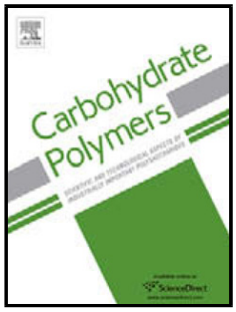

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The glycogen of *Galdieria sulphuraria* as alternative to starch for the production of slowly digestible and resistant glucose polymers

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Highlights

- *G. sulphuraria* glycogen is digested more slowly than a starch-derived highly branched polymer
- Amyloglucosidase treatment of this glycogen generates a hyperbranched polymer that is resistant to digestive enzymes
- The higher resistance to digestive enzyme and low viscosity of glycogen is conferred by its short side chains and high branch density

Abstract

Highly branched glucose polymers produced from starch are applied in various products, such as peritoneal dialysis solutions and sports drinks. Due to its insoluble, granular nature, the use of native starch as substrate requires an energy consuming pre-treatment to achieve solubilization at the expense of process costs. Glycogen, like starch, is also a natural glucose polymer that shows more favorable features, since it is readily soluble in cold water and more accessible by enzymes. The extremophilic red microalga *Galdieria sulphuraria* accumulates large amounts of a small, highly branched glycogen that could represent a good alternative to starch as substrate for the production of highly branched glucose polymers. In the present work, we analyzed the structure-properties relationship of this glycogen in its native form and after treatment with amyloglucosidase and compared it to highly branched polymers produced from potato starch. Glycogen showed lower