



Harmful Chemicals in Processed Food

م. شيماء لؤي عبدالهادي
فرع الكيمياء الصيدلانية

Introduction

- **Processed foods** have become a significant part of modern diets, occupying supermarket shelves and influencing our food choices.
- These foods **undergo various manufacturing processes, altering their natural state and composition.**
- **Various mechanical, chemical, or thermal processes** that have been done to enhance their convenience, shelf life, taste, and texture.

The U.S. Department of Agriculture (USDA) definition

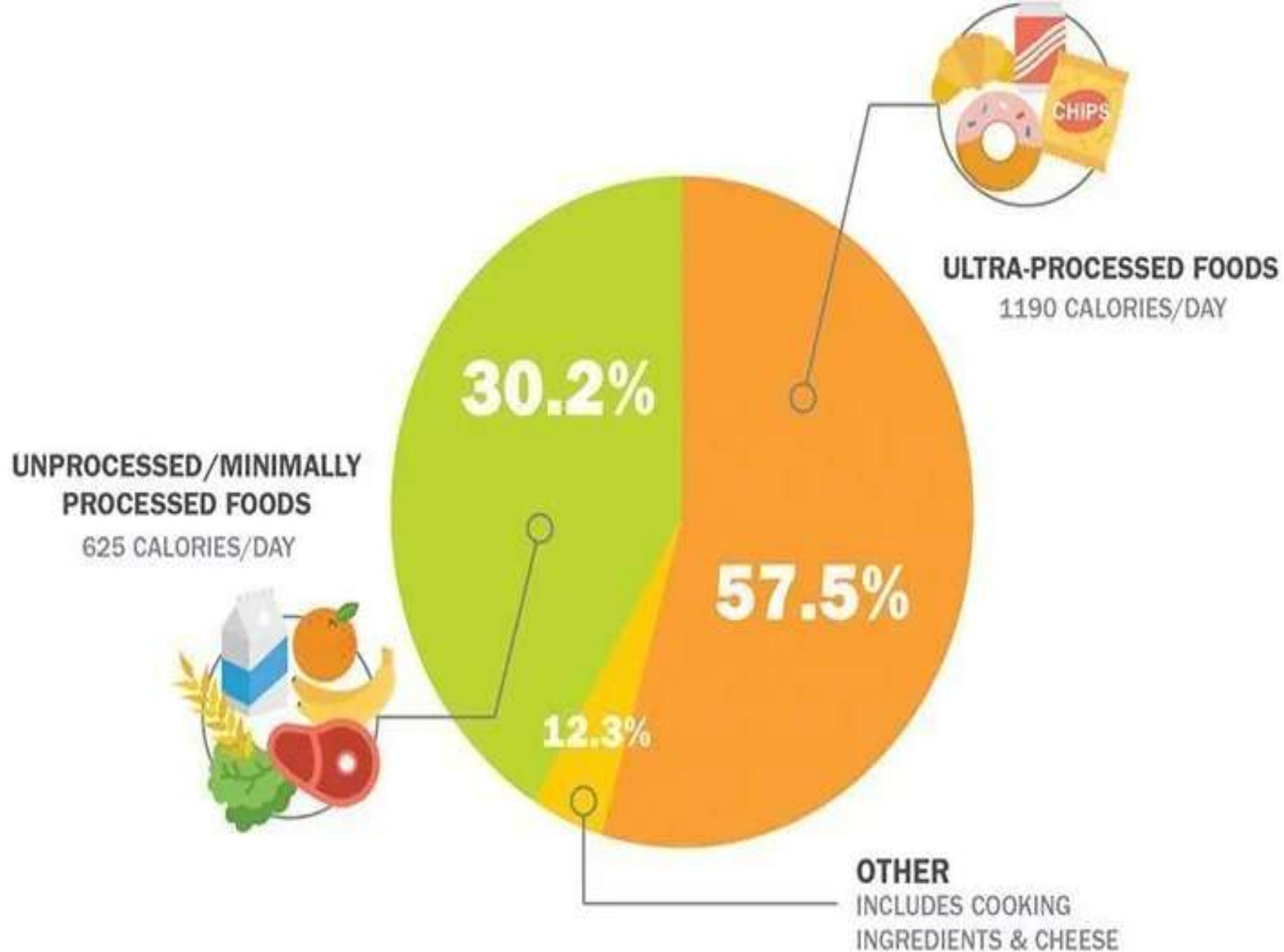
- A processed food as one that has undergone any changes to its natural state—that is, any raw agricultural commodity subjected to washing, cleaning, milling, cutting, chopping, heating, pasteurizing, blanching, cooking, canning, freezing, drying, dehydrating, mixing, packaging, or other procedures that alter the food from its natural state.
- The food may include the addition of other ingredients such as preservatives, flavors, nutrients and other food additives or substances approved for use in food products, such as salt, sugars, and fats.

