FERMENTED FOODS

FACTSHEET

What is fermentation?

A natural metabolic process where microbes **break down complex nutrients in food** into **simpler components.**

Plant- or animal-based raw materials are **exposed to helpful microbes**, which **transform** them into new products.

This can create positive changes in **flavour, nutritional value, texture, digestibility,** and **shelf-life.**

Common approaches to food fermentation

Wild fermentation: Microorganisms naturally present in the raw food or environment drive the process like in **sauerkraut, kimchi.**

Inoculation: Specific microorganisms are added, either as a starter culture or by backslopping from a previous batch like **kefir grains, kombucha** SCOBY

In both cases

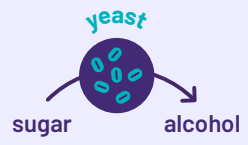
Microorganisms use enzymes (special proteins) to break down food nutrients into simpler compounds.

Different microbes produce unique enzymes, which is why we get a variety of fermented foods.

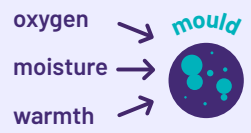
Symbiotic Culture Of Bacteria and Yeast

Which microorganisms are most common?

Lactic acid bacteria convert sugar into lactic acid (e.g., yoghurt, kimchi, sauerkraut).



Yeast converts sugar into alcohol & carbon dioxide (e.g., wine, beer, bread).



Moulds break down starch & protein in warm, moist, oxygen-rich conditions (e.g., miso, tempeh and soy sauce).

Fermented foods offer a range of nutritional benefits, but only some retain live cultures when consumed:

With live microbes (i.e., probiotics) kefir, kombucha, kimchi.

Without live microbes (killed by heat or processing): sourdough bread, wine, chocolate

Historical conext

12.000 YEARS AGO

The shift from hunter-gatherer to agricultural communities led humans to use fermentation to preserve food.

7.500 YEARS AGO

Cheese making was discovered around the Tigris and Euphrates rivers (modern-day Iraq), when nomads stored milk in the stomachs of animals, and it started to ferment.

~5.000-3.000 YEARS AGO

Egyptian and Sumerian civilizations use alcoholic fermentation to produce wine and beer. Egyptians also discovered how to make bread rise through fermentation.

PRESENT DAY

Fermented foods and beverages represent 5 to 40% of our diets. While many staples endure, new products are emerging to meet our evolving needs, preferences and curiosities.

What are the benefits of food fermentation?

Test your knowledge on fermented foods with our quiz!

1 PRESERVATION

Fermentation **extends shelf life** by creating **acidic conditions** and **beneficial microbes** that inhibit harmful bacteria **– reducing food waste** and **lowering risk of foodborne illness.**

*It's important to know the difference between normal fermentation and signs of spoilage.

2 SUSTAINABILITY & CIRCULAR ECONOMY

Fermentation can turn **surplus, seasonal, imperfect produce or by-products** into **valuable products with longer shelf-lives** – also reducing long-distance transport and energy-intensive processing.

3 UNIQUE FLAVOURS & TEXTURES

Fermentation creates distinctive tastes and textures like **tangy, sour, or umami notes** and enhanced **creaminess, tenderness, or crunch** – adding to a diversity of global **cultural cuisines.**

4 IMPROVED NUTRITION

Fermentation increases the **bioavailability of vitamins and bioactive compounds, breaks down anti-nutritional factors**, and improves nutrient digestion and absorption.

5 SUPPORT FOR GUT HEALTH & DIGESTION

Some fermented foods contain beneficial bacteria that can **help balance the gut microbiota** by breaking down complex components (like sugars or proteins), making foods easier to digest.

Play the "fermented food dominoes" game to learn more!

DOMINO

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 964590

UKRI UK Research and Innovation