

Frontier Research in Food Microbiology

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I am pleased to introduce this Special Issue, which covers a wide range of areas. The objective is to contribute to the overall knowledge of microbial communities in food by presenting various points of view on both the positive bacteria, investigating their characteristics and their usage in improving the food properties and in valorising the food by-product and waste, and the pathogenic ones, investigating strategies to control them.

This editorial aims to summarize the scientific papers in the Special Issue and to point out the importance of microorganisms in food.

The microbial communities in food are key factors in the whole production chain from food processing to its spoilage and waste disposal.

All the various processing steps of food production from the handling of raw materials to waste treatment are highly influenced by microorganisms.

To date, multidisciplinary food microbiology research has focused on different areas such as probiotics, functional foods, fermented food, advanced food technology, food safety and hygiene, innovative methodologies usable for food analyses and advanced systems for by-product or food waste valorisation.

The main objective is to acquire in-depth knowledge of the microbial communities, of which several food products are or could be made of, with a two-fold purpose: on the one hand, we aim to know and exploit what the potentialities of microorganisms known as probiotics are or to discover new strains of them, usable for food and/or nutraceutical improvement or new production and for by-product valorisation, while on the other hand, we aim to identify new strategies against pathogenic bacteria.

In this Special Issue, the research on probiotics has been given particular attention. Generally, a vast amount of the literature reports on the potential of probiotic bacteria, including their survival in the gastro-intestinal tract (GIT) and the positive effect on gut microbiota composition due to biomolecule consumption [1,2]. Furthermore, new potential or known probiotic strains have been screened for natural bioactive substances, immunomodulation capacity, as well as anticancer and other health benefits [3–9].

Malki et al. performing a screening of 20 *Lactobacillus* strains isolated from fermented dates and assessed the anti-oxidation effect, the inhibition of α -glucosidase activity and the cholesterol-reducing and anti-inflammatory effects of two new potential probiotics [3].

Kim et al. isolated a novel lactic acid bacterium that overproduces vitamin B2 and assessed that it could be used as a beneficial probiotic strain in human and animal applications, concluding that it could represent a new alternative to riboflavin supplementation and could help to address riboflavin deficiency [4].

Jung et al. reported the immunomodulatory actions of lipoteichoic acids (LTA) isolated from the cell wall of four *Lactiplantibacillus plantarum* strains [5]. The different structures of these LTAs were responsible for the different binding abilities with the host cell surface receptors and for the differences in signal pathways.

To date food, safety is considered to be a public health and socioeconomic priority.

Several studies focus on new bioactive biomolecules usable as antimicrobial agents [6,7].

Gervasi et al. reported the use of an endolysin as a novel antimicrobial for the biocontrol of *Clostridium perfringens* in the gut environment [7,8].



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Lauková et al. reported the promising anti-staphylococcal effect of Enterocin A/P and indicated its promising use as an additive for the processing of dairy products [9].

Gervasi et al. investigated the antimicrobial effect of natural raw and roasted unsalted polyphenols-rich pistachio extracts and hexane oil fractions against American Type Culture Collection (ATCC) food and clinical isolates of Gram-positive and Gram-negative bacteria and assessed their inhibitory effect against one of the most common pathogens causing foodborne disease, *Listeria monocytogenes* [10].

Other studies investigated the potential of biomolecules and phytochemicals, which in combination with other preservatives, could be used in the food industry to promote microbial stability and safety [11,12].

In addition, microorganisms play a pivotal role in food by-product recovery and valorisation as reported in the literature [13–17].

Briefly, and as a final remark, the contributions presented in this Special Issue provide a snapshot of the up-to-date and emerging interest on the research of food and microorganisms, including various aspects of the food microbial community for their important effects on human health and environmental sustainability.

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