- Unprocessed or minimally processed foods
Unprocessed foods include the natural edible food parts of plants and animals.
- Minimally processed foods have been slightly altered so they can be more easily stored, prepared, and eaten; this processing level does not substantially change the nutritional content of the food. Examples include cleaning and removing inedible or unwanted parts, grinding, refrigeration, pasteurization, fermentation, freezing, and vacuum-packaging. This allows the food to be preserved for more time and remain safe to eat. Many fresh fruits, vegetables, whole grains, nuts, meats, plain yogurt with no added sugar or artificial sweeteners, fresh and dried pasta, tea, coffee, and milk fall into this category.



Ultra-processed foods Also commonly referred to as “highly processed foods,” these are foods from the prior group that go beyond the incorporation of salt, sugar, and fat to include artificial colors and flavors, preservatives, thickeners, emulsifiers, and artificial sweeteners that promote shelf stability, preserve and enhance texture, and increase palatability





Source: American Institute for Cancer Research

- **Packaged Snacks:**
- This category includes **chips, crackers, cookies**, and other pre-packaged snacks that are often high in **unhealthy fats, sodium and added sugars**. They are convenient but may **lack essential nutrients**



Sugary Beverages:

Soft drinks, fruit juices, energy drinks, and flavored beverages are loaded with **added sugars and artificial ingredients**. Regular consumption of these drinks can **contribute to weight gain** and an increased risk of chronic diseases



- **Frozen Meals:**
- **Frozen** pizzas, nuggets, potato wedges, corn cutlets, and many more ready-to-eat meals are convenient options but are **typically high in sodium, unhealthy fats, and preservatives**. They usually lack the nutritional components present in freshly prepared meals.



- **Canned Goods:**
- **Canned soups, vegetables, and fruits are widely available but often contain added sodium, sugars, or preservatives**



- **Highly Refined Grains:**

Processed grains like **white bread, cornflakes, white rice, and refined cereals** have undergone significant processing, **strip away fibre and nutrients, and often lead to blood sugar spikes.** They offer fewer nutrients as compared to whole grains



Whole wheat flour



Refined wheat flour



Whole grain wheat as harvested



Whole grain wheat

- **Processed Meats:**
- **Sausages**, for example that **often contain high amount of sodium and unhealthy fats**. Their consumption is associated with an increased risk of certain health conditions, including heart disease and cancer.



- **Condiments and Sauces:**
- Condiments such as **ketchup, mayonnaise, salad dressings**, and barbecue sauces can contain **high levels of added sugars, unhealthy fats, and artificial additives.**



processed foods is crucial for making informed dietary choices.

Category	Examples	Impact on Health
Minimally processed	Bagged salads, pre-cut fruits and vegetables	Retains most nutrients but may contain preservatives
Processed ingredients	Vegetable oils, refined sugars	High in calories and can contribute to weight gain
Moderately processed	Canned fruits and vegetables, frozen meals	May contain added sugars, sodium, and artificial additives
Highly processed	Packaged snacks, fast food, sugary beverages	High in calories, added sugars, unhealthy fats, and sodium; linked to obesity and chronic diseases

How Do Processed Foods Impact Your Health?

