ERASMUS+ PROJECT · E-BOOK

# HEALTHY AND YOUNG

*Healthy nutrition, organic farming and food waste with traditional recipes and menus from our partner countries*

Türkiye · Poland · Croatia · Italy · North Macedonia
E-book production

Cooperation partnership in school education · KA220-SCH · 2024–2026

Open contents

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# Introduction

## What is this e-book about?

This e-book is the main output of the Erasmus+ project **HEALTHY AND YOUNG** (HAY), a two-year cooperation partnership between schools from Türkiye, Poland, Croatia and Italy.[1] It was created to help young people build a balanced nutrition culture and grow into healthy generations, by explaining how nutrition, agriculture and health are connected.

The book brings together lessons written by teachers of the partner schools. It introduces the European Union's *Green Deal* and its *From Farm to Fork* strategy, shows why organic farming matters for access to healthy food, draws attention to food waste, and presents traditional healthy menus from the partner countries. At the same time, it supports students' digital competences and language skills.

## How the book is organised

- **Part 1 – Healthy Nutrition:** the balanced diet, diseases caused by unhealthy nutrition, fast food, food additives and nutrition labels.
- **Part 2 – From Farm to Fork and Organic Farming:** organic farming, the EU Green Deal and genetically modified foods.
- **Part 3 – Food Waste:** causes, consequences and measures at home, in industry and in government.
- **Part 4 – Recipes and Menus:** traditional dishes and menus from the four countries.

Parts 1 to 3 each contain four lessons, one from each partner country, always in the same order: Türkiye, Poland, Croatia, Italy. Most lessons start with warm-up questions and end with comprehension questions or a short activity.

### How to use this interactive e-book

- Click any line of the **Contents** to jump straight to that page.
- Use **Previous**, **Contents** and **Next** at the bottom of every page.
- Click a **flag** at the bottom right to jump to that country's lesson in the current part.
- On the cover and on each part's opening page, click a flag or country card to open the lesson.
- Open the bookmarks panel of your PDF viewer to see the full structure.
- Foreign-language words and scientific names are set in *italics*. Small numbers in the text refer to the notes at the bottom of the page; all sources are listed in the **Bibliography**.

### Who is it for?

A concise guide for students, teachers and other participants, with short explanations and practical examples on nutrition, agriculture and food waste, so that reliable information is easier to find.

[1] Project application *Healthy and Young* (HAY), Erasmus+ KA220-SCH, Cooperation partnerships in school education, 2024.

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# The Project and Its Partners

| | |
|---|---|
| **Project** | **HEALTHY AND YOUNG** |
| **Acronym** | HAY |
| **Programme** | Erasmus+ · KA220-SCH Cooperation partnerships in school education |
| **Duration** | 24 months (1 November 2024 – 31 October 2026) |
| **Coordinator** | Adile Mermerci Anatolian High School, Türkiye |

## Project objectives

- Create a balanced nutrition culture and raise healthy generations by explaining the relationship between nutrition and health.
- Introduce the EU Green Deal *From Farm to Fork* strategy and the importance of organic farming for access to healthy food.
- Draw attention to food waste and ways of preventing it.
- Collect traditional healthy menus from the partner countries and encourage intercultural exchange.
- Improve students' digital and language competences.

## Partner schools



**TÜRKIYE**
Adile Mermerci Anatolian High School
Coordinator



**POLAND**
Zespół Szkół Ogólnokształcących im. Stefana Żeromskiego w Bielsku-Białej



**CROATIA**
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**ITALY**
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## E-book production

This e-book was designed and produced by the **Association for Sustainable Development ARS PUBLIKA, North Macedonia.**

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# 01

PART 1

# Healthy Nutrition

What we eat shapes how we grow, learn and feel. The four lessons in this part explain what a balanced diet is, what can go wrong when nutrition is unhealthy, how fast food and food additives affect the body, and how to read a nutrition label.

CHOOSE A COUNTRY



TÜRKIYE

## Diseases Caused by Unhealthy Nutrition

p. 6



POLAND

## Fast Food and Its Harmful Influence

p. 11



CROATIA

## Balanced Diet

p. 16



ITALY

## Food Additives and Nutrition Labels

p. 22

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# Diseases Caused by Unhealthy Nutrition

TÜRKIYE

**TÜRKİYE:Diseases Caused By An Unhealthy Nutrition**

Warm up questions

1- What do you think is an unhealthy nutrition?

2- Do you think you are eating healthy?

3- What are the consequences of an unhealthy diet?

4- Do you know the root causes of diseases such as obesity, diabetes or eating disorders?

Unhealthy nutrition is a problem that can have serious effects on the health of both individuals and societies. The aim of this course is to understand the diseases that can be caused by unhealthy nutrition and the effects of these diseases on the quality of life of individuals.

**Diseases Caused by Unhealthy Nutrition**

**1-Obesity**

Obesity; It is accepted as a disease that occurs as a result of the energy (calories) taken with food being more than the energy expended and the excess energy being stored as fat in the body (20% or more), which adversely affects the quality and duration of life. In daily life, individuals need daily energy that varies according to age, gender, work, genetic and physiological characteristics and disease status. In order to maintain a healthy life, the energy taken and the energy spent must be kept in balance. 15-18% of body weight in adult men and 20-25% in women is adipose tissue.When this ratio exceeds 25% in men and 30% in women, it constitutes obesity.

**Causes of obesity;**



excessive and wrong eating habits

Inadequate physical activity

Age

Gender

Socio - cultural factors

Income status

Hormonal and metabolic factors

Genetic factors

Psychological problems

Frequent very low-energy diets

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# Diseases Caused by Unhealthy Nutrition



Smoking and alcohol use

Some medications used (antidepressants, etc.)

Number of births and time between births

**How is obesity determined?**

Body Mass Index (BMI) is commonly used to determine obesity based on the WHO classification of obesity. BMI is a value obtained by dividing the body weight (kg) of an individual by the square of his/her height (in m) (BMI=kg/m2). BMI is used to estimate body weight according to height and does not provide information about body fat distribution.

The risk of disease in adults according to waist circumference measurement is shown in Table 1

Table 1 Risk of obesity-related diseases and waist circumference measurements in adults

| Cinsiyet | Risk (Uyarı sınırı) (=BKİ>25) | Yüksek risk (Eylem sınırı) ( =BKİ>30) |
|---|---|---|
| Erkek | > 94 | > 102 |
| Kadın | > 80 | > 88 |

| Gender | Risk (Warning limit) (=BMI>25) | High risk (Action limit) (=BMI>30) |
|---|---|---|
| Male | > 94 | > 102 |
| Female | > 80 | > 88 |

**Health problems/risk factors caused by obesity :**

- Insulin resistance - Hyperinsulinaemia
- Type 2 Diabetes Mellitus (Diabetes)
- Hypertension( high blood pressure)
- Coronary artery disease
- Hyperlipidaemia - Hypertriglyceridemia (Elevated Blood Fats)
- Metabolic syndrome
- Gall bladder diseases
- Some types of cancer (gallbladder, endometrial, ovarian and breast cancer in women, colon and prostate cancer in men)
- Osteoarthritis
- Paralysis
- Sleep apnoea
- Fatty liver disease
- Asthma
- Difficulty breathing
- Pregnancy complications
- Menstrual irregularities
- Excessive hair growth
- Increased risk of surgery
- Mental problems (such as Anorexia nervosa (not eating) or Bulimia nervosa (not utilising the food eaten by vomiting), Binge eating, night eating syndrome, or trying to achieve psychological satisfaction by eating more of something)

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# Diseases Caused by Unhealthy Nutrition



- Social disharmonies

- Skin infections, fungal infections in the groin and feet due to excess subcutaneous fat tissue, especially as a result of frequent weight loss and gain

- Musculoskeletal system problems

**The methods used in the treatment of obesity are grouped under 5 groups. These methods are**

1.Medical Nutrition (Diet) Therapy

2.Exercise Therapy

3. Behaviour modification therapy

4.Pharmacological treatment

5.Surgical treatment

Video Source:: https://youtu.be/9zM1alZ-hTQ?feature=shared

https://youtu.be/JoiiJrhIVxU?feature=shared

Source : https://hsgm.saglik.gov.tr/tr/dokumanlar-6.html

**2-Bulimia Nervosa and Anorexia Nervosa**

Anorexia nervosa and bulimia are eating disorders characterised by restricted eating, extreme weight loss and disturbing body shape. Although anorexia nervosa symptoms include anorexia and weight loss, a picture with complaints very common in general medicine develops. In addition, it is an important and dramatic psychiatric disorder that is sometimes the subject of the media due to the risk of mortality. Anorexic patients have tried to limit their calorie intake for many years, preferring to use self-induced vomiting, laxatives and diuretics after eating attacks due to fear of obesity in this process. However, most anorexic patients easily regain the lost body weight by following a difficult diet. Bulimia nervosa is a serious psychiatric disorder with a lifetime prevalence of approximately 1% of the population.



It is usually more common in women than in men. The causes of this disorder are voluntary vomiting, hormonal dysfunction caused by the misuse of laxatives and diuretics, hyperactivity and stimulant intake, and damage to thyroid hormones. Eating disorders are characterised by their negative effects on body shape and weight and are often accompanied by different aspects of social cognition. The authorities should raise public awareness about this serious disease, and such patients should receive psychological counselling with the support of their families, if necessary, and their subsequent nutrition processes should be transformed into eating habits under the control of a specialist dietician.

Source: Türkiye Sağlık Bilimleri ve Araştırmaları Dergisi, 3(2), 61-74
https://youtu.be/meZTDVAjFh4?feature=shared

**4-. Anaemia**

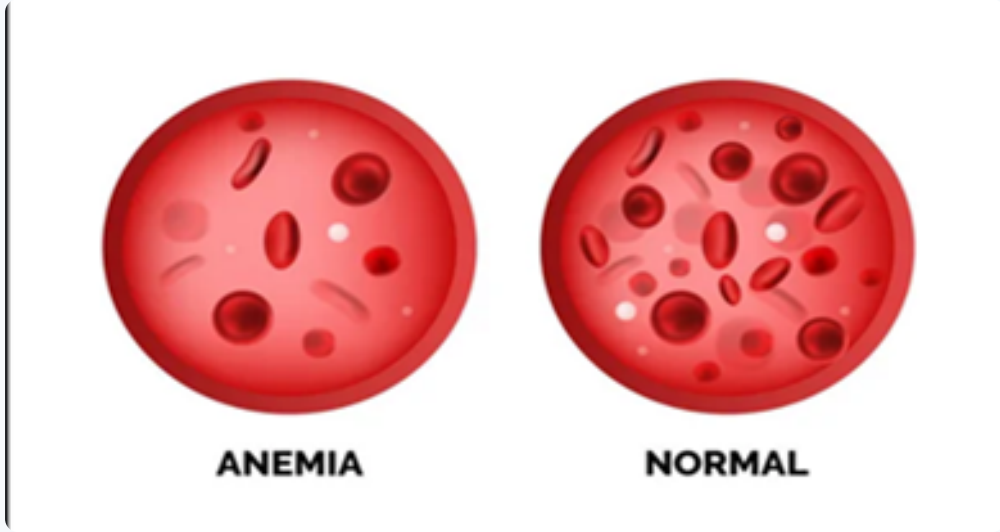
# Diseases Caused by Unhealthy Nutrition

TÜRKIYE

Anaemia occurs when you do not have enough red blood cells. The job of these red blood cells is to take oxygen from the lungs and carry it through the bloodstream to all other organs and tissues of the body. This is done with iron and a helper protein, haemoglobin, which is found inside the red blood cells. Being anaemic means feeling tired, feeling more cold than usual, and having paler skin. This is because the organs do not get enough of the oxygen they need.

What are the signs and symptoms of anaemia? Symptoms such as fatigue, shortness of breath and chills are seen in all types of anaemia. Other different symptoms are:

- Dizziness or weakness,




- Headache,
- Tenderness in the corners of the mouth and lips,
- Pale, dry or easily bruised skin,
- Involuntary movements in the lower leg (restless leg syndrome),
- Fast pulse.

Because of iron deficiency, your nails may be brittle or spoon-shaped and your hair may fall out. Your sense of taste may change or your ears may ring. People with Sickle Cell Anaemia often have heart and lung complications.

Untreated anaemia can lead to arrhythmia (irregular heartbeat), enlarged heart or heart failure. You are also at increased risk of infection and depression.The most common cause of anaemia is low levels of iron in the body;

Diet poor in vitamin B12

Diet without folic acid

Hereditary blood diseases (sickle cell anaemia or thalassaemia),

Anaemia occurs when your body does not have enough hormones to form red blood cells.

Source: https://atlasuniversitesihastanesi.com/anemi-nedir/

**5- Diabetes**

Diabetes is the lack and/or insufficiency of the hormone insulin, which balances the sugar level in the blood.

The sugar level measured after fasting for at least 8 (ideally 10) hours is defined as ‘fasting’.

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# Diseases Caused by Unhealthy Nutrition

TÜRKIYE




blood sugar' is called. Normal value; 70-100 mg/dl.

Blood sugar measured 2 hours after starting to eat is called ‘postprandial blood sugar’.

is given and should be below 140 mg/dl under normal conditions. Insulin is absolutely necessary for sugar to enter the cell. Insulin,

It acts as a key that opens the cell door for sugar to enter the cell.

When the pancreas does not produce enough insulin or when insulin

(insulin resistance), sugar cannot enter the cell and turn into energy.

Therefore, sugar starts to rise in the blood.

Decreased insulin production in the pancreas or sufficient insulin production

in case of insufficient effect at the level of tissues and organs

‘diabetes’ develops. Diabetes is called ‘Diabetes Mellitus’ in medical language.

It is called ‘diabetes’ and is popularly known as ‘diabetes’.

**Source:**:https://hsgm.saglik.gov.tr/depo/birimler/saglikli-beslenme-ve-hareketli-hayat-db/Dokumanlar/Diyabet/Diyabet-Nedir.pdf

https://youtu.be/XfyGv-xwjII?feature=shared

https://youtu.be/DMoh8_qGK30?feature=shared

https://youtu.be/JaYcs0wIxMk?feature=shared

Comprehension Questions

1-What are the symptoms of diabetes?

2-Do you know your body mass index?

3-What are the symptoms of anaemia?

4-What foods should we consume in case of anaemia?

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# Fast Food and Its Harmful Influence on the Body

POLAND

Warm-up questions:

1. How would you define “fast food”?

2. How many fast foods can you name in 30 seconds?

3. Why is fast food popular?

4. What are the nutritional concerns about fast food?

**I. Origins of fast food restaurants:**

The McDonald brothers opened their redesigned restaurant in 1948, and several fast-food chains that exist today opened soon after. Burger King and Taco Bell got their start in the 1950s, and Wendy's opened in 1969. Some chains, like Carl's Jr., KFC and Jack in the Box, existed before the Speedee Service System, but modified their cooking techniques after its debut. McDonald's, which started it all, is now the world's largest fast-food chain.

**II. What are some common types of fast food?**

## Different Types of Fast Food:

There are many kinds of fast food. What will one place have in terms of fast food types, depends on what grows there, what of ingredients can be obtained and what local people like. Here are some types of fast food:

**Hot dog**: a cooked sausage served in a sliced bun and garnished with condiments like mustard, ketchup, onions, mayonnaise, relish, cheese, and chili.

**Kebab**: pieces of meat, fish, or vegetables roasted or grilled on a skewer or spit. I originated in the Middle East.

**French fries**: invented by Belgians (surprise!), French fries are potatoes cut to short sticks and deep fried. Popular since 17th or 18th century.

**Hamburger**: a type of sandwich that has one or more meat patties placed in between two or more sliced buns and garnished with condiments.

**Chips**: Thinly cut potatoes (very thinly), heavily salted and deep fried until crispy. Legend says that they were made for the first time by a cook annoyed by his costumer who complained that his potatoes were too thick, soft and bland.

**Pizza**: a flat-bread baked in oven and topped with tomato sauce, cheese and various toppings. Modern pizza is invented in Italy and loved around the world.

**Sandwich**: a type of food where one type of food is place on or between two slices of bread. John Montagu, 4th Earl of Sandwich was inventor of this food.

**Taco**: Is a filling wrapped in a corn or wheat tortilla (type of flat-bread). Filling can be made of different ingredients like beef, pork, chicken, seafood, vegetables and cheese.

**Chicken nuggets**: made from meat slurry or chicken breasts cut to shape, breaded or battered, and then deep fried or baked. They were invented in the 1950s by Robert C. Baker, a food science professor at Cornell University.

**Onion rings**: a snack made of cross-sectional rings of onion dipped in batter or bread crumbs and then deep fried. It can be also made with onion paste.

**Fish and chips**: a fast food dish made of battered fish and deep fried chips (this time English “chips” meaning thickly cut deep fried potatoes). Can be garnished with vinegar and eaten with mushy peas.

**Poutine**: a sub-type of French fries originating from Canada. It is made of French fries and topped with a light and thin chicken, veal, or turkey gravy and cheese curds.

**Cheeseburger**: a hamburger with a sliced of melted cheese.

**Falafel**: a patty made from ground chickpeas, fava beans, or both and then deep fried. It is usually served in pita (slightly leavened flatbread baked made from wheat flour) or wrapped in a “lafa” (flexible flatbread).

**Popcorn**: a type of corn whose kernel puffs up when heated. It is very old fast food (people knew about it 8,000 years ago). It can be prepared salted or sweetened and it is still popular today.

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# Fast Food and Its Harmful Influence on the Body



**Corn on the Cob**: cooked ear of freshly sweet corn. Ear is picked while the kernels are still soft and cooked in boiling water. Kernels are then eaten directly off the cob.

## III. Health Impacts of Fast Food Consumption

We often turn to fast food when we're in a hurry. This choice comes with health risks that affect us now and later. Knowing about these risks helps us pick better food.

### Short-Term Health Effects

Eating fast food can change how we feel right away. Here are some short-term effects:

*Spikes in blood sugar:* Foods high in sugar and carbs make blood glucose go up fast. This can make us feel tired later.

*Elevated blood pressure:* Lots of sodium in fast food can make blood pressure go up.

*Digestive issues:* Foods that are greasy and processed can upset our stomachs.

*Mood swings:* Changes in sugar levels can make us feel grumpy or tired soon after eating.

### Long-Term Health Consequences

Eating fast food a lot can harm our health over time. These are some serious risks:

*Obesity:* Eating a lot of calories from fast food can make us gain weight and become obese. This is bad for our health.

*Diabetes:* Eating foods with a lot of sugar and not enough fiber can raise the chance of getting type 2 diabetes.

*Cardiovascular diseases:* Eating foods with a lot of bad fats can lead to heart disease and other heart problems.

*Nutritional deficiencies:* Fast food often lacks important nutrients, which can cause health problems over time.

## Key Components of Fast Food Nutrition

Understanding fast food nutrition helps us make better health choices. Fast food often has a lot of sugar, salt, and unhealthy fats. It also lacks fiber and important nutrients.

### High Sugar and Salt Content

Fast food has a lot of sugar and salt. This can make us want more food, increase calories, and lead to health problems. For example, a medium soda has over 50 grams of sugar, more than we should have in a day.

### Saturated and Trans Fats

Fast food often has bad fats like saturated and trans fats. These fats can make our cholesterol go up. Foods like burgers and fries have these fats, which can cause heart disease and weight gain. It's important to check the fast food's fat content often.

**Lack of Fiber and Nutritious Ingredients**

Fast food often doesn't have enough fiber or nutrients. Meals often miss out on veggies, whole grains, and vitamins. This can cause stomach problems and not help our health goals. Knowing about fast food's nutrition helps us choose better.

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# Fast Food and Its Harmful Influence on the Body

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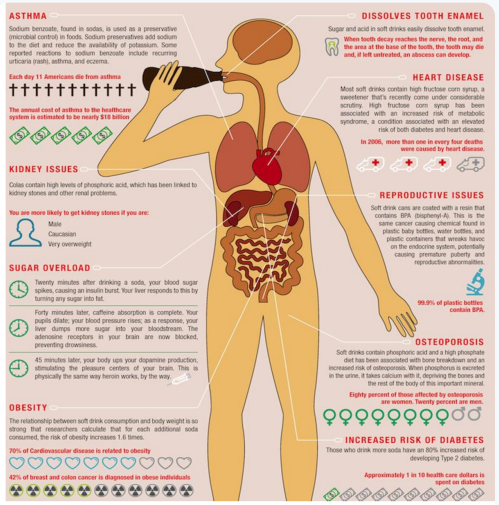


**Figure 3:** Health Impact of Carbonated Beverages (Source: Daily Infographic)

## IV. Healthy fast food is possible

Finding a well-balanced meal at a fast food restaurant may require making some special requests, but don't worry — you won't be the first person to ever ask for some tweaks. Don't be afraid to ask for extra veggies, to make a substitution or leave something off.

Keep these three quick tips in mind when making your fast food order:

Aim for lean protein, veggies andfiber.

Avoid supersized or jumbo meals.

Try to keep your meal at about 500 calories or less.

### Burgers

This fast food staple can pack in the calories. And all the grease can leave your belly feeling off. But if you're craving a burger, there are ways it can be calorie controlled.

Order the leanest type of burger you can. Or better yet, ask if they have aturkey burgeror a vegetarian option.

Order a single burger, rather than a double or triple stack.

Order a junior or kid size.

Stack your burger with as many veggies as you can. (Skip the iceberg lettuce and aim for baby spinach instead, if that's an option.)

Order your burger without a bun or ask for it to be lettuce-wrapped.

Skip the bacon.

### Chicken

A step up in nutrients from traditional meat burgers, chicken sandwiches or chicken nuggets can be a good source of lean protein.

Always opt for grilled chicken instead of fried. (At many places, you may see a "crispy" option. That's another word for fried.)

Skip the sauce (like mayo) and order without cheese. These items can quickly add calories.

Try ordering without a bun and dipping the chicken in mustard.

### Fish

If you're looking for a taste of the sea when it comes to fast food, tread carefully. While it may sound like a healthier choice (fish is a lean protein source, after all), a lot of fish options at fast food restaurants are actually high price in calories and fat.

Avoid breaded or fried fish items.

Tuna salad is usually packed with mayonnaise and is often beyond a normal day's fat guidelines. Ask to see a list of ingredients before ordering.

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# Fast Food and Its Harmful Influence on the Body

POLAND

### Salads

We know — if fast food is on the menu, you probably didn't have a salad in mind. But a number of fast food restaurants are making salads these days. Even still, some of the toppings you'll find on those salads can diminish their health potential. Keep your fast food salad healthy by:

Aiming for a lean source of protein like grilled chicken, beans or eggs.

Including a variety of food groups in your salad like fruits, nuts and seeds.

Asking for spinach or other dark leafy greens instead of iceberg lettuce.

Ordering dressing on the side or bringing your own healthier version. (Tip: Dip your fork in the dressing before you dig in. It can help keep your dressing use lower.)

### Burritos and tacos

When it comes to these popular fast-food meals, it's best to skip the tortilla and opt for a bowl instead. If you're a serious athlete who needs the carbs, you can go for the tortilla, but otherwise, you're going to be better off without it.

Start with lettuce as your base. Add brown rice and load up on veggies. Peppers, salsa and onions are good options.

Aim for lean meat, pinto beans or black beans for protein. (Avoid getting double meat. Your body can only absorb so much protein at a time.)

