Differences in the degradation and utilization of low-esterification pectin by different intestinal bacteria

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Abstract： The gel of low-esterification pectin has no special requirements for soluble solids and is often used as a thickening agent, gelling agent and stabilizer in food. Pectin is difficult to digest and absorb when ingested by the human body. It is mainly fermented and utilized by intestinal flora at the end of the intestine to produce active substances such as short-chain fatty acids. Therefore, pectin may be able to regulate the composition of intestinal flora and affect human health. The intestinal flora is diverse, and there may be a preference for the utilization of low-ester pectin. This study selected three different human intestinal bacteria, including 5 strains of Bacteroides xylanolyticus, 2 strains of Enterococcus faecium and 2 strains of Bifidobacterium longum, to explore their differences in the degradation and utilization of low-esterification pectin. The culture medium was prepared using low-ester pectin L102 as the sole carbon source. Through the growth pattern, pH value, sugar content and short-chain fatty acid changes of each strain in pectin culture medium, elucidated the degradation effect of different intestinal bacteria on low-esterification pectin. The results showed that Bifidobacterium longum had weak ability to degrade low-ester pectin and poor growth. Both Bacteroides xylanolyticum and Enterococcus faecium can degrade low-esterification pectin and grow well, among which Bacteroides xylanolyticum Bt-17 and Enterococcus faecium ET-2 are the best. The difference is that Bacteroides xylanolyticum Bt-17 degrades low-esterification pectin to mainly produce acetic acid and propionic acid, while Enterococcus faecium ET-2 degrades low-esterification pectin to mainly produce acetic acid. The research results provide a theoretical basis for the selective interaction between low-ester pectin and intestinal flora, and provide a strategy for selectively regulating the composition of intestinal flora.

Key words： Pectin · Low-esterification degrees · Bifidobacterium longum · Bacteroides xylanolyticum · Enterococcus faecium · short-chain fatty acids