

SOLUBLE CARBOHYDRATE FIBER PRODUCTION FOR FOOD INGREDIENT APPLICATIONS

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Soluble carbohydrate polymers that are not significantly hydrolyzed by the endogenous enzymes in the upper gastrointestinal tract, and additionally are not significantly fermented by the microbiota present in the lower gastrointestinal tract, are often added to a variety of foods to provide dietary fiber. Glucosyltransferases (glucansucrases) convert sucrose to D-glucose polysaccharides (glucan) or oligosaccharides, together with fructose as co-product. The anomeric linkage composition of the polysaccharides or oligosaccharides varies depending on the glucosyltransferase, and the solubility, viscosity, digestibility and fermentability of these carbohydrate products are each independently related to the anomeric linkage composition.

Glucosyltransferases have been screened for production of polysaccharides or oligosaccharides that were evaluated for functionality and flavor in food products such as yogurt, beverages and food bars. Homologs and truncated forms of selected glucosyltransferases were evaluated to determine the optimal enzyme or enzyme combination for production of both soluble carbohydrate fiber and fructose. Further modification of one or more of the properties of the polysaccharide or oligosaccharide fiber was accomplished using glucan endo-(1,3)-alpha-glucosidases or glucosyltransferases having alpha-(1,2)-branching sucrose activity. After separation from the soluble carbohydrate fiber, the fructose co-product was further purified by using alpha-glucosidases to convert low concentrations of disaccharides and oligosaccharides present into glucose and additional fructose.