Get a small size or split up the larger size and eat half now and half later.

Skip the sour cream and cheese or ask for a small amount. Or bring your own Greek yogurt to add on top. Avocado is another great topper and full of healthy fats.

### Sides

French fries are one of America's favorite foods and a staple at many fast food joints. But they're often overly processed, deep-fried and chock-full of saturated fat.

Your best bet is to avoid anything fried. Side salads, a baked potato, apple slices, fruit cups or yogurt are healthier side choices.

If you're really craving fries, get the smallest size possible.

### Drinks

Soda and fast food seem to go hand-in-hand. But it's no secret that soda isn't good for us. (That includes the "diet" kinds, which are full of artificial sweeteners that should be avoided.) But you can find healthier choices on just about any fast food menu.

Opt for unsweetened tea or stick with water.

Avoid shakes, which could easily run you up to 800 calories.

### Sauces

Condiments, dips and seasoning can wreak havoc on an otherwise healthy meal. That's in part because most have a ton of hidden sugar and sodium.

Be mindful of how much you're actually using. Measure it out if you can.

Bring your own healthier or homemade version.

Mustard, guacamole, salsa, vinegar, hummus and hot sauce are all great options for adding flavor without sacrificing the rest of the dish's calories.

Avoid (or at least ask to ask to go light on) mayonnaise and creamy sauces.

### Dessert

Sometimes, you just need a sweet treat. Plus, who wants to take the kids to the ice cream shop and not get anything?

Consider frozen yogurt or no-sugar-added treats.

Skip the candy toppings.

## Make it an occasional thing

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# Fast Food and Its Harmful Influence on the Body



POLAND

A survey by Cleveland Clinic found that nearly half of Americans eat fast food every week. Even when you're making healthier fast food choices, you don't want to overdo it. Zumpano suggests working to limit your intake of fast food to once a week at the most.

"Most fast food is made from packaged and processed ingredients," Zumpano explains. "So, it's going to be very high in sodium. It's void of vitamins and minerals, too, so it's not providing us much in the way of nutrition."

If you need an occasional indulgence on quick eats, it's OK. We all need a convenient bite here and there. But knowing there are healthy choices to be made, even at the drive-thru, can help ensure you get that convenience without derailing your day.

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# Balanced Diet



**CROATIA: Balanced Diet**

Warm up questions:

What do you think a balanced diet is?

Why do you think it's important to have a balanced diet?

Can you list some food groups that are important for a balanced diet?

How does eating a balanced diet affect your health?

Introducing the key concepts:

**What is a balanced diet?**

A balanced diet is one that provides all the essential nutrients — such as carbohydrates, proteins, fats, vitamins, and minerals — in the correct proportions to maintain health, energy levels, and support normal body functions. It involves consuming a variety of foods from all food groups while ensuring the right balance between energy intake and expenditure. (World Health Organization, n.d.)

**Key concept: Energy and metabolism**

A balanced diet is crucial for maintaining homeostasis, which is the body's ability to regulate and stabilize its internal environment despite external changes. Homeostasis ensures that vital processes, such as body temperature, pH levels, and nutrient concentrations, are kept within optimal ranges. The body achieves this balance through various biochemical processes, including metabolism, which consists of two main types of reactions: catabolic and anabolic.

Catabolic reactions involve the breakdown of complex molecules, such as carbohydrates, fats, and proteins, into simpler ones, releasing energy in the form of ATP. This energy is crucial for powering various cellular functions, including movement and repair. On the other hand, anabolic reactions use energy to build complex molecules from simpler ones, such as the synthesis of proteins and DNA, supporting growth and tissue repair.

These metabolic processes are interconnected with thermochemical reactions, where the chemical energy from food is converted into heat and work. This energy conversion is tightly regulated by hormones and enzymes, ensuring that the body maintains a stable temperature (about 37°C in humans) necessary for enzymatic activity. Thus, a balanced diet provides the essential nutrients needed for efficient metabolism, which, in turn, supports homeostasis and the body's overall health. (National Institute of General Medical Sciences, n.d.).

**Key concept: Basal metabolism**

Understanding the daily energy requirements of the body is essential for creating and maintaining a balanced diet. The body's energy needs vary depending on age, gender, activity level, and health status. A key concept in this is the basal metabolic rate (BMR), which refers to the amount of energy the body needs to perform basic life-sustaining functions such as breathing, circulation, and cell production while at rest. On average, BMR accounts for about 60-75% of total daily energy expenditure. For an adult, the average BMR is approximately 1,200 to 1,800 kcal per day, although this can vary.

In addition to BMR, the body requires energy for physical activities and the digestion of food. Total daily energy expenditure (TDEE), which includes BMR, physical activity, and the thermic effect of food, varies depending on activity levels but typically ranges from 2,000 to 2,500 kcal for adults. (National Institute of General Medical Sciences, n.d.).

**Key concept: Macronutrients intake**

A balanced diet must meet energy needs while also providing adequate amounts of macronutrients - carbohydrates, proteins, and fats - which are essential for the body's functions. Proteins serve as building blocks for muscles and tissues, while carbohydrates provide a quick source of energy, and fats support cell structure and energy storage. Additionally, micronutrients such as vitamins and minerals play crucial roles in maintaining proper bodily functions, such as immune response, bone health, and enzyme activity.

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# Balanced Diet



Thus, understanding how much energy the body requires at rest and during activity helps ensure that a diet supports both energy balance and the maintenance of vital bodily functions. (American Society for Biochemistry and Molecular Biology, n.d.)

**Table 1.** Components of a balanced diet.

| Components of a Balanced Diet | Properties | Sources | Function |
|---|---|---|---|
| **Carbohydrates** | Carbohydrates are the body's main source of energy. They are broken down into monosaccharides (glucose), which is used by the body for energy. | Bread, rice, pasta, potatoes, fruits, and vegetables. | Provide quick and accessible energy for daily activities. |
| **Proteins** | Proteins are essential for the growth, repair, and maintenance of body tissues. They are also involved in enzyme and hormone production. | Meat, fish, poultry, dairy products. | Help build and repair body tissues like muscles, skin, and organs. |
| **Fats** | Fats are necessary for energy storage, protecting vital organs, and maintaining healthy skin. They also aid in the absorption of fat-soluble vitamins (A, D, E, and K). | Olive oil, avocado, nuts, seeds, butter, and fatty fish like salmon. | Provide long-lasting energy and assist in nutrient absorption. |
| **Vitamins and Minerals** | Vitamins and minerals are essential for various body functions, including immune support, bone health, and wound healing. | Fruits, vegetables, dairy products, meat, fish, and whole grains. | Help the body function properly and prevent deficiencies. |
| **Water** | Water is vital for maintaining hydration, regulating body temperature, and aiding digestion. | Water, fruits, vegetables, soups, and beverages. | Hydrates the body and supports all metabolic functions. |

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# Balanced Diet



**Benefits of a Balanced Diet**

Maintains Healthy Body Weight (a balanced diet helps in controlling calorie intake and prevents obesity).

Improves Energy Levels (consuming the right amount of carbohydrates, proteins, and fats provides sustained energy throughout the day).

Boosts Immune System (nutrients from a balanced diet, such as vitamins and minerals, strengthen the immune system, helping the body fight off illnesses).

Promotes Healthy Skin and Hair (proper nutrition helps maintain healthy skin and prevents dryness, acne, and hair loss).

Supports Mental Health (a balanced diet is also linked to better mental health, improved mood, and cognitive function).

**Guidelines for a Balanced Diet**

Eat a variety of foods and ensure a range of foods from all the major food groups to get a full spectrum of nutrients.

Control portion and pay attention to portion sizes to avoid overeating.

Limit processed foods and avoid excessive intake of processed foods, which often contain unhealthy fats, sugars, and additives.

Drink plenty of water and stay hydrated throughout the day to support body functions and digestion.

Moderation is key while some foods are healthier than others, it's important to enjoy treats in moderation.

Source for educational video:
https://www.youtube.com/watch?v=mRJOnXz9u0s&ab_channel=NSLEARNINGTOOLS

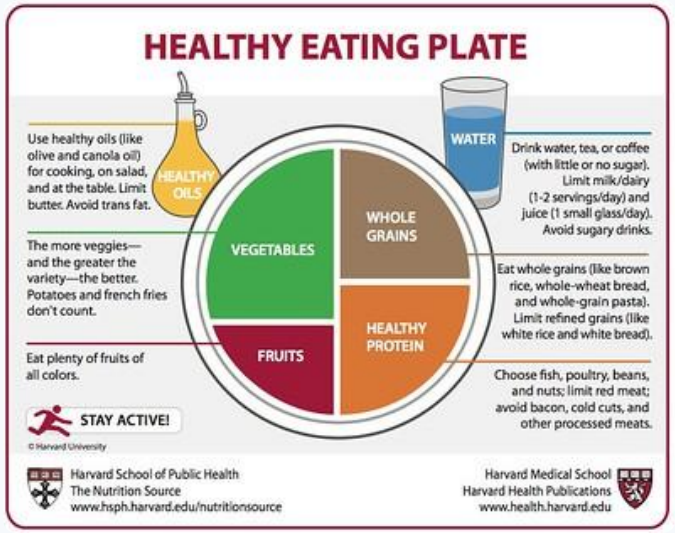


**Table 2.** Pictorial summary of the main food groups and their recommended proportions for a balanced diet (Harvard T.H. Chan School of Public Health, n.d.). Shared under CC licence.

**Common nutrient deficiencies from poor diet**

A poor or unbalanced diet can lead to deficiencies in certain essential nutrients, which can have serious health consequences such as iron deficiency (leads to anaemia, causing fatigue and weakness), calcium deficiency (may cause bone disorders, such as osteoporosis), vitamin D deficiency (impairs calcium absorption and can lead to bone pain and weakness) and vitamin A deficiency (can result in vision problems and a weakened immune system). (Centers for Disease Control and Prevention, n.d.)

**Practical tips for maintaining a balanced diet**

Include whole grains like oats, brown rice, and whole-wheat bread to ensure you get enough fiber.

Choose lean protein sources such as chicken, fish, eggs, beans, and lentils.

Eat a variety of colorful vegetables and fruits to ensure you're getting a range of vitamins and minerals.

Limit sugary drinks and replace them with water, herbal teas, or fresh fruit juices.

# Balanced Diet



Snack on healthy options like nuts, fruits, or yogurt instead of chips or sweets.

**Activity: Student survey on nutrition and physical activity and a class discussion**

As part of this lesson, we will conduct a survey to assess students' current understanding of balanced diets, their eating habits, and their physical activity levels. The purpose of this survey is to reflect on the students' current lifestyle and see how closely it aligns with the principles of a balanced diet.

After completing the survey, we will discuss the results as a class. This discussion will help students reflect on how their own eating habits and physical activity levels compare to what they have learned about a balanced diet. We will also talk about any habits that need to be improved and share tips for making healthier choices.

Available on link: https://forms.cloud.microsoft/Pages/AnalysisPage.aspx?AnalyzerToken=nxLDWtNarv3iULX3RbkC2biTd5lUel0D&id=DQSIkWdsW0yxEjajBLZtrQAAAAAAAAAAAAO__TZhawhURFpNQUpMWktLM1FDR0VWTkk3SERORkRRNS4u

**Comprehension questions**

What are the main components of a balanced diet?

Why is water considered an essential part of a balanced diet?

What is the role of carbohydrates in providing energy?

How does a balanced diet contribute to mental health?

What can happen if you have an iron deficiency?

What are some practical tips for maintaining a balanced diet?

**Conclusion**

Maintaining a balanced diet is crucial for supporting overall health and well-being. By consuming a variety of nutrient-rich foods in the right proportions, individuals can optimize their physical and mental health, reduce the risk of chronic diseases, and improve their quality of life. A balanced diet is not just about eating the right foods, but also about understanding how the body uses those nutrients to stay healthy and function at its best.

**Post-lesson reflection**

After the class discussion and survey results, encourage students to reflect on their own habits. Ask them to set a personal goal for improving their diet and physical activity based on what they've learned.

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**Appendix: Survey results**

**1. Introduction**

This study examines the dietary awareness, eating habits, lifestyle patterns, and BMI distribution among students at Gimnazija Metković. A total of 129 students participated in the survey, representing approximately one-third of the total student body of the school. The sample included both male and female students, all of whom are enrolled at Gimnazija Metković. The study aims to investigate students' understanding of a balanced diet and analyse the correlation between their nutritional choices, physical activity, and BMI.

**2. Hypotheses**

H1: Students who consume more fruits and vegetables will have a lower BMI.

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H2: Higher consumption of sugary drinks is associated with an increased BMI.

H3: Students with regular physical activity will have healthier BMI levels compared to those with sedentary lifestyles.

H4: Insufficient sleep correlates with higher BMI values.

**3. Materials and Methods**

A questionnaire was distributed to 129 students at Gimnazija Metković to assess their dietary habits, lifestyle patterns, and BMI. The survey included questions about age, gender, frequency of fruit and vegetable intake, sugary drink consumption, water intake, sleep duration, physical activity levels, and meal timing. BMI values were self-reported and analysed for accuracy. Data were categorized and presented as absolute numbers and percentages.

**Questionnaire used in research.**

1. How old are you?
2. What is your gender?
3. What is your BMI? *(Respondents were asked to calculate it using an online BMI calculator.)*
4. Do you know what a balanced diet is?
5. How many meals do you have per day?
6. How often do you consume fruit?
7. How often do you consume vegetables?
8. Do you consume both fruit and vegetables?
9. Do you consume sugary drinks?
10. Which of the following foods do you consider unhealthy for a balanced diet?
11. How many glasses of water do you drink daily?
12. How many hours before sleep do you eat your last meal?
13. How much physical activity do you have daily?
14. Do you think your diet affects your energy levels and mood?
15. How many hours of sleep do you typically get each night?

**4. Results**

The survey was conducted using Microsoft Forms, and the collected data was processed and analyzed in Microsoft Excel. Advanced statistical correlations and insights were generated using an AI-powered tool for complex data analysis, which facilitated the identification of key patterns and relationships within the dataset

**4.1. Age Distribution:** 16-17 years: 74 students (57.4%), 18-19 years: 30 students (23.3%), 14-15 years: 24 students (18.6%)

**4.2 BMI Distribution**

Normal weight: 80 students (62.0%)

Underweight: 20 students (15.5%)

Obese: 15 students (11.6%)

Overweight: 11 students (8.5%)

Most students fall within the normal weight range, while 24.1% are either overweight or obese.

**4.3 Dietary Habits Fruit Consumption**

Often (60-70% of meals): 46 students (35.7%)

Occasionally (30-40% of meals): 44 students (34.1%)

Always (90-100% of meals): 25 students (19.4%)

Rarely (10-20% of meals): 10 students (7.8%)

Never (0% of meals): 4 students (3.1%)

**4.4. Vegetable Consumption**

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Often (60-70% of meals): 41 students (31.8%)

Occasionally (30-40% of meals): 38 students (29.5%)

Always (90-100% of meals): 38 students (29.5%)

Rarely (10-20% of meals): 11 students (8.5%)

Never (0% of meals): 1 student (0.8%)

**4.5. Sugary Drinks Consumption**

Sometimes: 67 students (51.9%)

Yes (regular consumption): 43 students (33.3%)

No: 19 students (14.7%)

**4.6. Water Intake**

5-6 glasses: 37 students (28.7%)

3-4 glasses: 29 students (22.5%)

7-8 glasses: 27 students (20.9%)

More than 8 glasses: 18 students (14.0%)

1-2 glasses: 14 students (10.9%)

Less than 1 glass: 4 students (3.1%)

**4.7. Lifestyle Habits Sleep Duration**

5-6 hours: 61 students (47.3%)

7-8 hours: 52 students (40.3%)

Less than 5 hours: 9 students (7.0%)

More than 8 hours: 7 students (5.4%)

**4.8. Physical Activity**

An hour or longer daily: 44 students (34.1%)

More than 30 minutes daily: 42 students (32.6%)

Less than 30 minutes daily: 36 students (27.9%)

No physical activity: 7 students (5.4%)

**5. Discussion**

The results confirm a connection between BMI and students' dietary and lifestyle choices:

Hypothesis 1 confirmed: Students who frequently consume fruits and vegetables tend to have normal BMI levels.

Hypothesis 2 confirmed: Those who regularly consume sugary drinks show a higher prevalence of overweight and obesity.

Hypothesis 3 confirmed: Students who engage in physical activity for at least 30 minutes daily generally maintain a healthy BMI.

Hypothesis 4 confirmed: A correlation exists between shorter sleep duration and higher BMI values, emphasizing the importance of adequate rest.

**6. Conclusion**

The findings highlight the significance of promoting healthier eating and lifestyle habits among students. Encouraging increased physical activity, reducing sugary drink consumption, and improving sleep patterns may contribute to better overall health. Educational programs focusing on balanced nutrition and active living could further support students' well-being.

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# Food Additives and Nutrition Labels

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## ITALY: Additives in food and their harms

Warm up questions:

Are all the ingredients in our food actually safe for us to consume?

What do you think food additives are and why are they used for?

Why do you think it's important to know about food additives?

How do food additive regulations impact public health and consumer choices?

This paper provides a detailed exploration of food additives, regulatory oversight, health effects, and public concerns, ensuring a comprehensive understanding of the topic.

Introducing the key concepts:

**What are food additives?**

Food additives are substances added to food to maintain or enhance their safety, freshness, taste, texture, or appearance. They can be either natural, derived from plants, animals, or minerals, or synthetic, created in a lab.

Among the **natural additives** there are:




**colorants** derived from fruits, vegetables, or minerals (e.g., red color from beetroots, purple color from grape skins).

**flavor enhancers** like herbs, spices, or natural extracts (e.g., salt, vinegar, smoke).

**preservatives** or substances that help prevent spoilage, like salt, sugar, or vinegar.

**thickeners and stabilizers** that derive from plants or animals (e.g., carrageenan from seaweed, xanthan gum from bacteria).

**antioxidants** like vitamin C, which prevent oxidation and rancidity.

Among the **synthetic additives** the main important are:

**colorants** like synthetic dyes (e.g., tartrazine).

**artificial sweeteners** better known as aspartame and saccharin.

# Food Additives and Nutrition Labels



**preservatives** or synthetic chemicals (e.g., sodium nitrite, sodium benzoate).

**flavors and flavor enhancers** that artificially produce flavor compounds.

**emulsifiers, stabilizers, and thickeners s**ynthetically produced to improve texture and consistency.

In the European Union (EU) all food additives are identified by an E number. An E number means that an additive has passed safety tests and has been approved.

This paper explores the classification, regulatory aspects, safety testing, potential health effects, and public concerns surrounding food additives while referencing contemporary studies and regulatory guidelines.




**Classification of Food Additives**

Food additives are categorized on their function to improve or maintain food quality and characteristics:

**Preservatives** (added to prolong the shelf-life of foods by protecting them against micro-organisms to prevent microbial growth and spoilage):

Sodium benzoate (E210–E213)

Potassium sorbate (E202)

Nitrates and nitrites (E249–E252)

Sulphites (E220–E225 and E228)

**Colorants** (that enhance or restore color lost during food processing or following exposure to light, air, moisture, and variations in temperature):

Tartrazine (E102)

Sunset Yellow FCF (E110)

Yellow 2G (E107)

Cochineal (E120)

**Flavor Enhancers** (used to intensify or supplement the natural flavors of food, rather than imparting a new flavor themselves):

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Monosodium glutamate (MSG) (E621)

Disodium guanylate (E627)

Disodium inosinate (E631)

**Sweeteners** – (provide a sweet taste without added calories):

Aspartame (E951)

Saccharin (E954)

Sucralose (E955)

**Emulsifiers** – (that help combine oil and water, which don't naturally mix, creating stable emulsions and improving texture, stability, and shelf life in foods like mayonnaise, ice cream, and baked goods):

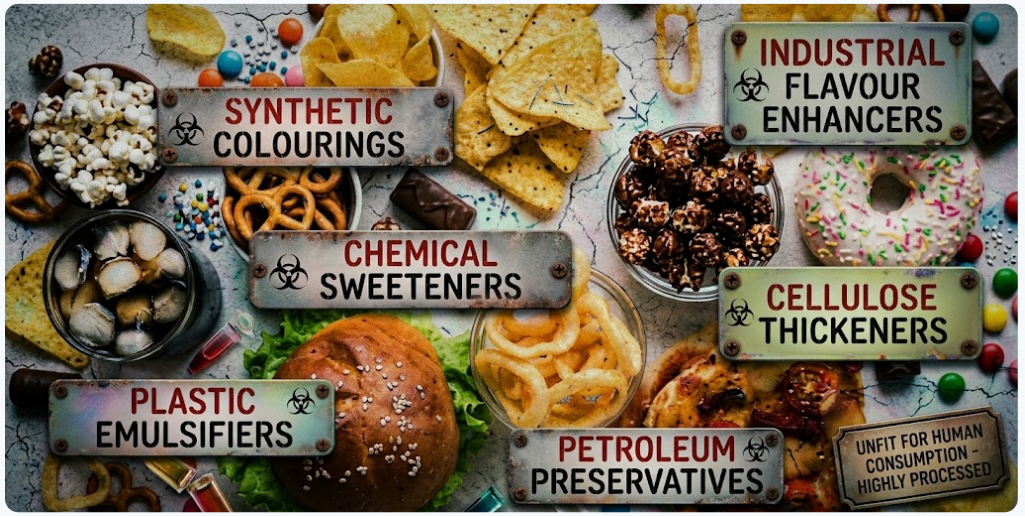
Lecithin (E322)

Polysorbates (E432–E436)

**Stabilizers and Thickeners** (they maintain consistency and texture):

Xanthan gum (E415)

Guar gum (E412)




**Antioxidants** – (that prevent oxidation, which leads to food deterioration like spoilage, rancidity, and changes in color and flavor):

Butylated hydroxyanisole (BHA) (E320)

Butylated hydroxytoluene (BHT) (E321)

**Anti-Caking Agents** – (they are used in powdered or granulated foods to prevent clumping and ensure free-flowing properties):

Silicon dioxide (E551)

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Calcium silicate (E552)

**Food acids** – (they maintain the right acid level):

Citric acid (E330) – Found in soft drinks, candies, fruit juices

Acetic acid (E260) – Used in vinegar, pickled foods

Lactic acid (E270) – Found in dairy products, fermented foods

Malic acid (E296) – Used in sour candies, fruit-flavored drinks

**Humectants** – (substances that keep foods moist):

Glycerol (E422) – Used in cakes, chewing gum, dried fruits

Sorbitol (E420) – Found in sugar-free candies, baked goods

Propylene glycol (E1520) – Used in icings, processed meats

**Foaming agents** – (they maintain uniform aeration of gases in foods):

Lecithin (E322) – Found in whipped toppings, sauces

Gelatin (E441) – Used in marshmallows, mousses

Mono and diglycerides of fatty acids (E471) – Found in coffee creamers, baking mixes

**Mineral salts** – (they enhance texture and flavour):

Calcium carbonate (E170) – Used in fortified foods, antacids

Sodium phosphate (E339) – Found in processed cheese, meats

Magnesium sulfate (E518) – Used in bottled water, sports drinks

**Flour treatment** – (it improves baking quality, texture, and appearance, such as enriching with nutrients, bleaching for color, or maturing for dough strength(:

Ascorbic acid (E300) – Strengthens dough

Potassium bromate (E924) – Improves bread rise and texture

Ammonium persulfate (E923) – Used in flour processing

**Glazing agent** (which improves appearance and can protect food):

Beeswax (E901) – Used in chocolates, fruit coatings

Shellac (E904) – Found in candies, coated nuts



Carnauba wax (E903) – Used in gummy candies, chewing gum

**Gelling agents** – (they alter the texture of foods through gel formation):

Agar-agar (E406) – Used in jellies, vegetarian gelatin substitutes

Pectin (E440) – Found in jams, jellies, fruit preserves

Carrageenan (E407) – Used in dairy products, plant-based milks

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**Propellants** – (help propel food from a container, like in aerosol sprays, and can include substances like carbon dioxide, nitrous oxide, butane, and propane).

