

## YOUR GUIDE TO Fermented Food

Fermented foods, a category that includes fermented beverages, have been defined as “foods made through desired microbial growth and enzymatic conversions of food components”.<sup>1</sup>



### MICROORGANISMS USED IN FERMENTATION

Lactic acid bacteria, acetic acid bacteria, yeasts, and moulds are the most widely used microorganisms in fermentation. These microorganisms are used to produce fermented dairy, vegetable, cereal, meat, alcoholic and other fermented products.<sup>1,2</sup>

### LIVE MICROORGANISMS IN FERMENTED FOODS

All foods and beverages produced by fermentation are considered fermented foods, but not all fermented food contain live microorganisms in the final product.<sup>1</sup>

Bread, beer and wine are examples of fermented foods that are prepared using live microorganisms but include steps in the manufacturing process to remove them from the final product. In addition, many fermented foods are heat-treated or pasteurised after fermentation to improve food safety or to extend the product’s shelf-life, thus resulting in products that no longer contain live microorganisms.<sup>1</sup>

### PRODUCTS NOT CONSIDERED FERMENTED FOOD

Products that are excluded in the fermented food definition are those that contain ingredients made by fermentation, non-fermented products that are supplemented with microorganisms, and chemically derived versions of fermented foods. Examples of these types of products include chemically leavened bread, fresh sausage, vegetables pickled in brine and/or vinegar, chemically produced soy sauce, and salted or cured processed meats and fish.<sup>1</sup>

#### Fermented foods that contain live microorganisms (unless heat-treated or pasteurised)

- Fermented dairy products – yoghurt, fermented milk drinks, most cheeses, sour cream, kefir
- Fermented soy products – miso, natto, tempeh
- Fermented vegetables
- Salami, pepperoni and other fermented sausages
- Boza, bushera and other fermented cereals
- Most kombuchas
- Some beers

#### Fermented foods that do not contain live microorganisms

- Bread, including sourdough
- Wine, most beers and distilled spirits
- Coffee and chocolate beans (after roasting)
- Heat-treated or pasteurised yoghurt, sour cream, fermented vegetables, sausage, soy sauce, vinegar and some kombuchas

## PROBIOTICS VS. FERMENTED FOODS

Probiotics are defined as “live microorganisms which, when administered in adequate amounts, confer a health benefit on the host”.<sup>3</sup> Fermented foods and beverages often do not meet the requirements of a probiotic because:<sup>1</sup>

- The products generally contain undefined microbial strains, in variable amounts
- Their potential health benefits have not been demonstrated in well-controlled intervention studies

On the other hand, a product could be considered a “probiotic fermented food” if there is evidence from well-controlled intervention studies that a specific microbial strain(s) in adequate amounts confers a health benefit on the host. Otherwise, products should be labelled “containing live and active cultures”.

## REGULATORY LANDSCAPE

The use of microbial cultures in food mediums are regulated by the European Food Safety Authority (EFSA) which includes criteria for establishing safety. Microorganisms that do not raise safety concerns are granted Qualified Presumption of Safety (QPS) status by EFSA.<sup>8</sup>

Across the European Union (EU) and within the UK, foods can only carry a nutrition or health claim in accordance with EU\* and UK\*\* Regulations. All health claims on food products across the EU and within the UK require an assessment of scientific evidence by EFSA or the UK Nutrition and Health Claims Committee (UKNHCC), respectively.

Currently only one health claim has been approved for a fermented food; *live cultures in yoghurt or fermented milk improve lactose digestion of the product in individuals who have difficulty digesting lactose.*<sup>9</sup>

\*Regulation (EC) No 1924/2006

\*\*Nutrition (Amendment etc.) (EU Exit) Regulations 2020

### IMPACT ON THE GUT MICROBIOTA

Some human studies have shown that microorganisms in fermented foods can survive gastric transit and reach the large intestine alive, and therefore play a part in modulation of the gut microbiota.<sup>4-7</sup> However, more well-designed studies are needed to investigate the impact of different types of fermented food on the modulation of the gut microbiota.

**Kefir:** Kefir has some evidence to support short-term improvements in the quality of life of patients with inflammatory bowel disease (IBD).<sup>10</sup>

**Sauerkraut:** In a pilot study, sauerkraut was shown to improve the symptom severity score in patients with irritable bowel syndrome (IBS).<sup>11</sup>

**Natto:** There is some evidence to suggest that natto can improve bowel habits in patients with mild constipation.<sup>12</sup>

**Sourdough bread:** A study reported that sourdough baked goods significantly reduced gastric volume, hydrogen production and post-prandial gastrointestinal symptoms compared to brewer's yeast baked goods.<sup>13</sup>

The process of product fermentation has also shown to improve the availability of bioactive compounds and remove toxins or antinutrients<sup>14-16</sup>, enhancing the nutritive value of fermented foods and beverages.

### IMPACT ON HEALTH

The rise of consumer interest in fermented foods has been driven by their proposed health benefits, however, only a few randomised controlled trials in humans have been performed to explore these potential benefits.<sup>1,2</sup>

A better understanding is needed to clarify the health benefits of different fermented foods and the live microorganisms they contain in human health as these studies are limited, often conducted in small sample sizes and the fermented foods used do not always represent what is available on the market.

### REFERENCES

1. Marco et al. (2021) *Nat Rev Gastroenterol Hepatol* 18:196–208
2. Dimidi et al. (2019) *Nutrients*, 11(8): 1806
3. Hill et al. (2014) *Nat Rev Gastroenterol Hepatol* 11: 506-514
4. Oozeer et al. (2006) *Appl Environ Microbiol* 72: 5615–5617
5. Tuohy et al. (2006) *J Appl Microbiol* 102(4): 1026-1032
6. Milani et al. (2019) *Nat Commun* 10(1): 1286
7. Taylor et al. (2020) *mSystems* 5(2): e00901-19
8. EFSA Panel on Biological Hazards (2020) *EFSA Journal* 18(2): 5966
9. EFSA Panel on Nutrition, Novel Foods & Food Allergens (2010) *EFSA Journal* 8(10):1763
10. Yilmaz et al. (2019) *Turk J Gastroenterol* 30(3): 242-253
11. Nielsen et al. (2018) *Food Funct* 9: 5323-5335
12. Mitsui et al. (2006) *Jpn Pharmacol Ther* 34(1): 135-148
13. Polese et al. (2018) *Jl Nutr*, 148(2): 202-208
14. Septembre-Malaterre et al. (2018) *Food Res Int* 104: 86-99
15. Melini et al. (2018) *Nutrients* 11: 1189
16. Reddy & Pierson. (1994) *Food Res Int* 27(3): 281-290

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