a widely used tool in dietary and health research, particularly in studies examining the link between ultra-processed foods and conditions such as obesity, diabetes, and heart disease.
- While some argue that the system oversimplifies food classification by focusing solely on processing rather than nutritional value, its influence on public health policies, food labelling, and global dietary guidelines continues to grow.

# Your key takeaways



- the Nova Food Classification System was developed in order to categorise foods based on the extent and purpose of their processing.
- It can help consumers, policymakers, and researchers understand the impact of food processing on health.
- The system also provides a clearer distinction between minimally processed foods and ultra-processed foods (UPFs), which have been linked to obesity, diabetes, and cardiovascular diseases.
- While there has been some criticism about the system, it's important to remember the purpose - that it classifies food based on processing not nutrient quality.