Nitrous oxide (E942) – Used in whipped cream dispensers

Carbon dioxide (E290) – Found in aerosol sprays, carbonated drinks

Propane and butane (E944, E943a, E943b) – Used in cooking sprays

**Raising agents** (that increase the volume of food through the use of gases):

Baking soda (E500) – Used in cakes, bread

Yeast (No E-number) – Found in bread, beer fermentation

Ammonium bicarbonate (E503) – Used in biscuits, crackers

**Bulking agents** –(increase the volume of food without major changes to its available energy):

Polydextrose (E1200) – Used in sugar-free products, desserts

Maltodextrin (No E-number) – Found in processed foods, sports drinks

Cellulose (E460) – Used in dietary fiber, low-calorie foods

Inulin (No E-number) – Found in fiber-rich foods and dairy alternatives




**3. Are food additives safe?**

Food additives have been used for centuries, with salt, sugar, and vinegar historically utilized for food preservation. However, modern food science has expanded the range of additives, incorporating synthetic compounds that undergo rigorous safety evaluations before approval.

Generally, food additives are considered safe when used at permitted levels, as they undergo rigorous safety assessments before being approved for use. However, some additives may pose risks for certain individuals, and it's important to be aware of potential sensitivities or allergies.

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Food safety authorities worldwide, like the European Food Safety Authority (EFSA), the World Health Organization (WHO), and the Food and Agriculture Organization (FAO), play a crucial role in ensuring safe food for consumers through risk assessment, setting standards, and responding to food safety emergencies. The safety of all food additives that are currently authorised has been assessed by the Scientific Committee on Food (SCF) and/or the EFSA. Only additives for which the proposed uses were considered safe are on the EU list.

As a result of the re-evaluation programme, so far the use of three food colours has been revised because EFSA decreased their acceptable daily intake (ADI) and considered that human exposure to these colours is likely to be too high. Therefore, the maximum levels of these colours that can be used in food have been lowered starting from the early 2012. This reference concerns E 104 Quinoline yellow, E 110 Sunset Yellow and E 124 Ponceau 4R.




4. Notable additives of concern

Here are 8 of the most common food additives, plus recommendations for which ones to keep out of your diet.

**Artificial food dyes** such as Red No. 3 and Yellow No. 5 have been linked to behavioral issues in children, including hyperactivity and attention disorders. These dyes are also suspected carcinogens in high doses and may contribute to long-term health risks. Found in: candies, soft drinks, baked goods.

**Brominated Vegetable Oil (BVO)** Used to stabilize citrus-flavored drinks, BVO contains bromine, a component also found in flame retardants. High levels of bromine exposure have been associated with neurological symptoms, thyroid dysfunction, and skin irritation. Its use has been banned or restricted in several countries (Wikipedia). Found in: sports drinks, citrus-flavored sodas.






# Food Additives and Nutrition Labels



**Monosodium Glutamate (MSG)** A common flavor enhancer, MSG has been reported to cause headaches, nausea, and allergic reactions in sensitive individuals. Some studies suggest that excessive consumption may have neurotoxic effects by overstimulating nerve cells. Found in: instant noodles, processed meats, chips, fast food.

**Sodium Benzoate and Potassium Benzoate** These preservatives, often found in soft drinks, have been linked to hyperactivity in children and may form benzene, a known carcinogen, when combined with ascorbic acid. Long-term consumption may contribute to oxidative stress and cell damage (National Institutes of Health). Found in: fruit juices, carbonated drinks, pickles.




**Aspartame** A widely used artificial sweetener, Aspartame has been linked to headaches, dizziness, and possible increased cancer risk. Some researchers have suggested that it may interfere with neurotransmitter function, affecting mood and cognitive abilities (National Cancer Institute). Found in: diet sodas, sugar-free gum, yogurt.

**Butylated Hydroxyanisole (BHA) & Butylated Hydroxytoluene (BHT)** These preservatives help prevent fats from going rancid but have been classified as possible carcinogens. Animal studies suggest that they may cause liver and kidney damage with prolonged exposure (NIH). Found in: chips, cereals, processed meats.




**Sodium Nitrates and Nitrites** Commonly used to preserve processed meats, these compounds have been linked to an increased risk of colorectal cancer. They can also contribute to the formation of nitrosamines, carcinogenic substances formed during digestion (Cancer Research UK). Found in: bacon, hot dogs, deli meats.

**High-Fructose Corn Syrup (HFCS)** A common sweetener that has been associated with obesity, diabetes, and fatty liver disease. HFCS is metabolized differently than regular sugar, leading to increased fat accumulation and insulin resistance (American Heart Association). Found in: soft drinks, sweetened yogurt, salad dressings.

**5. Regulation and Safety Assessment**

# Food Additives and Nutrition Labels



Food additives are subject to strict regulatory oversight to ensure consumer safety. The key regulatory bodies include:

**Food Standards Australia New Zealand (FSANZ)** – Regulates food additives in Australia and New Zealand.




**European Food Safety Authority (EFSA)** – Evaluates food additives for safety in the European Union (EU).

**U.S. Food and Drug Administration (FDA)** – Oversees food additives in the United States.

Before approval, food additives undergo toxicological studies to determine safe levels of consumption. The Acceptable Daily Intake (ADI) is established based on animal testing, usually incorporating a 100-fold safety margin to ensure human safety (EFSA, 2021).

Studies have shown variations in regulatory approvals. For instance, titanium dioxide (E171) was banned in the EU in 2022 due to concerns about potential DNA damage, but it remains approved in the U.S. (EFSA, 2021; FDA, 2023).

**6. Health Effects of Food Additives**

While most food additives are safe for consumption, some individuals experience adverse reactions. The most common concerns include:

**1. Allergic Reactions and Sensitivities**

Some additives trigger allergic reactions or intolerances. Notable examples include:

**Sulfites (E220–E228):** Can cause asthma symptoms in sensitive individuals (Simon et al., 2020).

**Tartrazine (E102):** Associated with hyperactivity in children (Bateman et al., 2004).

**MSG (E621):** Linked to "Chinese Restaurant Syndrome," characterized by headaches and nausea (Geha et al., 2000).

**2. Potential Carcinogenicity**

**Nitrites and nitrates (E249–E252):** Used in processed meats, these compounds can form nitrosamines, which are linked to colorectal cancer (IARC, 2018).

**Aspartame (E951):** A 2023 study by the WHO suggested possible carcinogenic effects, though regulatory bodies still consider it safe within ADI limits (WHO, 2023).

**3. Neurological Effects**

Some studies suggest artificial food colorings may exacerbate symptoms in children with ADHD (Stevens et al., 2011).

BHA and BHT, commonly used antioxidants, have been linked to neurotoxicity in high doses (Williams et al., 2017).

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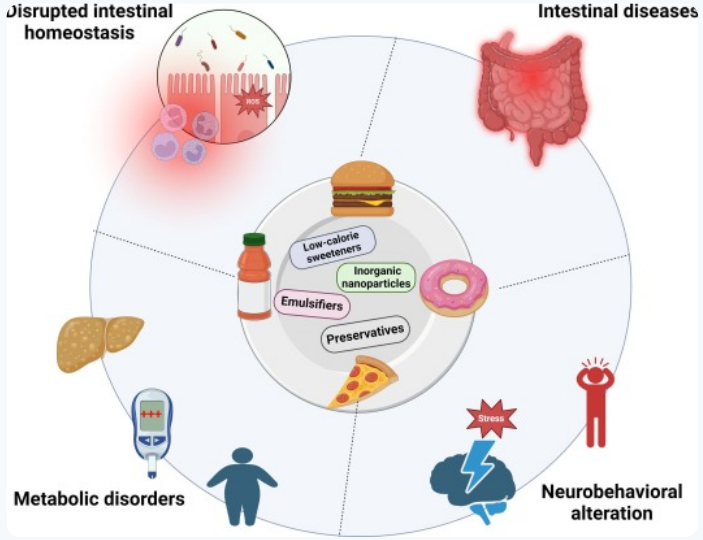


**7. Potential Health Risks Associated with Food Additives**

**Digestive and Nervous Disorders** Some additives have been linked to digestive issues such as diarrhea and colicky pains, as well as nervous disorders including hyperactivity, insomnia, and irritability (Better Health). These effects are particularly pronounced in children, whose developing digestive and nervous systems are more sensitive to chemical disruptions.

**Respiratory and Skin Problems** Additives can trigger respiratory issues like asthma and rhinitis, and skin reactions such as hives and rashes (Better Health). Certain preservatives and food dyes have been known to exacerbate allergic reactions in individuals with pre-existing conditions.

**Hormonal and Developmental Effects** Certain additives may interfere with hormonal functions, potentially affecting growth and development, particularly in children (Healthy Children). Some additives mimic estrogen, leading to concerns about early puberty and reproductive health disruptions.

**Cancer Risk** Some preservatives, like nitrates and nitrites used in processed meats, have been associated with an increased risk of certain cancers (Harvard Health). Long-term exposure to these chemicals has raised red flags among researchers examining links to stomach and colorectal cancer.

**Cardiovascular and Mental Health Issues** High intake of non-caloric sweeteners has been linked to cardiovascular disease and depression in adults and is associated with childhood obesity (PubMed). These additives may also contribute to metabolic disorders by altering insulin sensitivity.

**8. Comparative Regulatory Policies**

Regulatory differences between countries affect consumer choices. Examples include:

**Titanium Dioxide (E171)** – Banned in the EU due to genotoxicity concerns but still allowed in the U.S.

**Potassium Bromate (E924)** – Banned in the EU and Canada due to its carcinogenic potential but permitted in the U.S.

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**Artificial Colorings** – The EU requires warning labels on some artificial dyes, while the U.S. does not impose similar restrictions.

**Emerging Alternatives to Food Additives**

With increasing demand for clean-label foods, alternative preservation and enhancement methods are being explored:

**Natural Preservatives** – Rosemary extract and vitamin C are replacing synthetic preservatives.

**Fermentation** – Used in yogurt and cheese to naturally enhance flavor and shelf life.

**Plant-Derived Colorants** – Beet juice, turmeric, and spirulina are used as alternatives to synthetic dyes.

**Public Perception and Misinformation**

Public opinion on food additives is often influenced by media reports and misinformation. Common misconceptions include:

**"All processed foods contain harmful additives."** In reality, not all processed foods require additives. For example, frozen vegetables and pasteurized milk are processed but often free from additives.

**"Natural additives are always safer than synthetic ones."** Many natural substances, such as cyanide in almonds, can be toxic, while synthetic additives undergo rigorous safety evaluations.

**"MSG is inherently dangerous."** Although MSG sensitivity exists, scientific evidence does not support widespread harm (EFSA, 2017).

**Recommendations for Consumers**

**Read Labels** Be vigilant about ingredient lists and be aware of additives that may pose health risks.

**Limit Processed Foods** Reducing the intake of processed foods can decrease exposure to potentially harmful additives.

**Choose Natural Alternatives** Opt for foods with natural preservatives, such as vinegar, salt, or citrus extracts, instead of artificial chemicals.

**Cook Fresh Meals** Preparing meals at home using fresh, whole ingredients reduces reliance on processed foods and artificial additives.

**Stay Informed** Keep abreast of updates from reputable health organizations regarding food additive safety.

**Diagnosing food additive sensitivity**

If you think you may have a food additive sensitivity, it's important to seek professional help since all of the symptoms you may be experiencing can also be caused by other disorders.
It may help to keep a food diary and note carefully any adverse reactions. In the case of a sensitivity being identified, the usual practice is to eliminate all suspect foods from the diet and then reintroduce them one by one to see which additive (or additives) causes the reaction. This should only be done under medical supervision, since some of the reactions – such as asthma – can be serious.

**9. Conclusion**

Food additives play a crucial role in modern food production, ensuring safety, quality, and accessibility. While most are safe when consumed within regulatory limits, ongoing research continues to evaluate their long-term effects. Regulatory bodies worldwide must balance safety assessments with evolving scientific evidence to protect public health.

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ARS PUBLIKA, North Macedonia

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**Evaluation Questionnaire**

Section 1: General Knowledge and Beliefs

**How much do you know about food additives?** (tick one):

Very little

Some

A fair amount

A lot

**Do you believe that food additives are generally:**

Harmful

Neutral

Beneficial

Unsure

**Do you think food additives are necessary for the food industry?**

Yes

No

Unsure

**Can you name 3 common food additives?**

1.

2.

3.

**What are the main reasons why you think food additives are used?**

_____

**What are your biggest concerns about food additives?**

_____

Section 2: Personal Consumption Habits

**How often do you read the ingredient list on food packaging?**

Always

Often

Sometimes

Rarely

Never

**Do you actively try to avoid certain food additives?**

Yes

No

**If yes, which additives do you try to avoid?**

# Food Additives and Nutrition Labels



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_____

**Do you think the current labeling regulations regarding food additives are:**

Easy to understand

Difficult to understand

Unclear

**How much trust do you have in the information provided on food labels regarding additives?**

Very little

Some

A lot

Unsure

**Do you think food additives are more common in:**

Processed foods

Fresh foods

Both equally

Unsure

**Do you think food additives are more common in:**

Local foods

Imported foods

Both equally

Unsure

**Do you think food additives are more common in:**

Affordable foods

Expensive foods

Both equally

Unsure

**How important is it to you to eat food that is free of additives?**

Very important

Somewhat important

Not very important

Not at all important

Section 3: Open-Ended Questions

**Is there anything else you would like to share about your thoughts or experiences with food additives?**

_____

**Do you have any questions about food additives that you would like to ask?**

_____

## Presentation: Natural and Artificial Additives in Food

Slide 1

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# Food Additives and Nutrition Labels

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**Natural and Artificial Additives in Food**

Food additives play a crucial role in the modern food industry, extending shelf life and enhancing flavour.

Global food consumption patterns show increasing preference for "natural" products.

Slide 2



**What Are Food Additives?**

Official Definition Substances not normally consumed as food, added for technological purposes

Main Functions Preserve, colour, thicken, enhance flavour

Scale

Over 390 additives authorised in Europe

Slide 3

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# Food Additives and Nutrition Labels





**Natural Additives**

Origins Plant, animal or mineral sources

Examples Curcumin (E100), Ascorbic acid (E300)

Common Uses Yoghurt, juices, bread products

## Slide 4



**Artificial Additives**

Synthesis Chemically created compounds not found in nature

Common Examples Aspartame (E951), Sodium benzoate (E211)

Found In

Soft drinks, packaged snacks, confectionery

## Slide 5

**Natural vs. Artificial: Key Differences**

Natural Additives

Minimal processing Consumer preference Often less stable

May have taste variations

# Food Additives and Nutrition Labels

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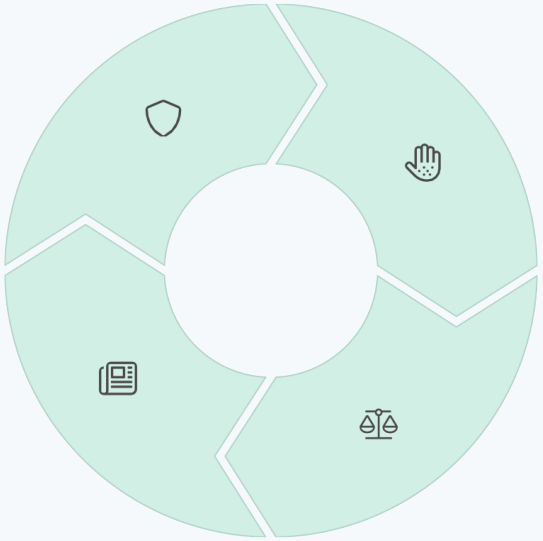
Artificial Additives

Chemical synthesis Consumer skepticism Greater stability Consistent properties

## Slide 6

**Risks and Benefits**



Safety Benefits

Extended shelf life prevents spoilage

Health Concerns

Allergies and intolerances in sensitive individuals

Regulation

ADI (Acceptable Daily Intake) limits established by scientific Institutions

Public Perception

Media alarms often exceed scientific evidence

## Slide 7

**Regulation and Labelling**

EU Regulations

Strict controls and E-number classification system

Scientific Oversight

EFSA and Health Ministries evaluate safety

Transparency Requirements

Mandatory labelling of all additives

## Slide 8

**Future Outlook**

Innovation

New technologies for safer additives

Market Demand

Growing preference for natural alternatives

Balance

Safety and innovation in food production

## Slide 9

**Now, go ahead!**

Plan your presentation working in groups.

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# Food Additives and Nutrition Labels

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Find out more about:

Group 1:

Examples of natural additives (plant origin, mineral sources, animal derivatives)

their purpose in food products

Group 2:

Examples of artificial additives

their purpose in food products

Group 3:

Regulation and labelling (E-number system, EFSA)

Guidelines for food additives in your country

Group 4:

Food additives and their impact on human health

Specific additives and associated risks

## Presentation: The Nutrition Facts Label

### Slide 1

**The Nutrition Facts Label**




### Slide 2

# Food Additives and Nutrition Labels



ITALY



**Nutrition Facts**

8 servings per container

**Serving size** **4 cookies (31g)**

**Amount Per Serving**

**Calories** **150**

| | % Daily Value* |
|---|---|
| **Total Fat** 6g | **8%** |
| Saturated Fat 3g | **15%** |
| *Trans* Fat 0g | |
| **Cholesterol** 0mg | **0%** |
| **Sodium** 115mg | **5%** |
| **Total Carbohydrate** 23g | **8%** |
| Dietary Fiber 0g | **0%** |
| Total Sugars 12g | |
| Includes 11g Added Sugars | **22%** |
| **Protein** 2g | **4%** |
| Vitamin D 0mcg | 0% |
| Calcium 6mg | 0% |
| Iron 0mg | 0% |
| Potassium 25mg | 0% |

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

**Servings**

The nutrition information listed on the Nutrition Facts Label is based on one serving.

Serving size is based on the amount of food customarily eaten at one time.

Calories

a unit of measurement used to define the amount of energy a food provides the body.

## Slide 3

**Fat**



**Nutrition Facts**

8 servings per container

**Serving size** **4 cookies (31g)**

**Amount Per Serving**

**Calories** **150**

| | % Daily Value* |
|---|---|
| **Total Fat** 6g | **8%** |
| Saturated Fat 3g | **15%** |
| *Trans* Fat 0g | |
| **Cholesterol** 0mg | **0%** |
| **Sodium** 115mg | **5%** |
| **Total Carbohydrate** 23g | **8%** |
| Dietary Fiber 0g | **0%** |
| Total Sugars 12g | |
| Includes 11g Added Sugars | **22%** |
| **Protein** 2g | **4%** |
| Vitamin D 0mcg | 0% |
| Calcium 6mg | 0% |
| Iron 0mg | 0% |
| Potassium 25mg | 0% |

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

A macronutrient that provides energy, stores energy, and helps digest certain vitamins.

There are 9 calories per gram of fat.

Sodium

It refers to the mineral table salt, or sodium chloride.

It helps in the function of nerves, muscles, and fluid balance.

## Slide 4

**Carbohydrate**

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# Food Additives and Nutrition Labels

ITALY



**Nutrition Facts**

8 servings per container

**Serving size** **4 cookies (31g)**

**Amount Per Serving**

**Calories** **150**

| | % Daily Value* |
|---|---|
| **Total Fat** 6g | **8%** |
| Saturated Fat 3g | **15%** |
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| **Cholesterol** 0mg | **0%** |
| **Sodium** 115mg | **5%** |
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| Dietary Fiber 0g | **0%** |
| Total Sugars 12g | |
| Includes 11g Added Sugars | **22%** |
| **Protein** 2g | **4%** |
| Vitamin D 0mcg | 0% |
| Calcium 6mg | 0% |
| Iron 0mg | 0% |
| Potassium 25mg | 0% |

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

It's a macronutrient which supplies energy to support bodily functions and physical activity.

Fiber

Improves digestive health and lowers risk of many chronic diseases.

## Slide 5

**Sugar**



**Nutrition Facts**

8 servings per container

**Serving size** **4 cookies (31g)**

**Amount Per Serving**

**Calories** **150**

| | % Daily Value* |
|---|---|
| **Total Fat** 6g | **8%** |
| Saturated Fat 3g | **15%** |
| *Trans* Fat 0g | |
| **Cholesterol** 0mg | **0%** |
| **Sodium** 115mg | **5%** |
| **Total Carbohydrate** 23g | **8%** |
| Dietary Fiber 0g | **0%** |
| Total Sugars 12g | |
| Includes 11g Added Sugars | **22%** |
| **Protein** 2g | **4%** |
| Vitamin D 0mcg | 0% |
| Calcium 6mg | 0% |
| Iron 0mg | 0% |
| Potassium 25mg | 0% |

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Total Sugars = sum of naturally occurring sugars and added sugar.

Added Sugars = sugars added during food processing.

Protein

A macronutrient needed to maintain bone, muscle, and skin health.

## Slide 6

**Vitamins & Minerals**

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# Food Additives and Nutrition Labels

ITALY



**Nutrition Facts**

8 servings per container

**Serving size** **4 cookies (31g)**

**Amount Per Serving**

**Calories** **150**

| | % Daily Value* |
|---|---|
| **Total Fat** 6g | **8%** |
| Saturated Fat 3g | **15%** |
| *Trans* Fat 0g | |
| **Cholesterol** 0mg | **0%** |
| **Sodium** 115mg | **5%** |
| **Total Carbohydrate** 23g | **8%** |
| Dietary Fiber 0g | **0%** |
| Total Sugars 12g | |
| Includes 11g Added Sugars | **22%** |
| **Protein** 2g | **4%** |
| Vitamin D 0mcg | 0% |
| Calcium 6mg | 0% |
| Iron 0mg | 0% |
| Potassium 25mg | 0% |

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Section where vitamin and mineral contents of food are listed.

% Daily

Value

The percent of each nutrient provided in one serving of

the food based on recommendations for a 2,000 calorie diet.

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# 02

PART 2

# From Farm to Fork and Organic Farming

HEALTHY AND YOUNG
Erasmus+ project e-book

Healthy food starts long before it reaches the plate. These lessons look at organic farming, at the European Green Deal and its *From Farm to Fork* strategy, and at the debate about genetically modified foods.

CHOOSE A COUNTRY



TÜRKIYE

## Organic Farming: Advantages and Disadvantages

p. 42



POLAND

## From Field to Fork: the EU Green Deal

p. 46



CROATIA

## The From Farm to Fork Strategy

p. 50



ITALY

## Genetically Modified Foods and Their Risks

p. 56

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# Organic Farming: Advantages and Disadvantages

TÜRKIYE



**TÜRKİYE:** What is organic farming ?

What are its advantages and disadvantages ?

