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Food Technology 2019-Prebiotics/Probiotics interaction for colon health- Osama O Ibrahim- Bio Innovation

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Prebiotics are the fermentable, non-digestible carbohydrates that stimulate the activity of beneficial bacteria (probiotics) in the digestive system. There are two prebiotics categories: Prebiotics fibres that are naturally occurred in whole grain, broccoli, asparagus, radish, cabbage, and others. And Prebiotics oligosaccharides such as Fracto-oligosaccharide (FOX), Galacto-oligosaccharides (GOS), Xylo-oligisaccharides (XOS), polydextrine, and others. These prebiotics oligosaccharides are added to foods for their health benefits and are labelled as food additives in the United States.

These Prebiotics oligosaccharides are manufactured in pure forms enzymatically or extracted from plants. Probiotics are the beneficial bacteria in the colon such as Befidobacteria and lactic acid bacteria. These probiotics bacteria assist in the maintenance of the natural balance of micro flora and reduce the effect of harmful and pathogenic bacteria in the digestive system, suggesting that these probiotics bacteria can prevent gastrointestinal tract from infection diseases and reduce colon inflammation. It is also, assumed that probiotics bacteria strengthen the immune system. Symbiotic are products that contain both prebiotics and probiotics. These symbiotic products have both non-digestible carbohydrates (prebiotics) and the good bacteria (probiotics). The impact of symbiotic on colon health will be highlighted in this presentation.

The colonic micro flora is important to health. The growth and metabolism of the many individual bacterial species inhabiting the large bowel depend primarily on the substrates available to them, most of which come from the diet. This has led to attempts to modify the structure and metabolic activities of the community through diet—using probiotics and prebiotics. Probiotics are live microbial food supplements. The best known are the lactic acid bacteria and bifidobacteria, which are widely used in yoghurts and other dairy products. These organisms are non-pathogenic and non-toxigenic, retain viability during storage, and survive passage through the stomach and small bowel. Prebiotics are non-digestible food ingredients which selectively stimulate the growth or activities, or both, of lactobacilli or bifid bacteria in the colon, thereby improving health.

Since probiotics do not permanently colonise the host, they need to be ingested regularly for any health promoting properties to persist. Most studies on probiosis have been observational rather than mechanistic, and thus the processes responsible for many probiotic phenomena are seldom explained. Some probiotics are members of the normal colonic micro flora and are not viewed as being overtly pathogenic. However, these organisms have occasionally caused infections in people whose health is compromised in other ways. Commercial probiotic preparations are usually mixtures of lactobacilli and bifid bacteria, although yeasts such as saccharomyces have also been used (box). Bifid bacteria are of particular interest. These are anaerobic pleomorphic rods or club shaped organisms which normally have an important role in breaking down dietary carbohydrate and interact directly with the host metabolism. Bifid bacteria also synthesise and excrete water soluble vitamins, but there are considerable differences in species and strains. These organisms predominate

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in the colons of breastfed babies; they account for up to 95% of all cultural bacteria and protect against infection. Bifid bacteria do not occur in such high numbers in adults.

The colonic micro flora normally presents a barrier to invading organisms, but pathogens often become established when the integrity of the micro biota is impaired through stress, illness, antibiotic treatment, changes in diet, or physiological alterations in the gut. Bifid bacteria are known to be involved in resisting the colonization of pathogens in the large bowel. The knowledge of the beneficial effects of lactic acid fermentation on human health dates back to ancient times. The Bible mentions sour milk several times. Ancient Romans and Greeks knew various recipes for fermented milk. A specific type of sour milk, called "leben raib", prepared from buffalo, cow, or goat milk, was consumed in ancient Egypt. A similar "jahurt" was also commonly consumed by people inhabiting the Balkans. In India, fermented milk drinks were known already 800–300 years B.C., and in Turkey in the 8th century. A milk drink called "ajran" was consumed in Central Russia in the 12th century, and "tarho" was consumed in Hungary in the 14th century.

Result: A particular interest in lactic acid fermentation was expressed in the beginning of the 20th century by the Russian scientist and immunologist working for the Pasteur Institute in Paris, awarded with the Nobel Prize in medicine for his work on immunology (in 1907), Ilia Miecznikow. Here is a quote from his book "Studies on Optimism": "with various foods undergoing lactic acid fermentation and consumed raw (sour milk, kefir, sauerkraut, pickles) humans introduced huge amounts of proliferating lactic acid bacteria to their alimentary tracts".

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