

# Fermented Food



Fermentation is among the oldest types of food preservation known to man. It involves the production of natural metabolites by desirable microbes within a food, so that spoilage and pathogenic microbes are excluded. It increases the shelf life, making foods safe for consumption well beyond their natural limits.

Fermentation is initiated by addition of a starter culture or occurs spontaneously by bacteria in the environment

It has been estimated that intentional fermentation of fruit, rice or honey beverages has been around for up to 10,000 years, with other foodstuffs like dairy, meat, veg and fish following since.

Estimates suggest fermented foods account for about one third of the global diet today.



Milk kefir is produced by adding kefir grains to cow or goats milk and allowing it to ferment at room temperature for 24 hours.

With the growing awareness of gut health among the scientific community and the public, probiotic supplements have emerged as a way to deliver beneficial bacteria to the gut. Fermented foods have been given a new lease of life as a natural source of probiotics, as well as making food easier to digest, less allergenic and/or releasing bioactive molecules that have benefits in their own right.



## 100 Years of fermented food research – the story so far

Russian Scientist, Élie Metchnikoff, proposed that consuming lactic acid bacteria and, in particular those present in the fermented milk beverage, kefir, could prolong lifespan.

Since Metchnikoff, the field has come along way in terms of studying the details of the fermentation process and the chemistry involved. Fermented foods are well characterised, and it has been shown that many important nutrients are present in the fermented end product that were not there initially.

With advances in DNA sequencing, the microbial composition of fermented is now much better understood, as previously only microbes that lent themselves to traditional microbiology culturing studies could be discovered. 16s DNA sequencing, and more recently shotgun sequencing, have led to an enormous amount of data that we are only beginning to understand.



## Research at the APC Microbiome Ireland

### • Fermented foods

Fermented foods offer a unique opportunity to study dynamic bacterial ecosystems. By examining the changes that occur throughout fermentation, the lab is uncovering more about the fundamentals of microbial ecology.



### • Microbial metabolism and food chemistry

Using next generation sequencing and mass spectrometry, the specific chemical attributes of a fermented food can be assigned to specific taxa in the fermentation cohort. This knowledge can then be used for industry and also for the design of future experiments.



### • Fermented foods as a probiotic source

Samples of fermented foods from all over the world are being examined at the moment for potential probiotic sources and to gain a better understanding of fermentation and microbial ecology in general. Shotgun sequencing has been applied to more than 50 foods to date.