Editorial Article

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Digestive Health: Improving and Maintaining with Phytochemicals and Functional Foods

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There is a noticeable, growing interest in developing functional foods aimed at maintaining digestive health these days. Foods with specific metabolic targets are at the forefront of scientific research due to strong links between the gut microbiome, oxidative stress, inflammation, and metabolism [1].

After products tailored to general wellbeing, foods aimed at digestive health are the second-largest positioning platform. Probiotic microorganisms and/or prebiotic dietary bioactive fibers are commonly found in such foods. Probiotics are viable microorganisms (bacteria or yeasts) that confer a health benefit on the host when administered in adequate amounts, according to the latest FAO/WHO (2002) definition, whereas prebiotics are nondigestible compounds that induce the growth or activity of beneficial microorganisms. Probiotic products must contain an adequate number of live cells that can proliferate and colonize in the gut in order to provide health benefits [2, 3]. The viability and functionality of probiotics, as well as the effective modulation of microbiota through prebiotics, in order to provide the greatest health benefit to the host, is a complicated and fascinating topic of research.

Aside from probiotics and prebiotics, other ingredients used in food development to improve functional properties include bioactive compounds with antioxidant and anti-inflammatory properties, as well as compounds linked to a targeted metabolic response [4].

Pharmaceutical products such as pills and capsules, rather than processed foods, currently dominate the digestive health functional market [5]. In this vein, the focus of this Research Topic is on novel functional foods/ingredients with beneficial properties for improving and maintaining digestive health. Furthermore, current knowledge about the complex relationship between food composition, gut microbiota, and digestive health, as well as food safety concerns, are presented as important determinants of the functional food market.

Probiotics have been shown to have a broad antitumor effect in colorectal cancer. The mechanism, however, is unknown [6]. Lu et al., investigated the effect of Bornlisy cocktails of three probiotics on colitis-associated colon cancer and the underlying mechanism. Bornlisy treatment reduced tumor loads in colitis-associated colon cancer mice and inhibited the proliferation and metastasis of CRC cells in vitro. According to the findings, Bornlisy could be used as an intervention strategy for CRC treatment, with G-protein-coupled receptor 43 (GPR43) being a possible target receptor during Bornlisy treatment.

According to Ogita et al., (2021) a soybean resistant protein containing diet derived from koritofu, a traditional Japanese food, resulted in lower serum levels of lipopolysaccharide-binding protein and higher expression of Reg3, a chemical barrier that plays an important role in microbiota segregation, thus improving intestinal barrier function in mice [7]. Furthermore, soybean resistant protein consumption resulted in changes in the cecal microbiota, as evidenced by changes in -diversity. According to the researchers, soybean resistant protein could be considered a functional food component that helps to maintain intestinal homeostasis.

Jana et al., (2021) discuss the role of hemicellulose-derived oligosaccharides as emerging prebiotics for disease alleviation [8]. Hemicellulose-derived oligosaccharides are functional ingredients that can be used in food because they play an important role in gut microbiota modulation and serve as substrates for probiotic production of health-promoting substances like short-chain fatty acids. Butyrate, which is produced by selective oligosaccharide fermentation, and other short-chain fatty acids help to reduce gut inflammation. The role of hemicellulose-derived oligosaccharides

in the alleviation of autoimmune diseases such as inflammatory bowel disease and others, such as obesity, diabetes, and urinary tract infection, as well as in antimicrobial resistance, is presented, as is the mechanism of oligosaccharide utilization and disease mitigation.

Intestinal inflammation has been linked to Western diets, whereas plant-based diets often result in a lower intake of total fats and meats and a higher intake of plant fibers, which may help to reduce inflammation. A better understanding of the role of diet in inflammatory bowel disease may lead to new dietary interventions and the use of specific foods or food supplements to help with inflammatory bowel disease management.

Roselli et al., (2021) discussed the colonization ability of foodborne microbes and their impact on the human gut microbiota in a systematic review that aims to provide the scientific literature addressing the connection between foodborne and gut microbiome and map gut microorganisms originating from fermented foods, either traditional or added with probiotics, among other things [9]. The review emphasized the need for more standardized experimental approaches and study designs in order to improve comparative analysis of published datasets.

Aside from human health, there has been a surge in interest in food safety as a result of concerns about the use of antibiotics in feed, which can lead to pathogenic bacteria developing drug resistance and drug residues in livestock products. Ma et al., (2021) investigated the effects of mixed organic acids supplementation on intestinal health, enzyme activity, and antioxidative properties in broilers as a result of this discovery [10]. By increasing antioxidant enzymes, total antioxidant capacity, and tight junction protein expression, as well as modulating the cecum microbiota, mixed organic acids supplementation improved broiler health.

For a better understanding of gut microbiota and foods-probiotics and prebiotics-interactions and their link to digestive health, more research using standardized and cross-disciplinary approaches is critical.

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