Warm up questions

1- What do you know about organic farming?

2- How can we tell if a product is organic?

3- Do you prefer organic products when shopping for food?

4- What is a pesticide?

The need for agricultural techniques that minimise erosion, soil salinisation, and the effects of other diseases and pests without polluting the air, water, and soil is increasing day by day. The nature-friendly production method that meets this need is referred to as ‘organic farming’.

Organic farming is a form of agricultural production that does not harm human health or the environment and does not use chemical inputs in production. It is a production method that aims to protect vital resources such as air and water and natural life by preserving the natural balance.

In organic farming, no chemical substances or pesticides are used in the cultivation, harvesting, cutting, processing, sorting, packaging, labelling, preservation, storage, transportation, or any other processes involved in bringing the product to the consumer. As farmers and their families are more frequently exposed to pesticides, organic farming primarily protects and improves the health of farmers, their families, and society in general. As organic farming becomes more widespread, the incidence of diseases that are very expensive to treat will decrease, and the economy will also be positively affected indirectly.

https://www.kaptar.org.tr/icerikler/organik-tarim-nedir

**Can we create the "perfect" farm? - Brent Loken**

https://youtu.be/xFqecEtdGZ0?feature=shared

**I Grew 12 Plants From Seed to Make this TIMELAPSE Compilation!**

https://youtu.be/lcZW43hUlzc?feature=shared

Organic farming is considered one of the best processes for regenerative agriculture due to the absence of synthetic or chemical components. Instead, organic farms use natural pesticides and biological fertilisers made from plants, recycled animal waste, and compost to aid plant growth. It is well known that chemical and synthetic fertilisers are harmful to the environment, particularly to soil health. So, is organic farming the best way forward? What are its advantages and disadvantages? What does the future hold for organic farming?https://www.bkt-tires.com/tr/tr/blog/agriculture-blog/organik-tarimi-secmek-avantaj-ve-dezavantajlar

## Key components of organic farming

- It uses organic matter instead of chemicals to enrich soil. This organic matter could be of plant or animal origin.
- It conserves soil for many years

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# Organic Farming: Advantages and Disadvantages

TÜRKIYE

- Crop rotation helps organic farmers preserve the soil quality and avoid monoculture
- Organic farming creates varied niches for organisms that act as natural foes of plant pests
- Weed control in organic farming is done by special techniques and machinery instead of chemical based weedicides

## Is there any difference between organic and 100% organic?

**Yes. A product is considered 100% organic when all its ingredients are organic and is completely processed organically. On the other hand, it is called organic when 95% or more of its ingredients are organic with the remaining being approved chemical additives. If 70% to 90% of a products ingredients are organic, it is labeled made with organic ingredients. There are some products with below 70% organic ingredients and labeled so.**




## Advantages of organic farming

The advantages of organic farming can be discussed in both consumer and producer perspectives. The organic produce is of superior quality in terms of vitamin and mineral content. This function in turn results in higher sugar content of fruits and vegetables and a better taste. Since it is not loaded with toxic chemicals such as pesticides, fungicides and herbicides, it is considered healthy. Organic foods can be stored for longer periods of time than those that are grown conventionally. Organically grown crops are naturally devoid of diseases and pests. Above everything organic farming ensures sustainability by protecting environmental It also reduces soil erosion and greenhouse gases. The use of synthetic agricultural chemicals is one of the biggest problems for pollinators such as bees. For example, glyphosate and neonicotinoids are responsible for the significant decline in some pollinator populations. Organic farming supports pollinators because it does not contain chemical-based enhancers.

One of the best aspects of organic farming is that it does not use genetically modified food. Organic farmers are only permitted to crossbreed to encourage natural production levels. They are not permitted to use industrial products to grow produce for market purposes.

Organic farming is beneficial not only for the health of the soil, food, and people who consume organic food, but also for the farmers themselves. Organic farmers are not exposed to harmful synthetic compounds because they work their fields daily.

**Disadvantages of organic farming**

Biofertilisers have the potential to harbour human pathogens, require monitoring, and can only be used to a limited extent.

More labour-intensive.

Being more expensive for the consumer makes them less accessible for some.

Lower crop yields.

Requires more planning and efficient operations to apply

The crop is susceptible to illness.

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# Organic Farming: Advantages and Disadvantages

TÜRKIYE

The crops are easily susceptible to illness that may slow down the production. Organic foods have a shorter shelf life as compared to conventional food. The reason is that we do not treat the organic food materials with waxes or preservatives, unlike conventional methods, to store it for a long time.

Low yield

Organic farming is unable to fulfil the world's demand for food to survive. It may lead to starvation in the countries that are producing enough food for the survival of their population.

Rigorous certification procedure

Organic farms have to go through tough certification processes. Also, it involves a certain certification amount. It is mandatory to meet organic standards. If an organic farm fails to meet these standards, it may have to face the consequences.

https://jliedu.ch/organic-farming-advantages-dis-advantages/

https://www.earthreminder.com/organic-farming-advantages-and-disadvantages/

**How to Start Organic Farming?**



Farmers wishing to engage in organic production must first ensure that their land is located at a sufficient distance from areas where conventional farming is practised, busy main roads, heavy industrial facilities, mining operations, areas where urban waste is dumped, and rivers and groundwater containing polluting waste.

**SUSTAINABLE AGRICULTURE IN THE EU**

Agriculture occupies a unique position at the heart of the European Union's society, environment and economy.

The common agricultural policy (CAP) is built around three main goals to achieve a sustainable system of agriculture in the EU:

- economic sustainability,
- environmental sustainability, and

# Organic Farming: Advantages and Disadvantages



- the social sustainability of farms.

To meet these three main goals, EU countries use a wide range of targeted actions, which aim to address each country's specific needs and make up CAP Strategic Plans. Through these plans, EU countries provide income support to farmers, support them in the transition towards sustainable production, and contribute towards the ambitions of the EU Green Deal.

https://agriculture.ec.europa.eu/cap-my-country/sustainability_en

**Aims of the organic logo**

The European Union organic logo gives a coherent visual identity to organic products produced in the EU. This makes it easier for consumers to identify organic products and helps farmers to market them across the entire EU.

The organic logo can only be used on products that have been certified as organic by an authorised control agency or body. This means that they have fulfilled strict conditions on how they must be produced, processed, transported and stored. The logo can only be used on products when they contain at least 95% organic ingredients and additionally, respect further strict conditions for the remaining 5%. The same ingredient cannot be present in organic and non-organic form.

Next to the EU organic logo, a code number of the control body must be displayed as well as the place where the agricultural raw materials composing the product have been farmed whether EU agriculture/non-EU agriculture.

https://agriculture.ec.europa.eu/farming/organic-farming/organic-logo_en



EU organic logo

**Source**

https://www.kaptar.org.tr/icerikler/organik-sebze-yetistiriciligi

https://jliedu.ch/organic-farming-advantages-dis-advantages/

**Assessment questions**

1- What are the fundamental components of organic farming?

2- What are the advantages and disadvantages of organic farming?

3- What is the impact of organic farming on organisms that facilitate pollination, such as bees?

4- What is the greatest challenge facing organic farming?

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# From Field to Fork: the EU Green Deal

POLAND

**POLAND: FROM FIELD TO FORK. What is EU Green Deal?**




**What changes it may bring?**

***Warm up questions:***

What do you know about EU Green Deal?

Is this an initiative that is close to you?

Do you think this project has a positive impact on the environment?

The European Green Deal is a growth strategy for EU and its citizens which aims to transform the European Union into a prosperous society that will live righteously in a modern and resource – saving economy. A package of policy initiatives was presented in 2019 and its goal is to steer EU towards ecological transformation, and then - to climate neutrality (its achievement is expected by the year 2050). The European Green Deal is giving particular attention to the fact, that fighting global warming requires involvement of all sectors, for example, agriculture and transport.https://www.ekologus.pl/europejski-zielony-lad-co-to-takiego/
https://www.gov.pl/web/rolnictwo/europejski-zielony-lad

**WHO IS RESPONSIBLE FOR THE EUROPEAN GREEN DEAL?**

The European Commission, led by Ursula von der Leyen, initiated this project in 2019. The people who participated in creating the Green Deal were Frans Timmermans, Teresa Ribera and many others. Responsible institutions are European Commission (main initiator, develops strategies and regulations), European Parliament and European Council.

https://geopolitique.eu/en/articles/the-green-deal-origins-and-evolution/

**KEY ASSUMPTIONS**

**+**distributing the costs of climate transformation fairly

**+**EU climate neutrality by 2050

**+**preservation and restoration of natural ecosystems

**+**transitioning to a circular economy

**+**limiting natural resources consumption and greenhouse gas emissions

**+** investments in environmental protection and nature-friendly technologies

**MAIN AND MOST IMPORTANT INITIATIVES**

+*Fit for 5* (reduction of greenhouse gas emissions in the EU by at least 55% by 2030 compared to 1990)

+ *European Climate Law* (EU climate neutrality by 2050 )

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# From Field to Fork: the EU Green Deal



POLAND

+*EU Strategy for Adaptation to Climate* Change (strengthening the EU's absorption capacity, more systematic and faster adaptation)

+ *Biodiversity Strategy for 2030* (protection of the natural system, and reversing the degradation of ecosystems)

+ *European Industrial Strategy* (boosting EU's international competitiveness)

+ *Circular Economy Action Plan* (transitioning to a circular economy, reducing the production of single-use products)

+ *Just Transition* (support for regions or countries that are struggling the most with transition and mitigating its economic and social consequences)

+ *Farm to Fork strategy* – something about it…

https://climate-adapt.eea.europa.eu/pl/eu-adaptation-policy/strategyhttps://akademiaesg.pl/baza-wiedzy/najwazniejsze-zalozenia-europejskiego-zielonego-ladu/https://www.gov.pl/web/wprpo2020/strategia-na-rzecz-bioroznorodnosci-2030

**FROM FIELD TO FORK – FOOD IN THE CONTEXT OF THE GREEN DEAL**

The main goal is to provide healthier and more sustainable food for Europeans. The EU's agricultural-food chain is an important sector of the European Union's economy, as its system provides hundreds of millions of Europeans with access to healthy and safe food (its production is not only a key service but also a source of income for a lot of people).

According to the IPCC report, about 1/3 of global greenhouse gas emissions come from food systems. It is also important that the current food model has really bad impact on the health of european citizens (more than 50% of adults are overweight).

For this reason the European Union has decided to transform the way of producing and consuming food (in order to make food systems more resilient to crises, reduce their environmental footprint and ensure accessible and healthy food for future generations).

**What is the strategy about?**

It was submitted in May 2020 and aims to transform the food system into a sustainable model. It also includes action plans for food security and organic farming, while also drawing attention to regenerative agriculture and global food safety standards in international trade. Attention is also focused on sustainable aquaculture, the labeling of organic pet food and a new trade standards focusing on honey and jam, among others.

**What does it mean for us?**

System built thanks to the strategy will not only be friendly to the climate but also for our health, because, according to the assumptions – it will reduce the use of pesticides and antibiotics by 50% by 2030. What is also promoted is healthy diet, as well as stronger product labeling and reducing food waste, which are so important in today's reality.

https://www.gov.pl/web/ijhars/strategia-farm-to-fork

**„EU Farm to fork strategy"- European Commission**

https://youtu.be/1tXseroYYFs

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# From Field to Fork: the EU Green Deal

POLAND



**GREEN DEAL – FARMERS**

The Green Deal affects the agricultural sector in many ways, by introducing a bunch of regulations and standards that are supposed to support the environment. The regulations cover a wide range of activities, starting from using artificial fertilizers responsibly, finishing with reduction of carbon dioxide emissions (not forgetting about to promote biodiversity).The European Green Deal is also encouraging sustainable farming practices, that are really good for the environment and farms. One of the assumptions is growing conservation tillage without tilling or strip tillage (strip-till) on the cropland.

Financial support for farmers has been provided to facilitate the modernisation and adaptation of agricultural holdings to new standards. However, the Green Deal causes a lot of worries among farmers, which stem from a lack of information and no consistent rollout strategy. *The most common concerns of farmers:*

**fear of competitiveness** (farmers from EU are scared that they will be subject to competition from manufacturers located outside the European Union, who do not have to meet as many restrictive environmental protection standards)

**insufficient funds** (implementing new standards can generate a lot of additional costs that exceed the budget of farmers, especially when it comes to the ones that are cultivating national resources in arable farming)

**loss of source of income** (farmers are scared that changing their practises will result in lower yields and costs of productions may also increase – which could lead to a loss of income in the future) https://mzuriworld.com/aktualnosci/wplyw-zielonego-ladu-na-rolnictwo/

Their concerns even caused a wave of protests in EU countries (in 2024 and 2025).

**Europe Farmers' Protest: European farmers renew protests against EU's Green Deal | WION News - WION**

https://youtu.be/iAPnFwMbZ1k

**FROM OUR PERSPECTIVE...**

People are scared that the cost of living will increase (prices of food or heating). They also fear that they will have to replace their cars (with the electric ones) and furnaces (thermomodernization).

Regardless, the European Green Deal provides a lot of eco-friendly solutions (directly related to consumers), such as reducing the amount of unnecessary packaging and promoting the idea of using refillable containers or bringing your own bags when shopping for fruits or vegetables. https://www.food-lex.pl/europejski-zielony-lad-koniec-z-marnotrawstwem-opakowan-wspieramy-ponowne-uzycie-i-recykling-20543

**THE IMPACT OF THE EUROPEAN GREEN DEAL ON THE ENVIRONMENT**

Co-funded by the European Union

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# From Field to Fork: the EU Green Deal

POLAND

It is apparent that the future of Europe depends on the condition of our entire planet, which we must care for with no doubt. However, human actvity is causing an increase in worldwide temperature, which affects climate patterns. Current economic patterns are deleterious to nature and the environment and do not correspond to what the planet has to offer, and yet as people and an economy - we are completely dependent on the proper dunctioning of factors such as the environment and ecosystems.

Thanks to the European Green Deal we have the opportunity to restore our nature and eliminate pollution, achieve climate neutrality, and implement a circular economy. All this actions have a very positive impact on our environment, which is why the European Green Deal plays an extremely important role in improving the state of the planet.

https://www.consilium.europa.eu/pl/policies/european-green-deal/

**„Parliament and the European Green Deal" – European Parliament**

https://youtu.be/W6MzP3nsKy8



***Sources***

https://www.consilium.europa.eu/pl/policies/european-green-deal/

https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/story-von-der-leyen-commission/european-green-deal_en

***Assessment questions:***

What are the pros and cons of the EU Green Deal for you?

What impact does the EU Green Deal has on the work of farmers?

How does this affect the economy of European countries?

# The From Farm to Fork Strategy






**CROATIA: FROM FARM TO FORK STRATEGY**

Warm up questions:

What do you think the phrase “From Farm to Fork” means?

Why is it important to know where our food comes from?

How can food production affect the environment?

What choices can we make to support sustainable food systems?

**Introducing the key concepts:**

**What is the From Farm to Fork Strategy?**

The From Farm to Fork Strategy is the European Union’s comprehensive plan to make food systems fair, healthy, and environmentally friendly. It is part of the European Green Deal and aims to reduce the environmental and climate footprint of the food system, ensure food security, and promote sustainable farming and consumption practices. (European Commission, n.d.)

**Key concept: Sustainability in food production**

Sustainable food production refers to the cultivation, processing, and distribution of food in ways that preserve the environment, protect natural resources, and promote long-term ecological balance. It is a core element of the *From Farm to Fork Strategy*, which aims to transform the EU’s food system into one that is resilient, fair, and environmentally responsible.

This approach involves reducing the use of harmful inputs such as pesticides and synthetic fertilizers, which can degrade soil quality and pollute water sources. Instead, it encourages organic farming, agroecological practices, and local food systems that minimize transportation emissions and support regional economies.

Sustainable farming also places strong emphasis on animal welfare, soil health, and water conservation. By maintaining fertile soils and clean water, farmers ensure that future generations will be able to produce food without compromising the planet’s ability to regenerate. Practices such as crop rotation, integrated pest management, and precision agriculture help optimize yields while reducing environmental impact.

Moreover, sustainable food production supports biodiversity by preserving natural habitats and promoting diverse crop varieties. It also contributes to climate action by lowering greenhouse gas emissions and enhancing carbon sequestration in soils and vegetation.

According to the European Environment Agency, transitioning to sustainable food systems is essential not only for environmental protection but also for public health, food security, and economic stability in the face of global challenges such as climate change and resource scarcity

**Key concept: Food waste and circular economy**

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# The From Farm to Fork Strategy



One of the central objectives of the *From Farm to Fork Strategy* is to significantly reduce food waste throughout the entire food supply chain — from agricultural production and transportation to retail and final consumption. Food waste not only represents a loss of valuable resources such as water, energy, and labor, but also contributes to greenhouse gas emissions and environmental degradation.

To address this issue, the strategy embraces the principles of the circular economy, which aims to keep resources in use for as long as possible. This approach promotes reusing, recycling, and recovering materials to minimize waste and reduce the environmental footprint of food systems.

For example, surplus or leftover food can be composted to enrich soil or used in anaerobic digestion to produce biogas, thereby transforming waste into renewable energy. Such practices not only help close the loop in food systems but also support climate goals and sustainable development. According to Eurostat, implementing circular economy principles in food systems is essential for achieving long-term sustainability and resilience.

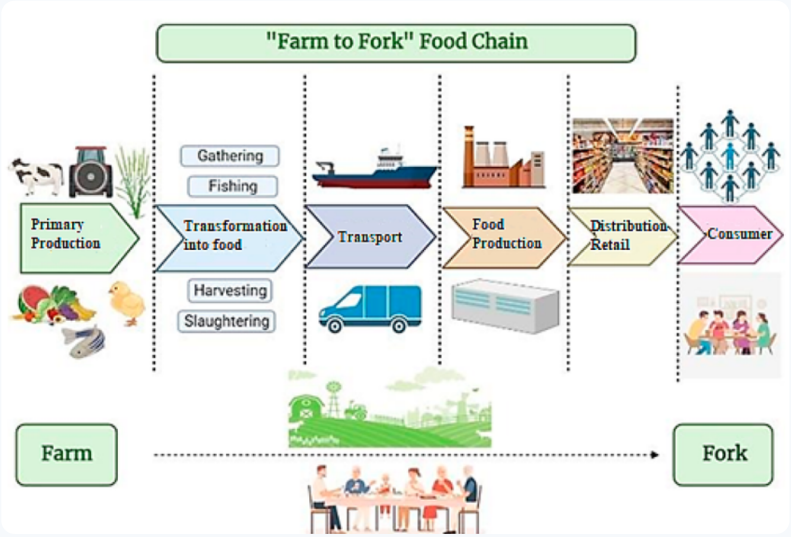


**Table 1.** An illustration of the "Farm to Fork" food chain from primary production to the consumer (Retrieved from https://www.researchgate.net/publication/370300082_Rapid_Sensing_Hand-Held_and_Portable_FTIR_Applications_for_On-Site_Food_Quality_Control_from_Farm_to_Fork )

**Key concept: Healthy and sustainable diets**

The *From Farm to Fork Strategy* emphasizes the importance of promoting diets that are both nutritionally balanced and environmentally sustainable. This dual focus aims to improve public health while reducing the ecological footprint of food systems.

A healthy and sustainable diet typically includes a higher intake of plant-based foods such as fruits, vegetables, legumes, and whole grains, while reducing the consumption of red and processed meats. It also encourages choosing seasonal, locally produced, and minimally processed foods, which require less energy for transportation and storage and support local economies.

# The From Farm to Fork Strategy



Such dietary patterns contribute to lower greenhouse gas emissions, reduced land and water use, and less pressure on biodiversity. At the same time, they help prevent diet-related diseases such as obesity, type 2 diabetes, cardiovascular conditions, and certain types of cancer. By shifting towards more sustainable eating habits, individuals can play a direct role in supporting climate action and improving their own well-being.

The World Health Organization and other international bodies recognize the need for systemic changes in food consumption patterns to ensure that food systems are aligned with global health and sustainability goals. Education, clear food labeling, and public awareness campaigns are key tools in encouraging this transition.

### Table 2. Principles of the From Farm to Fork Strategy

| Principle | Description | Examples | Benefits |
|---|---|---|---|
| Sustainable farming | Reducing chemical use, protecting biodiversity | Organic farming, crop rotation | Healthier soil, cleaner water |
| Reducing food waste | Minimizing loss during production and consumption | Composting, better storage | Less landfill, lower emissions |
| Promoting healthy diets | Encouraging balanced and eco-friendly eating | More vegetables, less processed food | Better health, lower carbon footprint |
| Fair food systems | Ensuring fair income for farmers and access to food for all | Local markets, fair trade | Social equity, food security |

## Benefits of the From Farm to Fork Strategy

### Protects the environment by reducing pollution and conserving resources.

Improves public health through better nutrition and safer food.

Supports farmers by promoting fair prices and sustainable practices.

Reduces food waste and encourages responsible consumption.

Strengthens food security by making food systems more resilient.

## Guidelines for sustainable food choices

Choose seasonal and locally grown produce

Reduce meat and dairy consumption

Avoid overly packaged and processed foods

Plan meals to avoid food waste

Support farmers' markets and eco-certified products

## Educational video suggestion:

From Farm to Fork Strategy – EU Green Deal: https://www.youtube.com/watch?v=Z4zv5zjv9qI

## Common challenges in food systems

Overuse of pesticides and fertilizers

Loss of biodiversity due to monoculture

High greenhouse gas emissions from livestock farming

Unequal access to healthy food

Food waste in households and supermarkets

## Practical activity: Food footprint calculator and class discussion

Students will use an online food footprint calculator to assess the environmental impact of their weekly diet.

Afterward, we'll discuss how individual choices can contribute to a more sustainable food system and brainstorm ideas for reducing food waste at home and school.

## Comprehension questions

What are the main goals of the From Farm to Fork Strategy?

How does food production affect the environment?

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# The From Farm to Fork Strategy



What is the circular economy in the context of food?

Why is reducing food waste important?

What are some ways to make your diet more sustainable?

### Conclusion

The From Farm to Fork Strategy highlights the importance of transforming our food systems to be more sustainable, fair, and health-oriented. By understanding how food is produced and consumed, and making informed choices, we can contribute to a healthier planet and society.

### Post-lesson reflection

Ask students to reflect on their food choices and set a personal goal to reduce their food footprint — such as eating more plant-based meals, buying local produce, or wasting less food.

### References

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**Appendix**

Quiz questions based on the EU's From Farm to Fork Strategy, organised into four sections.

## Quiz: From Farm to Fork Strategy (EU)

## Basic Concepts

1. What does the term *From Farm to Fork* refer to?

Exporting food from the EU

**The process from food production to consumption**

A packaging method for food

A strategy for increasing food imports

2. What is the main goal of the *From Farm to Fork Strategy*?

Reducing food prices

Increasing food exports

**Creating a sustainable, healthy, and fair food system**

Promoting genetically modified food

3. Which EU document introduced the From Farm to Fork Strategy?

Green Deal

**European Green Deal**

Common Agricultural Policy

Food Safety Act

# The From Farm to Fork Strategy



CROATIA

4. When was the From Farm to Fork Strategy officially launched?

2018

2019

**2020**

2021

## Environmental Aspects

What percentage of global greenhouse gas emissions comes from food systems?