- **High sugar consumption** leads to an increased risk of obesity, type 2 diabetes, cardiovascular disease, and dental problems.
- **Diets high in unhealthy fats**, particularly trans fats and saturated fats, are directly associated with an augmented risk of disturbed lipid profiles that give rise to heart diseases.
- **Excessive sodium intake**, commonly found in processed foods, contributes to imbalance in blood pressure, leading to hypertension.
- **Lack of fiber content**: Processed foods often lack dietary fiber, which is essential for maintaining a healthy gut environment and supporting diverse microbiota. The low fiber content in these foods **disrupts the balance of beneficial bacteria in the gut, potentially leading to digestive issues, inflammation, and compromised immune function**.

Health effects of consuming processed foods:

- **Weight gain:** Consuming processed foods has been associated with an increased risk of **obesity and weight gain**. These foods are often high in calories, fats and added sugars, and low in dietary fiber
- **Risk of Diabetes and Heart Diseases:** Regular consumption of processed foods has been linked to an elevated **risk of chronic diseases, including type 2 diabetes, heart disease, and certain cancers**. These foods are typically low in essential nutrients and **high in unhealthy additives, preservatives, and trans fats**, which contribute to inflammation and oxidative stress in the body.

Negative Effect on Mental Health

- Emerging research suggests a link between the consumption of **processed foods and an increased risk of mental health disorders.**
- **A high** intake of processed foods, particularly those high in added sugars and unhealthy fats, has been associated with a higher prevalence of depression, anxiety, and other mental health conditions.

2. Artificial ingredients

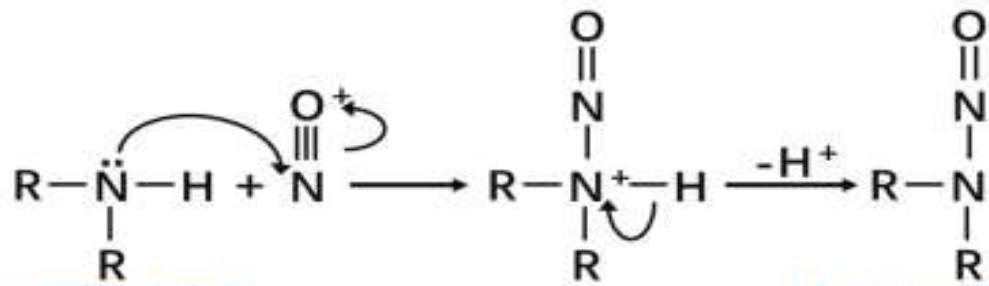
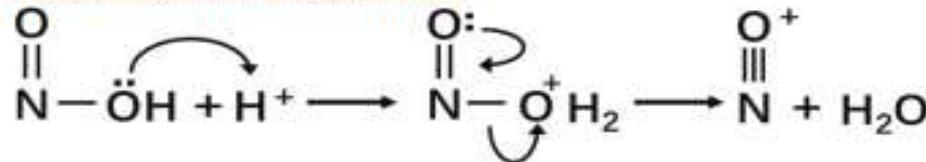
- The ingredients list on the back of processed food packaging is often full of unrecognizable substances. Some are artificial chemicals that the manufacturer has added to make the food more palatable.
- There are about 5,000 substances that get added to our food. Most of them have never been tested by anyone other than the company using them. That includes additives to change color, texture, flavor and odor as well as ingredients like preservatives and sweeteners.
- preservatives, which keep the food from going bad quickly
- artificial coloring
- chemical flavoring
- texturing agents
- Also, processed foods can contain dozens of additional chemicals that are not listed on their labels.

Sodium Nitrite & Nitrate: The Preservatives with a with a Dark Side

- They are commonly found in processed meats.
- High intake can lead to the formation of nitrosamines.
- Nitrosamines are carcinogenic compounds.



The formation mechanism of nitrosamines

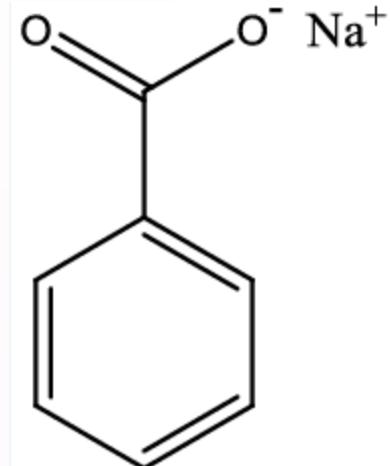


Artificial Preservatives

Examples: Sodium Benzoate identified as E211

Found in: Cereals, chips, processed meats.

