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Cláudia Amorim, Sara C. Silvério, Lígia R. Rodrigues

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**One-step process for producing prebiotic arabino-xylooligosaccharides from  
Brewer's spent grain employing *Trichoderma* species**

Cláudia Amorim<sup>a</sup>, Sara C. Silvério<sup>a</sup>, Lúcia R. Rodrigues<sup>a\*</sup>

<sup>a</sup>CEB-Centre of Biological Engineering, Universidade do Minho, Campus de Gualtar,  
4710-057 Braga, Portugal

**Abstract:** Xylooligosaccharides (XOS) are prebiotic nutraceuticals that can be sourced from lignocellulosic biomass, such as agro-residues. This study reports for the first time an optimization study of XOS production from agro-residues by direct fermentation using two *Trichoderma* species. A total of 13 residues were evaluated as potential substrates for single-step production. The best results were found for *Trichoderma reesei* using brewers' spent grain (BSG) as substrate. Under optimal conditions (3 days, pH 7.0, 30°C and 20 g/L of BSG), a production yield of  $38.3 \pm 1.8$  mg/g (xylose equivalents/g of BSG) was achieved. The obtained oligosaccharides were identified as arabino-xylooligosaccharides (AXOS) with degree of polymerization from 2 to 5.

One-step fermentation proved to be a promising strategy for AXOS production from BSG, presenting a performance comparable with the use of commercial enzymes. This study provides new insights towards the bioprocess integration, enabling further developments of low-cost bioprocesses for the production of these valuable compounds.

**Keywords:** Agro-residues; prebiotic; xylooligosaccharides; Brewers' spent grain; *Trichoderma*.

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\* Corresponding author: Lúcia R. Rodrigues. E-mail: [lrnr@deb.uminho.pt](mailto:lrnr@deb.uminho.pt); Tel + 351 253 601978; Fax (+351) 253 604429

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