10%

20%

**30%**

50%

2. What is one of the strategy's targets regarding pesticide use?

Increase pesticide use

**Reduce use and risk by 50%**

Introduce new chemical pesticides

Replace pesticides with fertilizers

3. What is the goal regarding fertilizer use?

Increase use by 20%

**Reduce nutrient losses by at least 50%**

Ban all fertilizers

Replace fertilizers with compost

4. How does the strategy address biodiversity?

Promotes monoculture farming

**Supports preservation of biodiversity**

Encourages deforestation

Limits crop variety

## Health and Nutrition

1. How does the strategy contribute to public health?

By promoting processed food

By introducing food supplements

**By ensuring access to safe, nutritious, and sustainable food**

By reducing the number of meals

2. What is the EU's target for organic farming by 2030?

10% of agricultural land

15%

**25%**

50%

3. How does the strategy aim to improve food labeling?

Remove labels

**Introduce clearer and more informative labeling**

Add advertisements

Standardize packaging

4. What role does the strategy play in promoting healthy diets?

Encourages fast food

# The From Farm to Fork Strategy



CROATIA

**Promotes plant-based and balanced diets**

Supports sugary drinks

Limits fruit and vegetable intake

## Economic Aspects

1. How does the strategy support primary producers (farmers)?

By reducing their income

By removing them from the supply chain

**By ensuring fair economic returns**

By increasing taxes

2. What is one of the goals regarding food waste?

Increase food waste for recycling

**Reduce food loss and waste**

Penalize food disposal

Import food waste from third countries

3. How does the strategy affect food affordability?

Makes food more expensive

**Ensures access to affordable food for all**

Limits food distribution

Supports luxury food markets

4. What is the strategy's approach to trade?

Ban food exports

**Promote sustainable trade practices**

Increase tariffs

Focus only on local markets

# Genetically Modified Foods and Their Dangers

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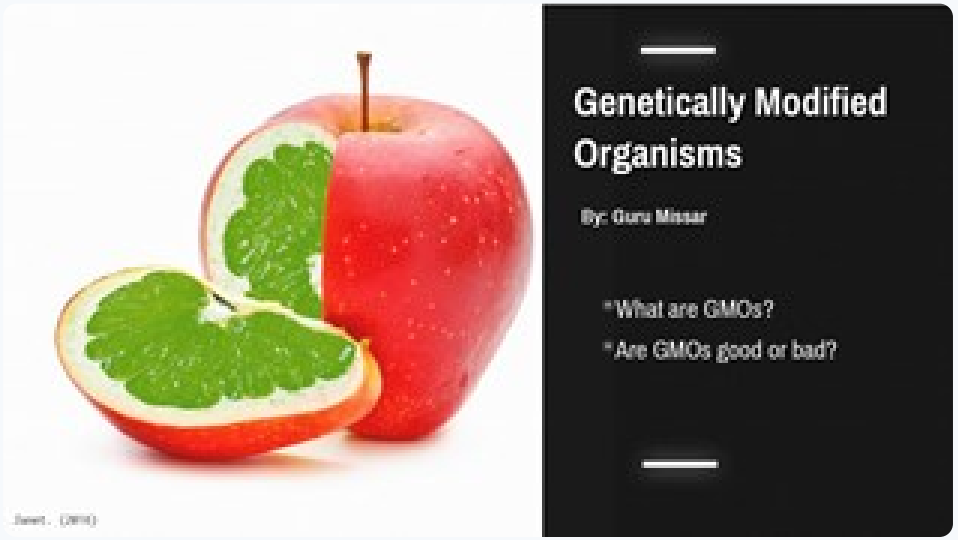





**ITALY: Genetically modified foods and their dangers**

Today genetically modified foods have quietly revolutionised our plates. Yet beneath the promise of enhanced nutrition and increased yields lies a complex web of health concerns, regulatory gaps, and unanswered questions that every consumer deserves to understand.

Introducing the key concepts:

**What are GMOs?**

A Genetically Modified Organism (GMO) is a microorganism, plant, or animal whose genetic characteristics have been altered by the insertion of a modified gene or a gene from another organism using the techniques of genetic engineering. Scientists have the ability to introduce, remove or modify specific parts of the organism's genome.

Genetically modified crops (GMCs, GM crops, or biotech crops) are plants whose DNA has been modified in order to introduce a new trait to the plant which does not occur naturally in the species.

Examples include:

- resistance to certain pests, diseases, or environmental conditions,
- resistance to chemical treatments (e.g. resistance to a herbicide),
- production of a certain nutrient or pharmaceutical agent.

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# Genetically Modified Foods and Their Dangers

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Examples of properties of GM crops include:

- Resistance to glyphosate or glufosinate herbicides (filed corn, soybean, rapeseed, sugar beet).
- Resistance to diseases (papaya, squash, zucchini/courgette, sweet pepper).
- Insect resistance by introducing genes of the bacterium Bacillus thuringiensis (Bt) (field corn, tobacco, rice).
- Addition of an enzyme that converts starch into sugar to facilitate ethanol production (field corn).
- Killing of susceptible insect pests (cotton, soybeans).
- Addition of beta-carotene, a source of vitamin A (rice).

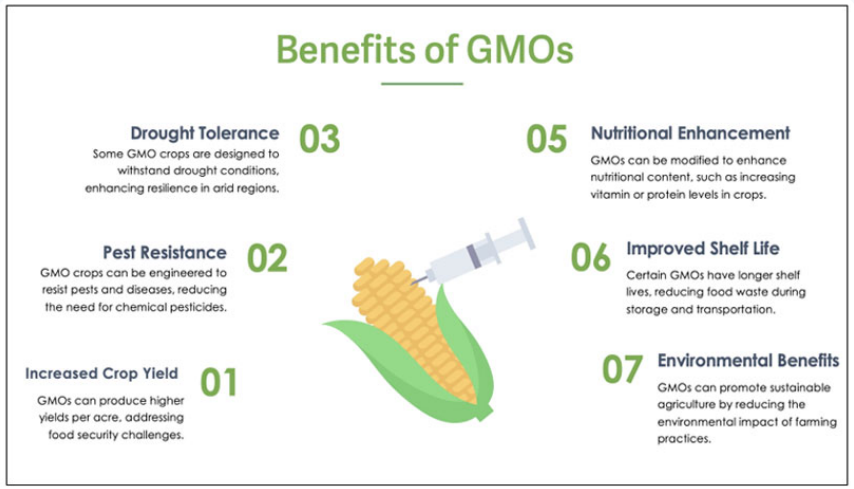


**Figure 1: Benefits of GMOs**

**Are GMOs good ...**

GMOs are regulated by national bodies like the FDA, USDA, and EPA in the U.S. and the EFSA in the EU, as well as international agreements like the Cartagena Protocol, which governs their transboundary movement. Each country has its own specific certification processes for GMOs and their products. The question of GM food safety remains one of the most contentious issues in modern science, with the scientific community deeply divided despite decades of research and billions invested in safety studies. GMO foods may offer advantages to the grower and consumer. These can include:

Pest control: Many GMO crops have been genetically modified to express a gene that protects them against pests and insects. The *Bt* gene is commonly genetically engineered into crops like corn, cotton, and soybeans. It comes from a natural bacteria known as Bacillus thuringiensis and produces a toxic protein to several pests and insects, which gives the GMO plants a natural resistance. As a consequence a 2020 study notes that GMO technology has reduced global chemical pesticide use by 8.3% indirectly reducing greenhouse gas emissions because farmers don't need to spray their fields as often.

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# Genetically Modified Foods and Their Dangers

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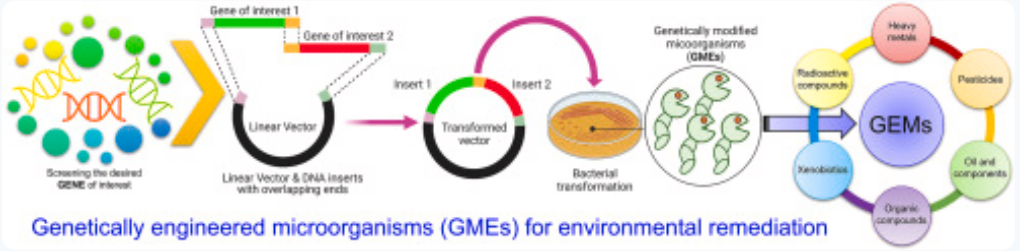
Improved survival and greater yield: some GMO crops have been modified with genes that help them survive stressful conditions, such as droughts and resist diseases like blight

Increased nutritional value: genetic modification can increase the nutritional value of foods. For example, the golden rice high in beta carotene, a precursor to vitamin A, was developed to address widespread vitamin A deficiency (VAD) and its associated health problems like blindness and increased child mortality, particularly in developing countries and regions where local diets are chronically deficient in vitamin A.

Enhanced flavor: Genetic modification can enhance the flavor and appearance of foods, such as the non-browning apple.

Vaccine possibilities: in early 2013 the FDA approved the first GMO flu vaccine.




Bioremediation: plants and microorganisms can be modified to remove toxic pollutants from the environment. GM animals can resist diseases and better withstand typical factory farm conditions.

**...or bad?**

**Toxicity Risks**

The genetic modification process itself presents risks in the food safety. Unlike traditional breeding, which works within the natural genetic boundaries of species, genetic engineering involves inserting genes from entirely different organisms – bacteria, viruses, or other species – into crops. The main important aspects that deal with the genetic modification process are:

**1 Random insertion**

Each genetic insertion occurs randomly within the plant's genome, potentially disrupting existing genes or regulatory sequences that control regular toxin production.

**2 Unpredictable effects**

The complex interactions between inserted genes and the host genome can produce unexpected proteins or alter metabolic pathways in ways that create new toxins

**3 Limited testing**

Long-term toxicology studies are not mandatory, despite FDA scientists' warnings about potential risks.

FDA scientists warned that GM foods could increase natural toxicants or create new ones, yet comprehensive long-term toxicology tests remain optional rather than mandatory.

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# Genetically Modified Foods and Their Dangers

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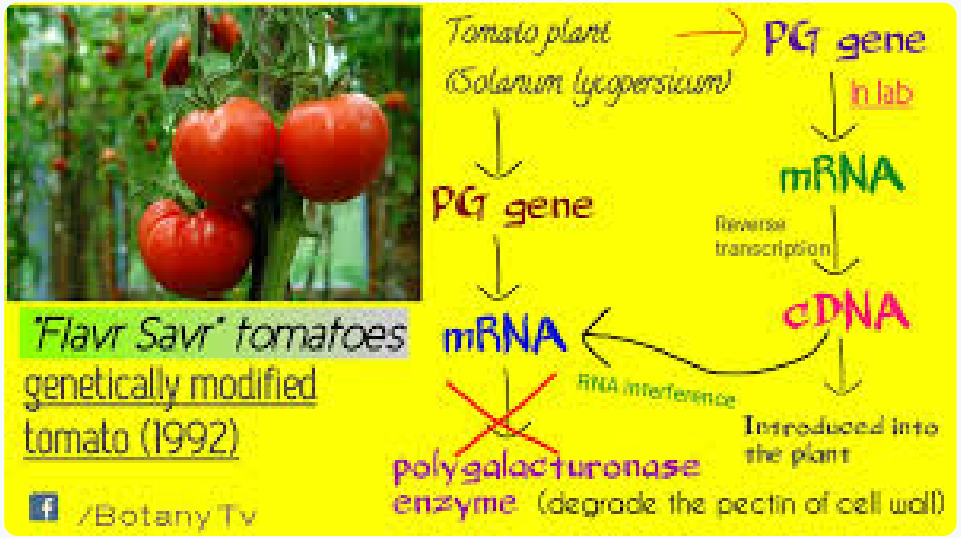
The Flavr Savr tomato




The first commercially developed and commercially available GM food, the Flavr Savr tomato provides a sobering case study. It is a GE tomato that had a trait for delayed ripening developed by the company Calgene in the 1980s – During pre-market safety testing, laboratory rats fed these tomatoes developed stomach lesions and showed signs of necrosis. Despite these alarming findings, the product was initially approved for market, though it was later withdrawn due to poor commercial performance rather than safety concerns. It disappeared from shelves for good in 1997, just three years after its introduction.

This pattern of concerning animal studies followed by regulatory approval has become disturbingly common in the GM food approval process, highlighting the disconnect between scientific caution and commercial interests.

**Allergic Reactions and Immune Concerns**

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# Genetically Modified Foods and Their Dangers

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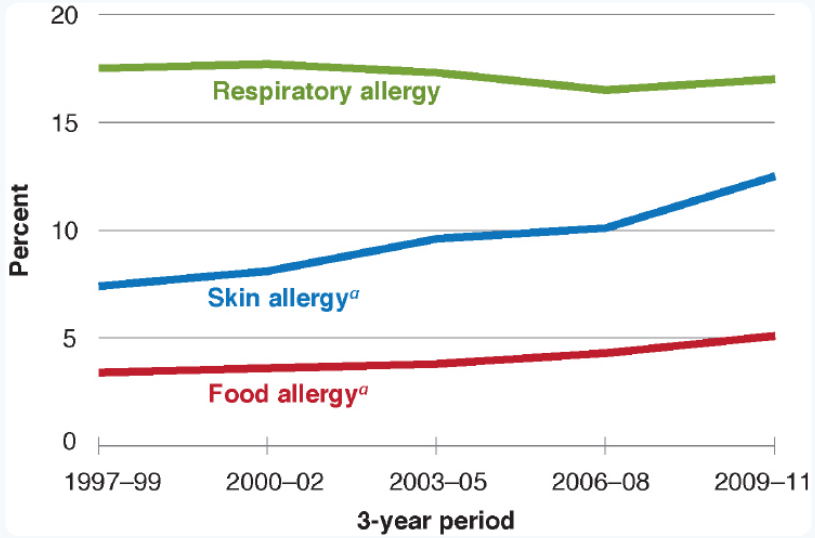
One of the most immediate and measurable risks of GM foods is the introduction of new allergens into our food supply. When genes from one organism are inserted into another, they bring with them the allergenic properties of the donor organism.



The Brazil nut example serves as a perfect illustration of this risk. When scientists attempted to improve the protein content of soybeans by inserting a gene from Brazil nuts, the resulting GM soy retained the allergenic properties of the nuts. Individuals with Brazil nut allergies experienced severe reactions when exposed to these modified soybeans, forcing researchers to abandon the project.

It is nearly impossible to predict all potential allergenic reactions before products reach consumers because of the complexity of food proteins.

Beyond specific allergenic proteins, emerging research suggests that GM food consumption may trigger broader immune system dysfunction such as autoimmune disorders, chronic inflammation, and compromised immune responses.

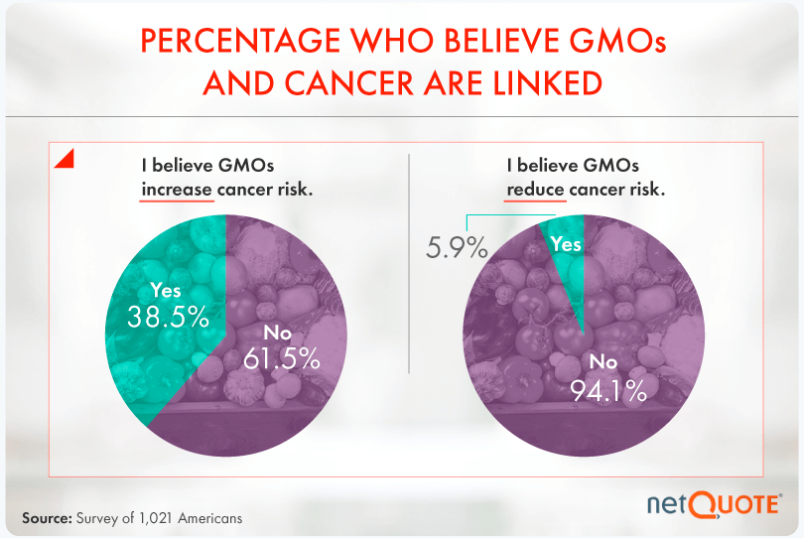



While animal studies provide valuable insights, the complex nature of human immune systems means that many potential reactions may only become apparent through long-term human exposure studies – studies that are currently not required for GM food approval.

**Organ damage and Cancer links**

# Genetically Modified Foods and Their Dangers






Because DNA mutations cause cancers, some people fear that eating foods with added genes may affect your DNA. The American Cancer Society (ACS) has stated that there's no evidence to link GMO food intake to an increased or decreased risk of cancer, and there is no evidence that eating GMOs will change your DNA. However, more long-term human research is still needed. In fact a growing body of animal research has identified concerning patterns of organ damage and potential cancer links associated with GM food consumption. These studies provide the most important long-term data available on GM food health effects.

## Liver Function Compromise

Multiple independent studies have documented liver inflammation, altered enzyme levels, and cellular damage in animals fed GM crops over extended periods. The liver, as the body's primary detoxification organ, appears particularly vulnerable to these new proteins produced by genetically modified organisms.

## Kidney and Pancreatic Effects

Research has revealed significant changes in kidney function markers and pancreatic cell structure in laboratory animals. These organs play crucial roles in waste filtration and blood sugar regulation, making these findings particularly concerning for long-term human health.

## Reproductive System Impact

Perhaps most alarming are the effects on reproductive organs, including altered hormone levels, reduced fertility rates, and structural changes to reproductive tissues in both male and female test animals.

### The IGF-1 Connection

Recombinant bovine growth hormone (rBGH), used in GM crops and dairy production, significantly increases levels of insulin-like growth factor-1 (IGF-1) in both animals and potentially in humans who consume these products.

These animal study findings underscore the urgent need for comprehensive, long-term human studies to assess the real-world health implications of widespread GM food consumption.

### Antibiotic resistance and gene transfer risks

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# Genetically Modified Foods and Their Dangers

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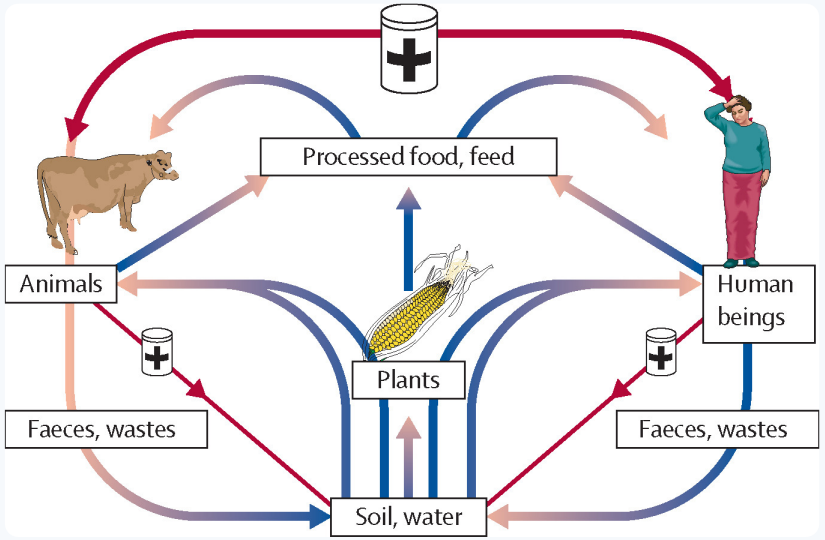


GM crops often contain antibiotic resistance genes used as selection markers during the modification process. These genes can potentially transfer to bacteria in the human gut or environment. Bacteria acquiring resistance genes become harder to treat with antibiotics. That's why, sometimes, the antibiotic treatment fails to treat infections. The antibiotic resistance crisis represents one of the most pressing global health challenges of our time, with the World Health Organisation identifying it as one of the top 10 threats to public health. The routine use of antibiotic resistance genes in GM food production adds another dimension to this crisis that deserves serious consideration.

During the genetic modification process, scientists frequently use antibiotic resistance genes as "markers" to identify successfully modified cells. These genes, which confer resistance to antibiotics like kanamycin, ampicillin, or chloramphenicol, remain active within the final GM product consumed by humans and animals.

The concern lies in horizontal gene transfer – the process by which bacteria can acquire genetic material from their environment, including from the food we eat. While the probability of such transfer occurring may be low, the consequences could be severe, potentially creating new strains of antibiotic-resistant pathogens.

Recent research has demonstrated that DNA from GM foods can survive the digestive process longer than previously thought, with some studies detecting GM DNA in human blood and organs. This persistence raises questions about the long-term accumulation of antibiotic resistance genes in our bodies and their potential interaction with our microbiome.

**Regulatory gaps and Scientific Debate**




**Who makes sure GMOs are safe?**

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# Genetically Modified Foods and Their Dangers

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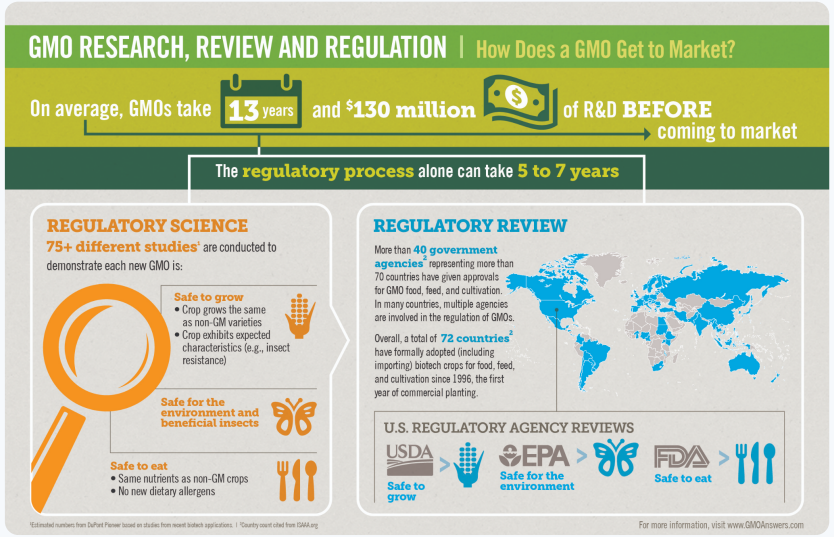
GM crops are mainly grown in the United States, Argentina, Canada, Brazil, India, and China. In the United States alone, over 90% of soy, maize, and cotton crops are genetically modified. These ingredients find their way into approximately 70% of processed foods on supermarket shelves, often without consumers' knowledge due to the absence of mandatory labelling requirements in many countries.The US FDA admits it has made "no dispositive scientific findings" on GM food safety, effectively allowing untested products on the market through a voluntary consultation process.

The EU is some way behind the United States in the commercial introduction of genetically modified crops.




On the other hand the EU is sceptical about GMOs and has the most stringent GMO regulations in the world. Public opinion across Europe is sceptical about genetically modified foods, and there is strong support for labelling them, public consultation and more comprehensive regulation and monitoring. Apart from food safety, concerns have been expressed on genetic transfers with native species. The EU has legislation (Directives 90/220 and 97/258) to regulate the release of GMOs – deliberate and accidental – and their safety in food. The EU marketing consent for GMO products takes at least 1-2 years; and none has been approved unanimously so far. Some countries, including Austria and Denmark, have included the impacts on agriculture in their assessment of environmental harm, while the European Commission and some Member States, such as the UK and the Netherlands, have tended to define environmental harm more narrowly, restricting risk assessment to the direct effects associated with GMOs. The European Commission published proposals for new legislation in 1996, broadening the risk management strategy to include indirect effects in terms of environment safety.