Health Risks: May cause cancer, hormone disruption, and allergic reactions.



A large concern over the use of sodium benzoate is its ability to convert to benzene, a known carcinogen.

Benzene can form in soda and other drinks that contain both sodium benzoate and vitamin C (ascorbic acid)

Other factors, including exposure to heat and light, as well as longer storage periods, can increase benzene levels

In 2005, 10 out of 200 sodas and other fruit drinks tested by the FDA contained more than 5 parts per billion (ppb) of benzene which is the limit for safe drinking water set by the US

Particularly, fruit-flavored diet sodas and juice drinks exceeded 5 ppb of benzene.

Artificial Sweeteners: Are They Really a Healthy Alternative?

- Artificial sweeteners replace sugar.
- They are in diet sodas and low-calorie foods.
- Studies suggest potential links to metabolic disorders.
- They can disrupt gut bacteria.





High Fructose Corn Syrup: The Silent Epidemic

High fructose corn syrup is a common sweetener. It's in many processed foods and drinks. It can lead to weight gain and insulin resistance. It is linked to type 2 diabetes.

Trans Fats & Hydrogenated Oils: A Recipe for Heart Disease

Trans Fats

Found in: Margarine, fast food, fried snacks.

Trans fats increase LDL cholesterol.

They lower HDL cholesterol.

Hydrogenated oils extend shelf life.

They contribute to heart disease risk.



Food Dyes

Found in: Candies, sodas, baked goods.

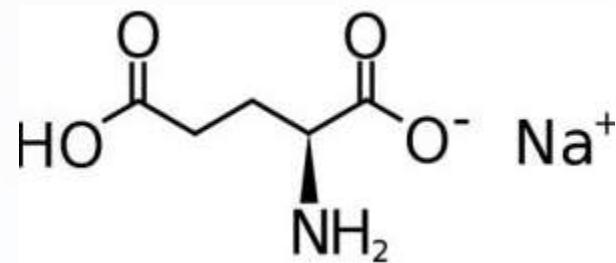
Health Risks: Hyperactivity in children, possible carcinogenic effects, allergies.



MSG (Monosodium Glutamate)

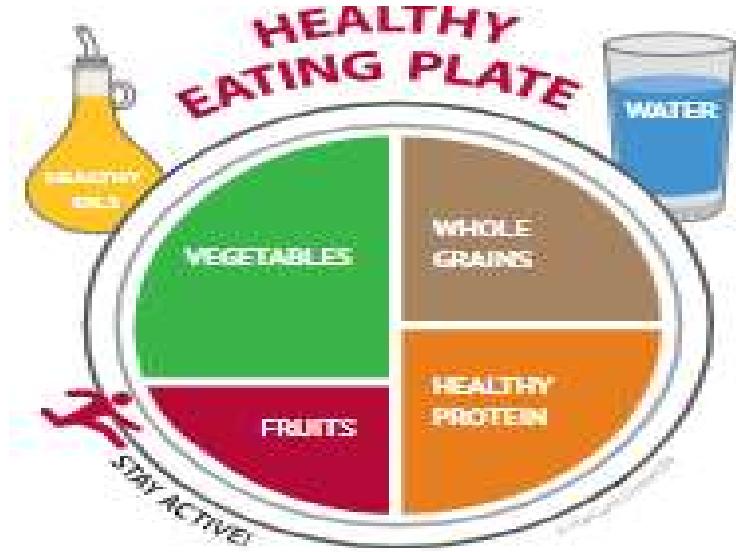
Found in: Processed meats, soups, snacks, fast food.

Health Risks: May cause headaches, excessive thirst, and metabolic issues



How to Avoid Harmful Chemicals

- **Read Labels Carefully**
- **Choose Whole, Fresh Foods**
- **Minimize Consumption of Processed Snacks**
- **Cook More at Home**



Create healthy,
balanced meals



**Eat healthy,
stay healthy.**



Thank you for listening