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Single-step production of arabino-xylooligosaccharides by recombinant *Bacillus subtilis* 3610 cultivated in brewers' spent grain

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Graphical abstract



Highlights

- *B. subtilis* 3610 wild type and mutants harboring the *T. reesei xyn2* gene produced AXOS.
- The mutant containing a secretion tag coupled to *xyn2* presented the highest yield.
- Optimal conditions were 20 g/L BSG, pH 7.0 and 45 °C at 12 h of fermentation.
- A mixture of AXOS with low amount of monosaccharides was produced.
- BSG one-step fermentation proved to be an effective approach for AXOS production.

Abstract. Brewers' spent grain (BSG) is an inexpensive and abundant brewery by-product that can be used to produce prebiotic arabino-xylooligosaccharides (AXOS). In this study, *Bacillus subtilis* 3610 was used, for the first time, to produce AXOS through direct fermentation of BSG. Additionally, the microorganism was genetically modified to

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