There is also a potential conflict between EU legislation and World Trade Organisation rules on free trade, which would prohibit import restrictions on genetically modified products unless there is scientific evidence of a risk to human or environmental safety. At an international level, United Nations Environment Programme (UNEP) technical guidelines for GMO risk assessment and current EU legislation are consistent. As part of the Convention on Biological Diversity, a Biosafety Protocol is now being negotiated: this is likely to require that transboundary movement of GMOs be subject to prior informed consent, with risk assessment based on scientific parameters.

## The "No Harm" Position

Major international bodies including the World Health Organisation, the US National Academies, and the European Food Safety Authority maintain that current evidence shows no confirmed harm from approved GM foods. However, these same organisations emphasise the need for continued monitoring and case-by-case risk assessment.

## The "Unproven Safety" Argument

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# Genetically Modified Foods and Their Dangers



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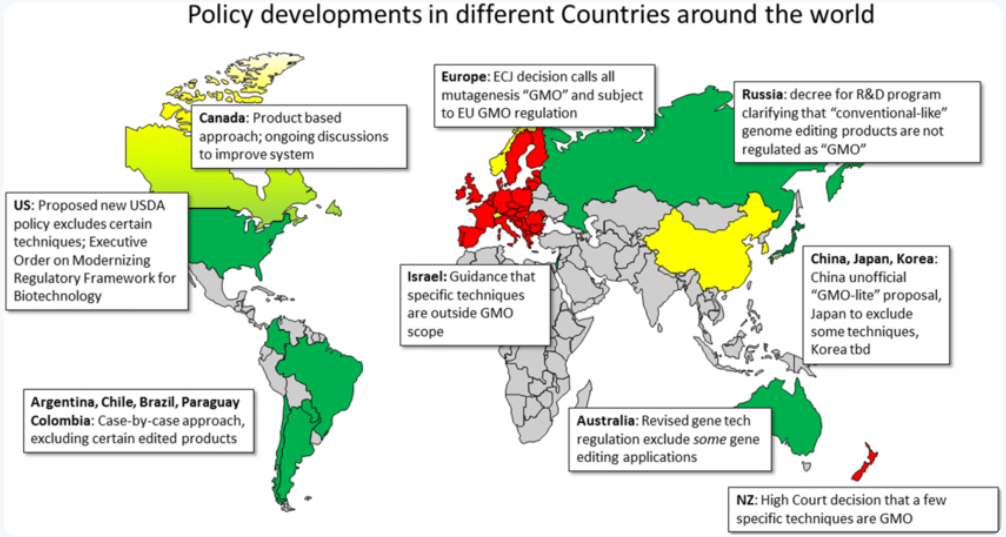
The European Network of Scientists for Social and Environmental Responsibility (ENSSER) and over 300 independent scientists argue that safety is not conclusively proven. They point to methodological flaws in industry-funded studies and call for more rigorous, independent long-term research.

**The Regulatory Patchwork**



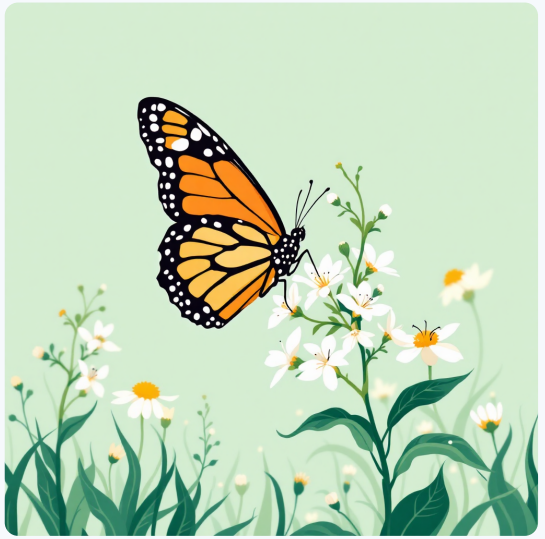

Global regulatory approaches to GM foods vary dramatically, reflecting these scientific disagreements and different cultural attitudes towards risk and precaution.

**United States**: Voluntary consultation process with FDA, no mandatory pre-market safety testing

**European Union**: Mandatory authorisation process, extensive testing requirements, strict labelling laws

**Japan**: Safety assessment required, voluntary labelling system

**Brazil**: Case-by-case evaluation, mandatory labelling for products containing more than 1% GM ingredients



- **Environmental and Ethical Concerns Amplify Health Fears**

**Biodiversity Under Threat**

The environmental impacts of GM crops extend far beyond the farm gate, with consequences that ultimately circle back to human health and food security.

## Pollinator decline

# Genetically Modified Foods and Their Dangers

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The production of insecticides may harm beneficial insects, including bees and butterflies essential for ecosystem health and food production.

## Gene flow risks

Modified genes can spread to wild plant, potentially creating invasive "superweeds" resistant to herbicides and altering natural ecosystems.

## Corporate control

Patent systems allow multinational corporations to control seed supply, threatening farmer independence and agricultural diversity.

These environmental and ethical concerns are intimately connected to health considerations. The loss of agricultural biodiversity may limit access to the genetic resources needed to develop naturally disease-resistant crops.

## Herbicide resistance crisis

The widespread use of herbicide-resistant GM crops has led to the evolution of "superweeds" requiring ever-stronger chemical treatments, increasing human exposure to potentially harmful pesticides.

## Monoculture vulnerability

Reliance on genetically uniform GM crops makes our food system more vulnerable to new diseases and climate change, potentially threatening long-term food security.

## Social justice issues

Patent restrictions and corporate control over seeds affect smallholder farmers in developing countries, raising questions about food sovereignty, equitable access to nutritious food, corporate power, environmental stewardship, and democratic participation in decisions about our food system. This complex web of interconnected concerns helps explain why the GM food debate extends far beyond simple questions of safety, encompassing fundamental questions about the kind of food system we want to create for future generations.

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**Evaluation Questionnaire**

**1. What does GMO stand for?**

a. Genetically Modified Organism

b. Generically Made Organ

c. Genetically Made Organism

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# Genetically Modified Foods and Their Dangers



ITALY

d. Generically Modified Organism

**2. Which of these is the primary method used to create a GMO?**

a. Selective breeding

b. Natural selection

c. Genetic engineering

d. Artificial selection

**3. Which bacterium is commonly used to introduce new genes into plants?**

a. Agrobacterium

b. Avobacterium

c. Granobacterium

d. Grega-bacterium

**4. What is a significant advantage of genetic modification in crops?**

a. Decreasing food costs

b. Eliminating food

c. Making food more expensive

d. Increasing food scarcity

GMOs in the Environment & Agriculture

**1. How does the use of GMOs, like Bt cotton, affect the environment?**

a. It causes widespread pest resistance.

b. It can lead to an increase in "superweeds".

c. It often allows for reduced pesticide use.

d. It eliminates the need for crop rotation.

**2. What is one potential environmental concern associated with herbicide-resistant GM crops?**

a. Increased use of diverse pesticides

b. Reduced biodiversity in agricultural land

c. Decreased soil quality and structure

d. Increased use of water for irrigation

GMOs and Health

**1. What is a key safety assessment area for GM foods?**

a. Whether they are delicious

b. Their allergenicity (potential to cause allergies)

c. Their long-term visual appearance

d. Their original genetic makeup

**2. Are GMOs a proven cause of cancer?**

a. Yes, and it is well-documented.

b. No, and there is no credible evidence of a link.

c. Only in very large quantities.

d. It depends on the specific GM crop consumed.

Benefits & Risks

**1. Which of these is an example of a benefit of GM crops?**

a. Decreased food affordability

b. Increased reliance on chemical inputs

c. Providing crops with enhanced nutritional value

d. Reduced crop yields

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# Genetically Modified Foods and Their Dangers



**2. What is a potential ethical concern regarding GM foods?**

a. They are too affordable for global markets.

b. They encourage healthy eating habits.

c. Manipulating the genetic material of organisms crosses a moral line.

d. They provide an opportunity for small-scale farmers.

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# 03

PART 3

# Food Waste

About one third of the food produced for people is lost or wasted, while many people go hungry. These lessons explore the causes and consequences of food waste and what consumers, businesses and governments can do about it.

CHOOSE A COUNTRY




TÜRKIYE

**Measures to Prevent Food Waste** p. 69



POLAND

**Food Waste and the Fight Against Hunger** p. 73



CROATIA

**Causes of Food Waste in the World** p. 78



ITALY

**Measures to Prevent Food Waste at Home** p. 82



HEALTHY AND YOUNG
Erasmus+ project e-book

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# Measures to Prevent Food Waste



**QUESTIONS**

1. What is the main difference between the “Use-By Date” (UBD) and the “Best-Before Date” (BBD) indicated on food packaging?

2. What is the most practical measure consumers can take to prevent food waste while grocery shopping?

3. What method can supermarkets and producers implement to prevent oddly shaped or slightly imperfect fruits and vegetables from going to waste?

According to the European Union, some of the causes of food waste are as follows:

At the consumer level, impulse buying encouraged by retail promotions, inappropriately sized packaging, lack of access to refrigerators or freezers, inadequate shopping and meal planning, and reluctance to buy “ugly-looking” fruits and vegetables are just a few of the reasons why households waste food. (1)

Preventing food waste is essential for building a sustainable future, reducing costs, and protecting the environment. In this effort, consumers, governments, and businesses (producers and retailers) have different responsibilities and opportunities to take action.

The table below provides a comparative summary of the strategic measures that these three key stakeholders can take to prevent food waste.



Food Waste Prevention Strategies

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# Measures to Prevent Food Waste



| Stakeholder | Main Focus | Key Measures That Can Be Taken |
|---|---|---|
| Consumers | Mindful Consumption and Household Management | • Make a shopping list before going shopping and plan purchases.<br>• Learn the difference between the Use-By Date (UBD) and the Best-Before Date (BBD).<br>• Repurpose leftovers using creative recipes.<br>• Store food properly by using refrigerators and freezers correctly. |
| Governments | Policy, Legislation & Infrastructure Development | • Introduce legal regulations and tax incentives that facilitate food donations.<br>• Organize food education programmes in schools and public institutions.<br>• Prevent confusion by clarifying standard food labeling rules (UBD/BBD).<br>• Establish infrastructure for organic waste separation and composting. |
| Industry | Supply Chain & Operational Efficiency | • Improve cold-chain systems throughout transport and storage.<br>• Sell nutritionally valuable but misshapen or “ugly” fruits and vegetables at discounted prices.<br>• Optimize portion sizes and packaging technologies, including resealable packaging.<br>• Donate safe, unsold food to food banks or soup kitchens. |

## Practical Food Storage Tips to Reduce Waste

The main causes of food spoilage include improper humidity levels, incorrect temperatures, and exposure to air. You can prevent these problems by following the methods below:

- Storing Leafy Greens with Paper Towels: After washing leafy greens such as lettuce, parsley, and mint, dry them completely. Place them in a glass jar or storage container with paper towels underneath and on top. The paper towels absorb excess moisture and help prevent spoilage.

- Separating Bananas: Bananas release ethylene gas as they ripen, which causes both the bananas themselves and nearby fruits to ripen and darken more quickly. Keeping bananas separate from other fruit can help slow the ripening of nearby produce.

- Keeping Potatoes and Onions Separate: Never store potatoes and onions in the same place. Storing them together can encourage potatoes to sprout and spoil more quickly. Keep both in cool, dark places, separated from each other.

- Organizing the Refrigerator (Maintaining the Correct Temperature): The refrigerator door is the warmest area, so store sauces there rather than highly perishable foods such as milk and eggs. Keep dairy products on the middle shelves and raw meat on the bottom shelf.

- Making Active Use of the Freezer: Freeze meat, bread, and even grated cheese before they reach their use-by dates. If tomatoes start to soften, grate them and freeze them in ice cube trays to create convenient portions for cooking sauces.

Preventing waste in industrial food production and supply chains is essential both to avoid billions of dollars in economic losses and to reduce the carbon footprint. Today, technology offers advanced solutions to extend the shelf life of food and minimize logistical losses throughout the process from farm to shelf.

The most effective smart packaging and logistics technologies used at the industrial level include the following:

## 1. Smart and Active Packaging Technologies

While traditional packaging primarily protects food from external factors, smart and active packaging can interact with food or its surrounding environment to extend its shelf life or provide information about its condition.

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# Measures to Prevent Food Waste



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Freshness and Gas Indicators: Special sensors or color-changing labels placed inside the packaging detect gases released by food, such as ethylene or ammonia. When the product begins to spoil, the label changes color. This helps prevent food from being thrown away solely because of a best-before date.

Time-Temperature Indicators (TTIs): These smart labels indicate whether a product has been exposed to temperatures outside the required range during transportation and storage. If the product exceeds a critical temperature limit during transport or storage, the label changes color, alerting the retailer.

Oxygen and Ethylene Absorbers: These are active systems that modify the atmosphere inside the package. Small sachets, known as scavengers, are placed inside the packaging to absorb ethylene gas, which accelerates the ripening of fruits and vegetables, or oxygen, which speeds up spoilage.

Modified Atmosphere Packaging (MAP): The atmosphere inside the package is modified or replaced with a specially optimized gas mixture, such as carbon dioxide and nitrogen, depending on the type of food. This technology can extend the shelf life of products, particularly red meat, poultry, and fresh vegetables, significantly, depending on the product and storage conditions.

## 2. Smart Logistics and Supply Chain Technologies

A significant proportion of food waste results from poor coordination in logistics processes and inadequate tracking. The industry is addressing this problem through next-generation tracking systems.

IoT (Internet of Things) and Real-Time Cold Chain Monitoring: IoT sensors installed in transport trucks and storage facilities transmit temperature and humidity data to a central system in real time. A temperature deviation beyond a preset threshold can trigger an automatic alarm. The driver or warehouse manager can then intervene, helping prevent large quantities of food from being wasted.

Traceability Through Blockchain Technology: Every stage of a food product's journey, from harvesting in the field to arriving on supermarket shelves, can be recorded on a blockchain network. If a problem occurs with a product, the source of the issue can be identified more quickly. This allows for targeted recalls of only the affected products rather than recalling unaffected products.

AI-Powered Demand Forecasting: Large supermarket chains and food producers use artificial intelligence to analyze historical sales data, weather conditions, upcoming holidays, and local events. This allows supermarkets to order quantities of fresh products that better match demand, preventing waste caused by overstocking and products reaching the end of their shelf life.

Dynamic Pricing Software: AI systems identify products that are approaching the end of their shelf life and automatically reduce their prices, updating digital price tags accordingly. This encourages consumers to purchase discounted products before they are thrown away.

## Government Policies and Legal Regulations to Prevent Food Waste

Individual and industrial efforts alone are not enough to prevent food waste. Governments must establish a legal framework and introduce policies that provide both deterrents and incentives. The following are examples of public policies and legal regulations that have been introduced to address food waste.

### European Union: Binding Food Waste Reduction Targets

Across the European Union, food waste reduction is increasingly addressed through binding targets under the revised Waste Framework Directive.

2030 Targets: Under the revised EU Waste Framework Directive, member states are required to reduce food waste by 10% in food processing and manufacturing and by 30% per capita across retail, food services, and households. In line with these targets, member states, including Germany through its national strategy, are strengthening their national action plans. (2)

Food Waste (1)

https://www.europarl.europa.eu/topics/en/article/20240318STO19401/food-waste-in-europe-facts-eu-policies-and-2030-targets#why-is-wasting-food-a-problem-3

Food Waste in Europe (2)

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# Measures to Prevent Food Waste

TÜRKIYE




https://www.europarl.europa.eu/topics/en/article/20240318STO19401/food-waste-in-europe-facts-eu-policies-and-2030-targets

Duration: 8 minutes | Method: Small-Group Activity

The class is divided into three main groups. Each group is assigned a different role and a discussion question relevant to that role to encourage students to come up with solutions.

Duration: 3 minutes | Method: Quick Brainstorming

The lesson begins with a question designed to capture students' attention and connect the topic to their personal experiences.

- Implementation: Students are asked to give brief answers (e.g., bread, leafy greens, and fruit). The teacher sparks their curiosity by sharing the fact that a substantial amount of food produced worldwide is lost or wasted.

## 2. Group Activity: "Food Waste Prevention Stations"

Duration: 8 minutes | Method: Small-Group Activity

The class is divided into three main groups. Each group is assigned a different role and a related warm-up question to encourage them to develop solutions.

- Group 1 (Consumers): "What should we do instead of throwing away food that is two days past its best-before date but still safe to eat? Come up with two practical ideas for using food that is no longer at its freshest."

- Group 2 (Supermarkets / Industry): "If you were a supermarket manager, what would you do to save fruits and vegetables that are unpopular simply because of their unusual shapes, as well as products approaching their expiration dates?"

- Group 3 (Government / Municipality): "What rules and campaigns would you introduce in schools or public spaces to work towards eliminating food waste in a city?"

Groups write down their ideas on a small sheet of paper within five minutes.

## 3. Sharing and Conclusion: "The Solution Map"

Duration: 4 minutes | Method: Group Presentations and Summary

A spokesperson is selected from each group to share the solutions they have developed with the class.

- Implementation: Each group presents its ideas in one minute. The teacher organizes the responses on the board under the headings Consumers, Industry, and Government.

- Closing Question: The lesson concludes with the following question:

"Based on what you have learned today, what is the first step you will take this evening to prevent food waste at home?"

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# Food Waste and the Fight Against Hunger

POLAND

**Lesson plan: ”Food Waste: Fight Against Hunger in the World’’**

**What exactly is food waste?**

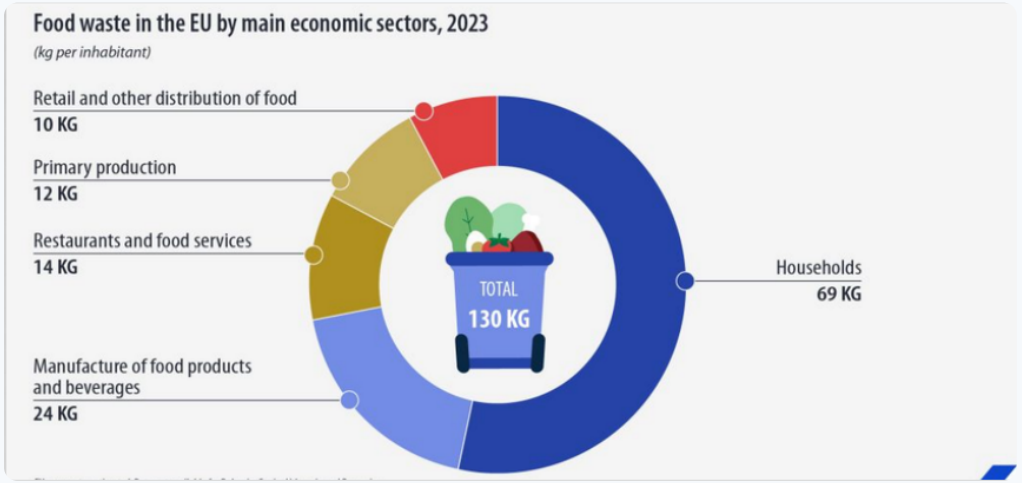
**What are the consequences of it?**

Warm up questions :

How many people in the world suffer from hunger? How much food is wasted every year? Why is this a serious problem?

What are the ways to fight hunger in the world? How does food waste affect the number of starving people?

Food waste is a very serious problem. More precisely, it refers to throwing away food for reasons such as bread being slightly stale or fruits that are not completely fresh. Statistics from 2023 show that Food Waste in the EU amounted to 130 kg per person most of this is food thrown away in our homes. But, what are the other popular places where our meals end up in the trash? The first we will probably think of will be restaurants. And we are right. They take the second place, just after food and beverages manufacture and it is about 14 kg per person every year. But, which is maybe more impressive, the total amount of wasted food in Europe is about 60 million tons every year. These numbers are very large and they cause a lot of problems, for example hunger.




The problem of world hunger

# Food Waste and the Fight Against Hunger

POLAND



Hunger is a really serious and global problem. In 2024 about 673 million people faced it. It is about 8.3% of global population. The largest number of starving people has been recorded in Africa - more than one in five people are experiencing hunger there, most in such countries as Yemen, Somalia and South Sudan. It is very unfortunate but a lot of them are children and young people. In Europe it is not a large-scale problem so sometimes we cannot even imagine how it feels.

But, what are the reasons for hunger?

Conflicts - during the wars people leave their homes, food production is disrupted and also they don't have jobs and money

Climate - When it's too hot or cold vegetables and fruits don't grow

More: Economics and Displacement

How Food Waste Affects Hunger?

To be honest it's so sad that people regularly throw away food, like a sandwich that they didn't eat while others would be very grateful to get it and satisfy their hunger. About 1trillion dollars each year is wasted on food that wasn't eaten. In the world it is about 1.3 billion tons of food! If we could use this money every person in the world would get 125 dollars each year.

Food waste vs climate changes and hunger

Source material:

https://www.youtube.com/watch?v=ishA6kry8nc&pp=ygUdaG93IGZvb2Qgd2FzdGUgYWZmZWN0cyBodW5nZXLSBwkJhwoBhyohjO8%3D

Another connection between them is that wasted food could provide about 600 kcal to each person a day. Maybe for people who can't afford to buy staple food it doesn't mean too much but when someone is starving it could make this person feel much better. And here food banks have become one of the solutions.

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# Food Waste and the Fight Against Hunger

POLAND

Food banks

Food banks collect products from such places as: supermarkets, food manufacturers, farms or community donations. Volunteers sort and pack food and then other people deliver it to those in need. Every package can change someone's life.

Other ways to fight with hunger (also by avoiding food waste):

plan your meals and make a shopping list - it can help you avoid buying too much food,

freeze the products you haven't used - it keeps the food fresh for longer,

"sharing is caring'' - donate food that would be wasted to local food banks,

buy only what you need "love your leftovers'' - freeze them for later or use in another meal instead of throwing away,

Use less water - water is essential to produce food and everything else and we can't live without water,

pick "ugly'' fruit and vegetables - they're usually fresh and tasty, but people don't want to buy them because of their appearance.

A short video (the number of starving people is other because it's from 2021 but it's good information that now it's smaller)

https://youtu.be/eRBLHaBNQh4?si=luqcP6kK5ESm_A90

Those small changes can be huge changes to a lot of people and make their life easier. Maybe now a person is rich, but someday they might be in need and then they will expect help from others. That's why if we have the means, it's always worth helping. Food does not only mean what we put in our mouth and digest; it is a basic human right and everyone should have access to it. We can easily see the contrast between some countries and it is so unfair.At the same time when one group of people is sitting in the restaurant and eating exclusive meals, another hopes for a warm meal to satisfy their hunger.



Source: https://www.borgenmagazine.com/10-steps-ending-world-hunger

What is the "Too Good To Go'' app ?

It is an app available in over 17 countries. It connects

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# Food Waste and the Fight Against Hunger

POLAND

users with restaurants, supermarkets, bakeries and cafés that have unsold food at the end of the day. You can order a “Magic Bag’’ at discounted prices, often 50-70% off. All you have to do is to choose the bag, pay for it and then go to pick it up at specified time. It is so easy because that app shows you shops and local facilities nearby. After picking your bag you can go home, unpack it, and be aware that you did something good for the planet and other people.

