Prebiotic effect of xylooligosaccharides produced from birchwood xylan by a novel fungal GH11 xylanase

A fungal endoxylanase belonging to the glycoside hydrolase gene family 11 (GH11) was obtained from the ascomycete Talaromyces amestolkiae. The enzyme was purified, characterized and used to produce a mixture of xylooligosaccharides (XOS) from birchwood xylan. A notable yield of neutral XOS was obtained (28.8%) upon enzyme treatment and the mixture contained a negligible amount of xylose, having xylobiose, xylotriose and xylotetraose as its main components. The prebiotic potential of this mixture was demonstrated upon analyzing the variations in microorganisms’ composition and organic acids profile in breast-fed child faeces fermentations. The strong production of acetic and lactic acid, the decrease of potentially pathogenic bacteria and the increase of bifidobacteria, and possible beneficial commensals, confirmed the prebiotic value of these xylooligosaccharides.