Summary

Food waste is a serious problem and we should try to prevent it. There are a lot of ways to minimize wasting. We can change small things such as planning shopping, freezing food or downloading “Too Good To Go’’ app and getting a “Magic Bag’’ at a really low price. A lot of people face hunger nowadays, most of them are children. When we try to avoid wasting food, we also do something to help people in need. Access to eatables is a basic human right and everyone deserves it. Maybe someday we will live in a world without hunger, in a better world because reducing food waste does not only mean saving money – it means saving lives.




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# Food Waste and the Fight Against Hunger



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# Causes of Food Waste in the World

CROATIA

**CROATIA: Causes of food waste? Food waste in the world.**

Warm up questions:




- What happens to the food we don't finish at home or school?
- Do you think food waste is a bigger problem in richer or poorer countries? Why?
- What are some reasons why supermarkets throw away perfectly good food?
- How does wasting a single apple affect resources like water and energy?

**Introducing the key concepts:**

**What is the Scale of Global Food Waste?**

According to international estimates, roughly one-third of all food produced for human consumption is lost or wasted globally, amounting to about 1.3 billion tonnes per year. This global crisis occurs at every stage of the food supply chain—from initial agricultural production down to final household consumption. Wasting food means we also waste the massive amounts of water, land, energy, and labor used to grow it.

**1. Key Concept: Food Loss vs. Food Waste**

While often used interchangeably, international organizations make a clear distinction based on where the problem occurs in the "Farm to Fork" chain:

Food Loss: Occurs during the early stages of the supply chain—specifically during harvesting, storage, and transport. This is heavily prevalent in developing countries due to poor infrastructure, lack of cold-storage technology, and inefficient climate control.

Food Waste: Occurs at the end of the supply chain—specifically during retail (supermarkets) and consumer consumption. This is a major issue in developed nations, driven by consumer behavior, strict aesthetic standards, and purchasing habits.

**2. Key Concept: Major Causes of Food Waste**

The roots of this global problem vary significantly depending on the region and market structure:

- Supermarkets often reject fruits and vegetables simply because they are misshapen, have minor blemishes, or do not fit strict size criteria, even though they are perfectly safe and nutritious.
- Consumers frequently confuse "Best Before" (a measure of quality) with "Use By" (a measure of safety). This leads to millions of tonnes of perfectly edible food being thrown away prematurely.
- In developed countries, culture encourages bulk buying ("buy one, get one free" deals) and oversized restaurant portions, much of which ends up in the trash.
- Inadequate forecasting, lack of coordination between farmers and retailers, and sudden market disruptions cause massive surpluses that cannot be sold in time.

**Table 1. Global comparison of food waste causes** (Food and Agriculture Organization [FAO]. (2011). *Global food losses and food waste: Extent, causes and prevention*. Rome: UN. Retrieved form https://www.fao.org/4/mb060e/mb060e00.pdf)

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# Causes of Food Waste in the World



| Stage of chain | Primary drivers | Region most affected | Major environmental consequences |
|---|---|---|---|
| **Production and transport** | Poor infrastructure, lack of refrigeration, pests | Developing regions (e.g. Sub-Saharan Africa, South Asia | Wasted water and land degradation |
| **Retail and supermarket** | Aesthetic standards, over-stocking shelves, expired dates | Developed regions (e.g. North America, EU) | High financial loss, rapid landfill dumping |
| **Household consumption** | Over-buying, bad meal planning, date label confusion | Developed regions (e.g. North America, EU) | Large methane emission from landfills |

### Environmental and Global Impacts

When food rots in landfills, it produces methane, a greenhouse gas much more potent than carbon dioxide. If food waste were a country, it would be the third-largest emitter of greenhouse gases in the world, behind only China and the USA.

Agriculture consumes about 70% of the world's freshwater. Wasting food means wasting the trillions of liters of water used for irrigation.

While one-third of global food is wasted, over 800 million people suffer from chronic undernourishment. Reducing waste is essential for achieving global food security and equity.

**Table 2.** Household Action Plan for Food Waste Reduction

| Action area | Smart strategy | Practice implementation | Intended benefit |
|---|---|---|---|
| **Planning and shopping** | Plan meals and shop with a list | Avoid impulse buying and strictly purchase what can realistically be consumed within a week. | Prevents over-buying and significantly reduces initial food surpluses. |
| **Sourcing and markets** | Embrace "ugly" products | Actively buy misshapen fruits and vegetables at markets to support local farmers. | Directly reduces sorting and cosmetic waste at the retail level. |
| **Storage and organization** | Practice proper storage (FIFO) | Store leftovers in the freezer immediately and arrange the fridge using the **First In, First Out** method. | Extends shelf life and ensures older ingredients are used before spoiling |
| **Label literacy** | Understand the expiration labels | Treat *"Best Before"* dates as a guideline for peak freshness, not as a strict safety deadline to discard food. | Prevents the premature disposal of perfectly safe and edible food. |

### Educational Video:

- The Shocking Truth About Food Waste | How 1.3 Billion Tons Could Change Our Future, https://www.youtube.com/watch?v=kqmF09saOpk (duration 12:06)

This insightful documentary, which has garnered 24 views since its premiere on July 10, 2026, sheds light on a critical global paradox: while the world produces enough food to feed everyone, nearly 1.3 billion tonnes are lost or wasted annually.

The film explores food waste as one of the greatest hidden challenges of the modern era. It takes viewers on a journey from farms and supermarkets down to household kitchens to uncover why so much edible food is discarded. Additionally, it highlights the severe environmental impact of this issue, illustrating how food waste drives climate change and generates a significant share of global greenhouse gas emissions.

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# Causes of Food Waste in the World



Far from being just a story about loss, the documentary focuses heavily on innovation. It showcases how scientists and engineers are actively transforming fruit peels, coffee grounds, stale bread, and food-processing residues into biofuels, bioplastics, renewable chemicals, fertilizers, and clean energy using cutting-edge biorefinery technologies

To kick off the activity immediately after the film, you can ask the students these quick reflection questions to get their gears turning:

- *Which statistic from the documentary surprised you the most?*
- *Before today, did you know that food waste could be turned into things like bioplastics or fuel?*

**Hands-on activity for students that directly connects to the documentary's themes of food waste reduction and biorefinery innovation.**

**Activity Name: The School Upcycling Biorefinery Challenge**

This activity shifts students from passive viewers into active innovators, encouraging critical thinking, teamwork, and problem-solving.

**Instructions for Students (Ready to Print/Share)**

**Objective**

In teams, you will act as a startup company of environmental engineers. Your goal is to design a creative, sustainable product or system that rescues common school or household food waste and transforms it into something valuable.

**Step 1: Map the Waste (Brainstorming)**

- Work in groups of 3 to 4.
- Think about the food waste you see every day at home or in the school cafeteria (e.g., apple peels, banana skins, leftover bread, orange peels, coffee grounds from the staff room).
- Choose **one specific type of food waste** to focus on.

**Step 2: Design Your Upcycled Solution (The Innovation)**

Inspired by the biorefinery technologies shown in the documentary, brainstorm how to transform your chosen waste. Your solution can be a physical product concept or a local system.

- *Examples to spark ideas:* Turning orange peels into an eco-friendly classroom cleaner, using coffee grounds to create garden fertilizer cubes, or designing a system that uses school lunch leftovers to generate energy for the greenhouse.

**Step 3: Create a "Startup Pitch"**

Prepare a 3-minute presentation (pitch) for the class. Your pitch must answer the following questions:

- What specific food waste are you targeting, and why is it currently a problem?
- What is your new product or system, and how does it work?
- How does your project support the Circular Economy and help fight Climate Change?

**Step 4: The Innovation Showcase**

- Present your pitch to the class.
- You can use a poster, a digital presentation, or even build a simple 3D model/prototype using recycled materials.
- The class will vote on the most innovative, feasible, and eco-friendly startup idea!

**References**


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# Causes of Food Waste in the World




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ARS PUBLIKA, North Macedonia

# Measures to Prevent Food Waste at Home





**Italy: Measures to Prevent Food Waste at Home**

Food waste is a significant global issue, with roughly one-third of all food produced for human consumption going uneaten. A substantial portion of this waste occurs at the household level, driven by over-purchasing, improper storage, and confusion over date labels. Preventing food waste at home not only saves money—reducing the average family's food bills—but also reduces the greenhouse gas emissions that occur when food rots in landfills. Implementing effective, daily strategies can significantly reduce this waste.

## Why Do We Waste So Much Food?

There are several everyday reasons why food ends up in the bin across different stages of the supply chain:

**Overbuying and Poor Planning:** Studies show that households are responsible for nearly **57% of total food waste in developed nations**, largely because people purchase more groceries than they actually need due to attractive promotional offers or a lack of shopping lists.

**Cosmetic Standards:** In retail markets, up to **20% to 40% of fresh produce is rejected before reaching store shelves** simply because of irregular shapes, sizes, or minor visual blemishes, even though the food is completely safe and nutritious.

**Confusion Over Date Labels:** Around **10% of European food waste is linked to consumer confusion** between *"Use By"* (a strict safety deadline) and *"Best Before"* (an indicator of peak quality), leading to premature disposal of perfectly good meals.

**Improper Storage:** Poor fridge management and incorrect temperature control account for over **15% of fresh food spoilage at home**, as items get forgotten at the back of shelves.



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# Measures to Prevent Food Waste at Home



**Strategic Planning and Shopping**

Fortunately, small and thoughtful changes in our daily routines can make a massive difference. Experts estimate that **up to 60% of household food waste is completely avoidable**.



The most effective measures to prevent food waste begin before entering the grocery store. Creating a weekly meal plan helps households buy only what is necessary, reducing the chances of perishables going bad before consumption. Before shopping, it is essential to take inventory of the pantry, refrigerator, and freezer to avoid purchasing duplicate items. Shopping with a list restricts impulse buying, which often leads to over-purchasing. Furthermore, avoiding "buy-one-get-one-free" deals on perishable items can prevent wasting food that cannot be consumed in time.

**Proper Storage and Management**

Once food is purchased, proper storage is key to extending its lifespan. Adopting the "First In, First Out" (FIFO) method, where older items are moved to the front of the fridge or pantry to be used first, reduces forgotten, spoiled food. Organizing the refrigerator by setting it to 40°F (5°C) or below keeps food fresh. Fruits and vegetables should be stored properly—for example, storing leafy greens in high-humidity drawers and

keeping ethylene-producing fruits like bananas away from others to prevent premature

ripening. Freezing leftovers, bread, or produce that is approaching its prime is a crucial method to "pause" its spoilage, allowing it to be used later.

**Understanding Date Labels and Composting**




Much consumer food waste stems from confusion over date labeling. "Best before" dates generally indicate when a product will be at its peak quality, but it is often safe to eat afterward, whereas "use by" dates are more related to safety. Relying on senses—checking for odor, texture, and appearance—rather than blindly throwing away food on the printed date can save significant amounts of food. Finally, for food that cannot be eaten, composting is a valuable alternative, turning scraps into nutrient-rich soil rather than wasting them in a landfill.

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# Measures to Prevent Food Waste at Home

ITALY

### Using Food Creatively

Fortunately, small and thoughtful changes in our daily routines can make a massive difference. Instead of seeing stale bread or overripe vegetables as rubbish, we can turn them into nutritious, mouth-watering dishes! Here are two classic, anti-waste recipes that prove leftover food can be extraordinary.



Repurposing food scraps and leftovers is an effective way to minimize waste. Slightly wilted vegetables can be turned into soups, stews, or stir-fries, while overripe fruits are perfect for smoothies or baking. Vegetable scraps such as stems, peels, and onion skins can be frozen and later used to make nutrient-rich vegetable stock. Adopting a "whole ingredient" approach—such as roasting broccoli stalks rather than discarding them—enhances the nutritional value of meals while minimizing waste. Leftovers can be transformed into new meals, such as turning roasted chicken into a salad or sandwich, rather than being discarded.

### Recipe 1: Classic Bread & Vegetable Soup (Tuscan Ribollita Style)

Ideal for using up stale bread and slightly wilted vegetables—ingredients that represent over 25% of thrown-away home groceries!



**Ingredients:**

200g stale bread (cut or torn into rough chunks)

2 carrots, 2 celery sticks, and 1 onion (chopped)

1 can of cooked white beans (e.g., cannellini)

2 cups of leafy greens (cabbage, spinach, or kale)

1 tablespoon olive oil, salt, pepper, and fresh herbs (rosemary/thyme)

1 litre of vegetable broth (made from leftover vegetable peelings!)

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# Measures to Prevent Food Waste at Home

ITALY

**Instructions:**

**Sauté the base:** In a large pot, heat the olive oil and gently cook the chopped onion, carrots, and celery until soft.

**Add vegetables and broth:** Add the leafy greens, white beans, herbs, and vegetable broth. Bring to a simmer for 20 minutes.

**Incorporate the bread:** Stir in the chunks of stale bread. Lower the heat and simmer for another 10–15 minutes until the bread absorbs the liquid and thickens the soup.

**Serve:** Season with salt and pepper, add a drizzle of extra virgin olive oil, and enjoy warm!

## Recipe 2: Overripe Fruit & Peel Smoothie

Perfect for soft, spotted bananas and bruised fruit that nobody wants to eat fresh!

Perfect for soft, spotted bananas and bruised fruit—preventing the waste of fruit, which accounts for nearly 45% of total produce losses globally.



**Ingredients:**

2 overripe bananas (peeled and sliced)

1 soft apple or pear (core removed, skin left on)

1 cup of milk or plant-based drink (oat, almond, or soy)

1 tablespoon of honey or peanut butter (optional)

A pinch of cinnamon

**Instructions:**

**Prepare the fruit:** Cut the overripe fruit into small pieces. *(Tip: You can freeze soft bananas in advance for a cooler smoothie!)*

**Blend:** Place all the fruit into a blender, add the milk, honey/peanut butter, and cinnamon.

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# Measures to Prevent Food Waste at Home



**Mix:** Blend on high speed for 1–2 minutes until smooth and creamy. Serve immediately in a tall glass.



**Conclusion**

Preventing food waste at home is a manageable goal that requires a shift in mindset and habits. By implementing planned shopping, proper storage, creative cooking, and understanding date labels, households can save money and reduce their environmental footprint. These small, daily actions contribute to a more sustainable, responsible, and ethical use of food resources.

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**Evaluation Questionnaire**

## Part 1: Reading Comprehension (True or False)

***Read the statements below and decide if they are True (T) or False (F) based on the text. Correct the false ones.***

Households in developed nations are responsible for nearly 57% of total food waste.

**[ ] True [ ] False**

"Use by" dates indicate when a product is at its peak quality, but the food is usually safe to eat afterward.

**[ ] True [ ] False**

Setting the refrigerator to 40°F (5°C) or below helps keep food fresh.

**[ ] True [ ] False**

The "FIFO" method stands for "Find It, Freeze Often".

**[ ] True [ ] False**

Ethylene-producing fruits like bananas should be stored away from other fruits to prevent premature ripening.

**[ ] True [ ] False**

## Part 2: Vocabulary in Context

***Match the words or phrases from the text (1–5) with their correct definitions (A–E).***

# Measures to Prevent Food Waste at Home



ITALY

Perishables

Impulse buying

Blemish

Stale

Composting

**A.** Buying items suddenly without planning or thinking about whether you really need them.

**B.** Food products that decay or go bad quickly if not stored properly.

**C.** Turning organic waste (like food scraps) into nutrient-rich soil.

**D.** No longer fresh and usually hard, dry, or tasteless (referring to food like bread).

**E.** A small mark, flaw, or imperfection on the surface of something (like a fruit or vegetable).

## Part 3: Comprehension Questions

***Answer the following questions in complete sentences based on the text.***

What are the two main benefits of preventing food waste at home mentioned in the introduction?

Why are a large percentage of fresh produce items rejected in retail markets *before* reaching the shelves?

What is the difference between a "Use By" date and a "Best Before" date?

How can vegetable scraps (like stems and peels) be used creatively according to the text?

What are the four main steps or pillars recommended in the conclusion to achieve a sustainable approach to food?

## Part 4: Discussion & Critical Thinking (Speaking or Writing)

***Discuss these questions with a partner or write a short paragraph (50–80 words) for each:***

Personal Habits: Look at your own household or school habits. Which of the four main causes of food waste (overbuying, cosmetic standards, date labels, or improper storage) happens most often? How can you change it?

Creative Cooking: Have you ever tried cooking with leftovers or overripe ingredients (like the recipes in the text)? What did you make? If not, which of the two recipes (the Tuscan Ribollita or the Smoothie) would you prefer to try first and why?

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# 04

PART 4

# Recipes and Menus

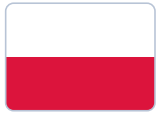
Traditional food is part of our cultural heritage and is often simple, seasonal and healthy. Each partner country presents typical dishes and menus. Try them at home and compare the traditions.

CHOOSE A COUNTRY




TÜRKIYE

**Soup, Stuffed Vine Leaves and Kibbeh** p. 89



POLAND

**A Traditional Menu and Three Classic Dishes** p. 93



CROATIA

**Breakfast, Dinner and Main Dish** p. 100



ITALY

**Wafers, Fresh Pasta and Sourdough Bread** p. 105

# Turkish Cuisine: Recipes

TÜRKIYE

**TURKISH CUISINE**



**Ingredients For Tarhana Soup Recipe**

3 tablespoons of home tarhana

1 tablespoon of tomato paste

1 teaspoon of mint

2 tablespoons of oil

5-6 cups of water

Salt

**How to Make Tarhana Soup Recipe?**

Firstly, soak the tarhana in a bowl with a glass of water for half an hour and crush it.

Put the oil in the pot and roast the tomato paste until it smells.

Add mint and 5 cups of water to the soaked tarhana.

Add salt and boil by stirring constantly until it thickens.

Enjoy your meal.

**Grape leaves stuffed with meat (etli yaprak dolma)**

Ingredients for Stuffed Leaf Wrap with Meat



1 kg fresh leaves

400 g minced meat

1 water glass of rice

2 tbsp tomato paste

# Turkish Cuisine: Recipes

TÜRKIYE

2 medium sized onions

Half a bunch of finely chopped parsley

Salt, black pepper

Cumin

1 tea glass of water

1 tea glass of flower oil (no need if our mince is greasy)

Boil the leaves in hot water and cool them.

Mix the minced meat, rice, grated onion, tomato paste, parsley, spices and water in a bowl and wrap the leaves. You can add the spices you want.

Place the leaves on the bottom of the pot and place the wrapped leaves on it.

If desired, pour the tomato paste sauce all over and cook over low heat. I only poured a mixture of oil and water.

Serve with yoghurt on the side.



Enjoy your meal.

**For the dough of kibbeh: (30 pieces )**

2 cups of fine bulgur for meatballs

1 water glass semolina

3 cups of hot water

1 egg

1 tablespoon

# Turkish Cuisine: Recipes

TÜRKIYE



tomato paste

1 tablespoon of chilli paste

1 tablespoon olive oil

3 tablespoons flour

2 teaspoons (wipe) chilli flakes

2 teaspoons salt

**For the kibbeh mixture:**

200 grams butter or margarine



550 grams of minced meat

1/2 tea glass water

4 medium onions

2 teaspoons salt

1 teaspoon mint (according to desire)

2 teaspoons chilli flakes (according to desire)

1 teaspoon thyme (according to desire)

1 teaspoon black pepper (according to desire)

1 pinch of cumin (according to desire)

10 stalks of parsley

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# Turkish Cuisine: Recipes

TÜRKIYE

1 cup walnut (coarsely ground)





# Traditional Menu and Recipes

POLAND

## Traditional menu

**Menu Tradycyjne**

**Przyjęcie w stylu polskim**

Śniadanie

Twaróg wiejski ze śmietaną, rzodkiewką i świeżym szczypiorkiem

Kiełbasa jałowcowa

Chleb żytni na naturalnym zakwasie z masłem wiejskim

Ogórki kiszone domowej roboty oraz pomidory malinowe z cebulką

Herbata z cytryną lub kawa zbożowa z mlekiem

Obiad

Przystawka

Tatar wołowy z żółtkiem, kiszonym ogórkiem, cebulką i musztardą sarepską

Zupa

Żurek staropolski na zakwasie żytnim, z białą kiełbasą, jajkiem i majerankiem,

podany w chlebie lub filiżance – do wyboru

Danie główne

Schabowy z kością, panierowany w tradycyjny sposób,

serwowany z młodymi ziemniakami z koperkiem

oraz kapustą zasmażaną na maśle z boczkiem

Deser

Sernik krakowski z wanilią i skórką pomarańczową,

na kruchym spodzie, z charakterystyczną kratką

Napój

Kompot z suszu – aromatyczny napar

z suszonych owoców i korzennych przypraw

Kolacja

Placki ziemniaczane z chrupiącą skórką,

podane z kwaśną śmietaną lub gulaszem wołowym

Pasztet domowy z nutą majeranku i dodatkiem żurawiny

Chleb razowy z domowym smalcem z cebulką

Herbata miętowa lub napar z rumianku

**Traditional Menu**

**Polish-themed reception**

Breakfast

Farmers' cheese with sour cream, radish, and fresh chives

Juniper sausage

Rye bread with natural sourdough starter and farmhouse butter

Homemade pickled cucumbers and heirloom tomatoes with onion

Tea with lemon or roasted grain coffee with milk

Dinner

Starter

Beef tartare with egg yolk, pickled cucumber, onion, and Sarepta mustard

Soup

Traditional sour rye soup with white sausage, egg, and marjoram,

# Traditional Menu and Recipes



POLAND

served in a bread bowl or a cup – your choice

Main Course

Traditional bone-in breaded pork chop,

served with new potatoes with dill

and braised cabbage with butter and bacon

Dessert

Cracow-style cheesecake with vanilla and orange zest,

on a shortcrust base with a characteristic lattice top

Beverage

Dried fruit compote – a fragrant infusion

of dried fruit and warming spices

Supper

Potato pancakes with a crispy crust,

served with sour cream or beef stew

Homemade pâté with a hint of marjoram and cranberries

Wholemeal bread with homemade pork lard and onion

Peppermint tea or chamomile infusion

## Polish traditional dishes: recipes

### PIEROGI

### POLISH

### DUMPLINGS

### Pierogi“Ruskie”:Potatoes. Cheese. Butter. The Polish are genius–this is dumpling heaven!

### A great weekend project–cook some now, freeze some for later.

### They cook from frozen!!

PREPTIME COOKTIME SERVINGS

2HOURS 5MIN 50PIECES

### Instructions

**---Filling:**

- Boil potatoes– Put potato and 1 tbsp salt in a large saucepan. Add cold tap water so it's 3cm/1 inch above potatoes. Bring to a boil on high heat then reduce heat to medium high and simmer for 15 minutes or until potatoes are soft.

Mash–Drain, then pass the potatoes through a potato ricer into a bowl(or use potato masher)

Cheese it–Immediately add butter, cheese, salt and pepper. Mix with a wooden spoon until fully combined.

Cool–Spreadout~1cm/1/2"thick on a tray. Cover with cling wrap, pressing so it is fully incontact. Cool on the counter(~30min)then

### Ingredients

### Pierogi dough:

300 g flour , plain/all-purpose

1 tsp cooking/kosher salt

50 g unsalted butter

125 ml water

1 large egg , whisked (55-60g/2oz)

### Pierogi filling:

# Traditional Menu and Recipes

POLAND

500 g potatoes , peeled and sliced 1cm / 1/2"thick (2 medium, Note 1)

1 tbsp cooking/kosher salt – for cooking potatoes

30 g unsalted butter

100 g shredded cheddar cheese , tightly packedcup (Note 2)

0.25tspcooking/koshersalt

0.5tspblackpepper

## Onion Butter:

30g/ 2 tbsp unsalted butter

1 onion , finely diced

0.5tsp cooking/koshersalt

## Cooking and serving:

1 tbsp cooking/kosher salt – for boiling water

25g/1.5tbspun salted butter, per 8–10 pierogis(Note3)

Sour cream , for serving

Parsley or chives , finely chopped – just a pinch

**---Pierogi Dough:**

- Meltbutter–Heat up the water and butter in a small sauce pan over medium heat just until butter is melted, do not boil water.(Or do this in the microwave). Turn off heat.
- Mixdough–Whisk the flour and salt in a mixing bowl. Make a well in the centre and then add the butter water plus egg. Mix to combine into a shaggy dough.
- Knead–Scrape out onto a lightly floured work surface. Knead for 5 minutes until the dough becomes smooth. You could also use your stand mixer.
- Rest–Wrap with cling wrap and leave on the counter for 30 minutes.

**---Wrapping pierogi:**

- Roll & cut–On a lightly floured surface, roll out the dough to3mm/1/8"thickness.Cut out rounds using a7.5cm/3"cutter.Do as many as you can, then gather surplus dough into a ball, wrap with cling wrap and set aside for later.
- Fill &wrap–Place 1 tablespoon of cheesy potato filling in the middle of a round. Dip finger with water and run along edge of half the circle. Fold dough over to enclose the filling and press to seal, making slight indents (no pleats).
- Wrap remaining– Place them on a lightly floured tray and continue to wrap remaining Pierogi (including rolling out the remaining dough). You should get ~30 pierogis.

**---Onion butter sauce:**

- In a non stick skillet, melt the butter until foamy over medium heat. Add onion and salt, then cook, stirring regularly, for 10 to 15 minutes until golden on the edges. Scrape out into a bowl, then set aside (OK to cool).

**---Cooking & serving pierogi:**

- Batch cooking – Directions below are for cooking and serving 10. Boil pierogis in batches of 10 to 12 max,they need space to bounce around in the water,and you need space to toss them in the butter. (Note 4 for big batch cooking)
- Boil 5minutes–Bring~3litres/quarts of water to the boil with 1tbsp salt. Lower 10 piergis into the water. Cook for 5minutes–they should be floating on the surface.
- Reserve water & drain–Dip a jug into the water and scoop out~1cupwater.Then use a slotted spoon to transfer pierogi into a bowl(or drain,if not cooking more).
- Buttersauce–Melt butter in a large skillet over medium heat. Add 1/3 of the onion butter plus the cooked pierogis with 2 tablespoons of the reserved cooking water. Toss for 1 minute, still on the stove, until the pierogis are coated in the butter.
- Serve Slide on to a serving plate, scraping out every drop of butter. Sprinkle with parsley, add a dollop of sour cream. Eat and be happy!

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# Traditional Menu and Recipes

POLAND



## Ingredients

8.5cups(2litres,0.5gallon) meatstock (chicken, mixed-meat, rosół works great too)

7oz(200g)unsliced bacon

1(200g,7oz)medium white onion

2 medium carrots (roughly4.2oz,120g)

- 2 parsley roots (roughly 4.2 oz, 120g) – can be substituted for a celery root)

4links(500g,1.1lb)white kiełbasa sausage

(fresh,uncooked)

- 2¼cups (500ml) Sour Rye Flour Starter (link to a recipe in the notes)

1garlic clove

- 3 tbsp whipping cream (optional, 30-36%fat)

1tbsp dried marjoram

Salt to taste

Pepper(freshly ground)to taste

### If using a homemade 'zakwas' fermented without spices:

4 bay leaves

5 all-spice berries

5 black pepper corns

### To serve:

4 boiled eggs, halved

Fresh marjoram to garnish

## ŻUREK: CLASSIC POLISH SOUR RYE SOUP

**With its distinctive sour flavor and hearty ingredients, this soup embodies the essence of Polish comfortfood. Made with fermented rye flour and enriched with kiełbasa and aromatic spices, it's aculinary delight worthexploring. Can't travel to Poland right now?**

***Make it at home—here's how.***

PREPTIME COOKTIME SERVINGS

30MINUTES 50MINUTES 10PORTIONS

## Instructions

- Get a cooking pot. Pour in the stock and start heating it up(on a medium heat).

Chop bacon and onion into small cubes. Using a frying pan, fry up the bacon first. There is need to add any additional frying fat, bacon will release plenty of its own.

# Traditional Menu and Recipes



Once the bacon fat has rendered, add the onion pieces and continue frying until both ingredients turn golden.

Move the contents of the frying pan into the pot with cooking stock. If your ‘zakwas’ starter was fermented without spices(that is: bay leaves, all-spice berries and peppercorns),it’s a good moment to add them directly into the soup. I place them inside a mesh spice bag/stock sachet, so that I don't have to struggle fishing the mout later.

Peel carrots and parsley roots, drop them whole into the stock.

Add white kiełbasa (uncut, whole links) as well and continue cooking for 30-40minutes, until the stock becomes meaty in aroma and flavour (you’ll have to test that empirically).

If you haven’t boiled the eggs already, now is a good moment to do so. Once cooked, allow them to cool down.

The next step would be to remove the spices. If you used the spice bag, just take it out. Otherwise, you can fish the mout manually with a spoon, or get rid of the musing asieve-and return the soup into the pot.

Now it’s time to add rye 'zakwas' starter. Add 1⅓cup (300ml) of zakwas for a

Mild Żurek, up to 2 cups(or more; roughly 500 ml)for a more sour result. If you’re not sure how much you should add, just pour it over gradually, tasting along the way.

There are two ways to do it:

Mix the contents of the jar/bottle,so that the liquid part blends with the floury part,

Or start by adding the liquid only, topping with the muddy floury part later on

-spoonful by spoonful, until you reach the desired thickness.

- Add 1 tablespoon of dried marjoram and one garlic clove (crushed or roughly chopped), cook for another 4-5 minutes.
- Remove the pot from heat. Remove the sausage and vegetables with a slotted spoon, slice them all and return to the pot.You can also leave the sausage unsliced - that’s up to you.
- Adding cream is optional, but it balances the flavours very nicely. Place 3 tablespoons of whipping cream into a cup or a small bowl. Add in a tablespoon of Żurek, mix well with a fork. And another spoonful of soup and mix again. Repeat with 2 more tablespoons of Żurek. Pour the mixture into the pot.
- Have a taste. Does it need any more salt or a pinch of pepper? If so, add some to taste. Garnish with fresh marjoram or chopped parsley and serve with boiled egg halves.



BIGOS

## POLISHHUNTER’S STEW

# Traditional Menu and Recipes

POLAND

**Making Polish bigos involves stewing sauerkraut, white cabbage, meat and sausage along with a handful of spices to create a warming, hearty dish that's moreishly delicious. Bigos stew is incredibly simple to make, requires very little effort and makes a fantastic potluck party dish.**

PREPTIME COOKTIME SERVINGS

40MINUTES 3HOURS 10-12PORTIONS

## Instructions

**Prep the ingredients:**

- Pour hot tap water over the dried mushrooms and submerge them for 20 to 40 minutes, or until soft.

Grind or crush the juniper berries(if using)and blackpepper corns roughly; you don't want a powder.

Cut the pork shoulder into large chunks ,about 2 inches and set aside.

Cut the sausages into similar-sized chunks and set aside.

Drain the sauerkraut and set aside.

Drain the mushrooms, straining the soaking liquid through a fine mesh sieve. Set the soaking liquid aside. Clean off any dirt from the soaked mushrooms and cut them

Into large pieces; leave small ones whole.

## Ingredients

1 ounce dried porcini or other wild mushrooms

1 tablespoon juniper berries, optional

1 tablespoon black pepper corns

2 pounds pork shoulder

1 to 2 pounds kielbasa or other smoked sausage

1 (25-ounce) jar fresh sauerkraut (were commend Bubbies, which you may be ableto find in the refrigerated section of your local supermarket)

1 1/2 pounds mixed fresh mushrooms

2 tablespoons bacon fat or vegetable oil

1 large onion, chopped

1 green cabbage, cored and chopped

Salt

2 tablespoons tomato paste, optional

1 smoked ham hock

1 pound fresh Polish sausage, optional

1 tablespoon caraway seeds

2 tablespoons dried marjoram

1 (12-ounce) bottle pilsner or lager beer

1 (15-ounce) can tomato sauce, optional

20 prunes, sliced in half, optional

1 to 2 tablespoons mustard or horseradish, optional

**Brown the pork shoulder:**

1.In a large lidded pot, heat the bacon fator vegetable oil for a minute or two.

Working in batches if necessary, brown the pork shoulder over medium-high heat. Do not crowd the pan. Set the browned meat aside.

**Add the onions and cabbage, then the tomato paste:**

# Traditional Menu and Recipes



POLAND

- Put the onion and fresh cabbage into the pot and sauté for a few minutes, stirring often, until the cabbage is soft. Sprinkle a little salt over them. The vegetables will give off plenty of water. When they do, use a wooden spoon to scrape any browned bits off the bottom of the pot.

If you are making the tomato-based version, add the tomato paste here. Once the pot is scraped and the cabbage and onions soft, remove from the pot and set aside with the pork shoulder.

**Add the fresh mushrooms, pork, cabbage, onions and seasonings:**

Add the fresh mushrooms and cook them without any additional oil, stirring often,

until they release their water. Once they do, sprinkle a little salt on the mushrooms.

When the water is nearly all gone, add back the pork shoulder, the cabbage-and-onion mixture. Then, add the ham hock, kielbasa, optional Polish sausage, drained sauerkraut, caraway seeds, marjoram, ground pepper corns, and juniper(if using).

**Add the beer(or tomato sauce) and simmer:**

- Add the beer,if using, or the tomato sauce if you're making the tomato-based version. Stir well to combine.

You should not have enough liquid to submerge everything. That’s good: Bigos is a

“dry”stew, and besides, the ingredients will give off more liquid as they cook. Bring everything to a simmer, cover the pot and cook gently for at least 2 hours.

Bigos is better the longer it cooks, but you can eat it once the hamhock falls apart. Check at 2 hours, and then every 30 minutes after that.

**Discard the bones and fat, then add the prunes and cook longer:**

- When the hock is tender, fish it out and pull off the meat and fat from the bones. Discard the bones and the fat, then chop the meat roughly and return to the pot. Add the soaked dried mushroom, strained mushroom soaking liquid, and prunes(if using), and cook until they are tender, at least 30 more minutes.

**Add the mustard just before serving:**

- Bigos is best served simply, with rye bread and a beer. If you want a littlekick, add the mustard(or horseradish) right before you eat it.

Bigos improves with age, too,which is why this recipe makes so much. Your leftovers will be even better the next day.

# Croatian Recipes



## Zlevanka: traditional Croatian breakfast

**Zlevanka - Traditional Croatian Breakfast**

In many parts of Croatia, breakfast relies on simple yet nutritious ingredients available in rural areas – fresh milk, cheese, cornmeal, honey, and seasonal fruit. One of the traditional dishes that stands out is *zlevanka*, an old-fashioned dish made from cornmeal, milk, and eggs. This simple yet delicious treat is often served with homemade sour milk, which enhances its flavour and makes it even more nutritious.

In a traditional Croatian breakfast, dishes made with cornmeal (palenta) and sour milk are always accompanied by an apple.

**Zlevanka Recipe**



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**Category:** Traditional Croatian Breakfast
**Prep Time:** 15 minutes
**Cook Time:** 45 minutes

*Ingredients:*

2 cups cornmeal

1 cup wheat flour

2 cups milk

1 cup sour cream

3 eggs

1/2 cup sugar

1 packet baking powder

a pinch of salt

1 packet vanilla sugar (optional)

2 tablespoons oil or melted butter

*Preparation:*

In a bowl, mix cornmeal, wheat flour, sugar, salt, and baking powder.

In another bowl, beat the eggs and add milk, sour cream, and oil.

Combine the wet and dry ingredients and mix well until you get a smooth batter.

Grease a baking dish with butter and pour in the mixture.

Bake in a preheated oven at 180°C (350°F) for about 30-40 minutes, until golden brown.

Serve warm or cold, accompanied by homemade sour milk.

**How to Make Homemade Sour Milk**

Ingredients:

# Croatian Recipes



1-liter fresh milk

2-3 tablespoons sour cream or a bit of already prepared sour milk (starter culture)

Preparation:

Gently heat the milk to around 40°C (104°F) (it should not be hot).

Stir in the sour cream or a small amount of prepared sour milk.

Pour into a glass or ceramic container, cover with a cloth, and leave in a warm place for 12-24 hours.

Once it thickens and develops a slightly tangy taste, store it in the refrigerator.

This simple process results in creamy, mildly tangy milk that pairs perfectly with zlevanka or other traditional dishes. Enjoy your meal!

**Portion Size:**

Zlevanka: 150-200g (about 1-2 pieces depending on size)

Kiselo Mlijeko: 200-250mL (a glass)

One apple

**Total Macronutrients and Energy for the Meal** (Zlevanka + Kiselo Mlijeko + an Apple):

Calories: 280-350 kcal



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Energy value of one medium apple (approximately 150–180g) is around 80 kcal

Protein: 11-14 g

Fat: 14-19 g

Carbohydrates: 50 g

## Main dish and lunch

### Neretva-Style Stew with Eel and Frogs

# Croatian Recipes



CROATIA

Neretva-style stew is made with two unique ingredients, eel and frogs, along with the addition of fresh fish such as scorpionfish, mullet, gurnard, or weever fish. Neretva-style stew is made with two unique ingredients, eel and frogs, along with the addition of fresh fish such as scorpionfish, mullet, gurnard, or weever fish. If eel or frogs are not available, you can easily make this dish with mixed freshwater or saltwater fish, such as scorpionfish, mullet, gurnard, and other local fish.Traditionally, it was a poor man's dish made from available river or sea fish, but today it is a delicacy often found on our tables. It is known for its deep red color and spiciness.

The stew is cooked in a thick-bottomed pot, and an important rule is that it should not be stirred. Instead, the pot is gently swirled left and right. The stew is cooked over low heat until the fish softens, depending on the type of fish, for about 30 to 40 minutes. It is traditionally served with cooked cornmeal (polenta).

Category: Main Dish / Fish Stew
Prep Time: 20 minutes
Cook Time: 45 minutes

Ingredients:

1 kg eel

12 cleaned frogs

250 g red onion

100 mL olive oil

50 g garlic

50 g parsley

100 mL tomato puree

1-2 bay leaves

100 mL wine vinegar

100 mL red wine

2-3 hot chili peppers

Preparation:

In a wide, shallow, thick-bottomed pot, heat the olive oil, bay leaves, and hot chili peppers. Once sautéed, add garlic, parsley, wine vinegar, red wine, and tomato puree. Season with salt and, if needed, add a bit of sugar to balance the acidity.

Cut the eel (or mixed fish) into chunks, keeping the bones, and clean each piece properly. Do the same with the other fish. Once the tomato sauce has cooked sufficiently, add the eel and fish, along with just enough water to cover them.

Cook uncovered over low heat for about 15-20 minutes. When the eel is halfway cooked, add the cleaned frogs and season with salt and pepper to taste. Occasionally shake the pot, but do not stir.

Serve the stew with polenta.

Enjoy your delicious Neretva-style stew!

**Portion Size:**

**Polenta (Pura)**: A standard serving of cooked polenta is typically around **150 g** for one person.

**Brudet (Stew)**: We keep the portion at around **325 g**.

**Total Macronutrients and Energy for One Portion**

Calories: 120 (polenta) + 280 (brudet) = 400 kcal

Protein: 3g (polenta) + 25g (brudet) = 28 g

# Croatian Recipes



Fat: 1g (polenta) + 18g (brudet) = 19 g

Carbohydrates: 25g (polenta) + 15g (brudet) = 40 g

## Dinner

**Collard Greens in Traditional Croatian Cuisine**

Collard greens, known locally as *raštika* or *raštan* (*Brassica oleracea* var. *acephala*), are a staple in traditional Croatian cuisine, especially in the southern regions. Packed with fiber, vitamins C and K, and calcium, collard greens are incredibly nutritious and have long been considered a “superfood” by our ancestors. In addition to being healthy, they are versatile and can be prepared in numerous ways, from stews and soups to casseroles.

However, the most popular preparation method is the simple *"lešo"* technique (boiled), which preserves their flavour and nutrients. Depending on your preference, collard greens can be prepared in a vegetarian style with olive oil or enriched with smoked bacon for a heartier dish. Both recipes reflect the tradition of simple yet nutritionally rich cooking from this region. The vegan version with olive oil highlights the natural flavour of collard greens, while the version with bacon offers a smoky, Savoury depth—perfect for colder days.



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# Croatian Recipes

CROATIA



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**Boiled Collard Greens with Olive Oil**

**Category:** Traditional Croatian Dish, Vegetarian Dish

**Prep Time:** 10 minutes

**Cook Time:** 30 minutes

**Ingredients:**

500 g (1 lb) collard greens

3–4 potatoes

olive oil (4–5 tablespoons)

salt and pepper to taste

garlic (optional, 1–2 cloves, finely chopped)

**Preparation:**

Clean the collard greens by removing the central tough stems from the leaves and washing them thoroughly under running water. Chop the larger leaves into strips.

Peel and dice the potatoes into cubes.

Bring a large pot of water to a boil, add salt, and then the potatoes. Cook for 10 minutes, then add the collard greens and boil everything together for another 10–15 minutes until the vegetables are tender.

Drain the vegetables, place them on a serving plate, and drizzle with olive oil. For additional flavor, you can sprinkle some garlic on top. Serve warm with a slice of crusty bread.

Boiled collard greens are typically served with one or two boiled eggs and a slice of bread. This combination makes a light, easily digestible dinner that is rich in macronutrients and dietary fibre.

**Portion Size (per person):**

**~165–170 g** cooked vegetables (collard greens + potatoes)

**~1.5 tablespoons olive oil** per person

**1-2 boiled eggs**

**1 slice of bread**

**Total Nutritional Estimate for one portion:**

| Components | Energy/Cal | Carbohydrates | Protein | Fat |
|---|---|---|---|---|
| collard greens + olive oil | 220 | 21 g | 3,5 g | 13 g |
| 1 boiled egg | 290 | 21,5 g | 9,5 g | 18 g |
| bread | +130 | +24 g | +4 g | +1,5 g |

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# Italian Recipes

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**ITALIAN CUISINE**

**Ingredients for Ferratelle**

200 g pastry flour

3 eggs

3 tablespoons of sugar

3 tablespoons of extra virgin olive oil

1 grated zest lemon

1/2 sachet of baking powder

1 pinch of salt

**How to make ferratelle**

Pour sugar into a bowl and whisk it together with eggs. Eggs should be at room temperature: they will better merge with sugar.

When the mix is foamy, slowly stir in the EVO oil. Add grated lemon zest. Add sifted flour and baking powder then blend until creamy. Always sift flour and baking powder to prevent lumps in the dough.



Heat the mold plates and brush both sides with a little extra virgin olive oil. Remember to always grease the plates of the mold to prevent the dough from sticking.

Once the plates are hot, you need to lower the heat, otherwise you risk burning everything. Put a small spoonful of dough in the center of the plate and press it lightly to make it expand.

Close and cook for about 1⁄2 minute over low heat. Turn the mold over to the other side and wait another 1⁄2 minute.

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# Italian Recipes

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Open the plates and gently remove the wafer thus obtained. As soon as the Ferratelle are done, carefully remove them from the plates and let them cool well before eating them, so they won't break.

Leave to cool and serve.



**FRESH EGG PASTA**

**Ingredients for fresh egg pasta**

Type 00 flour (600 g / 1 lb)

Salt (1 teaspoon)

Eggs (5)

Extra virgin olive oil (1 tbsp)

Water (3 or 4 tbsp)

**How to make fresh egg pasta**

Put the flour on a clean worktop and sprinkle with salt.

Make a well in the centre of the flour and the eggs.



Blend together lightly with a fork, add the olive oil.

Using the tips of your fingers and working in a circular motion, gradually pull the flour into the well until it is all incorporated. If it seems too dry, add a drop of water. If it is too wet, add a bit more flour.

Knead for ten minutes or until the dough is very smooth and elastic.

When the dough is silky smooth, shape it into a ball.

Wrap with clingfilm and let rest in the fridge for at least 30 minutes before using.

With a rolling pin, roll out the dough and cut into the required shape with a pastry wheel.

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# Italian Recipes

ITALY



**SOURDOUGH BREAD**

**Ingredients:**

450g bread flour

100g active sourdough starter (fed and bubbly)

10g salt

350g cold water

**How to make fresh egg pasta**

Widen the dough, fold the two flaps in the center, roll up the dough, pulling delicately (the bubbles inside must not break). Place in a floured banneton or bowl lined with a towel. Cover and let rise for 8-12 hours in the fridge (cold fermentation improves flavor).

Bake:

preheat the oven to 245°C (475°F) with a Dutch oven inside. Transfer the dough onto parchment paper, score the top with a sharp blade. Bake covered for 20 minutes, then uncover and bake another 20-25 minutes. Cool. Let the bread cool completely before slicing. This will give you a beautiful, crusty, tangy sourdough loaf.

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# Conclusion

This e-book followed food from the plate to the field and back again: what we eat, how it is produced, what we waste, and how our traditions turn simple ingredients into healthy meals. The main messages are summarised here.

## Healthy nutrition

A balanced diet gives the body the energy and nutrients it needs. Unhealthy nutrition – too much fast food, sugar, salt and processed food – is linked with obesity, diabetes, anaemia and eating disorders. Reading labels and knowing what additives are helps us make informed choices.

## From farm to fork

Healthy food depends on how it is produced. The EU Green Deal and the *From Farm to Fork* strategy aim at a fair, healthy and environmentally friendly food system. Organic farming protects soil, water and people but has limits, such as lower yields and higher prices, and the debate about GMOs shows why evidence, regulation and clear labelling matter.

## Food waste

About one third of the food produced for people is lost or wasted, while many people go hungry. Consumers, industry and governments each have a role: planning and storing food well, using leftovers, selling or donating surplus food, and setting clear rules and targets.

## Recipes and menus

Traditional dishes from Türkiye, Poland, Croatia and Italy show that healthy eating can be tasty, seasonal and rooted in local culture. Cooking and sharing them keeps traditions alive and builds understanding between young people of different countries.

### Five habits for a healthy young generation

- **Eat varied, fresh food** and choose water instead of sugary drinks.
- **Move every day:** at least 30 minutes of activity went with a healthy BMI in the Croatian survey.
- **Read labels** and choose seasonal, local and, where possible, organic food.
- **Waste nothing:** shop with a list, store food well, use leftovers and compost.
- **Share** food, recipes and knowledge.

Healthy and young generations grow one meal, one choice and one shared recipe at a time.

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E-book production:
ARS PUBLIKA, North Macedonia

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Co-funded by the European Union

E-book production: ARS PUBLIKA, North Macedonia