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Highly-efficient release of ferulic acid from agro-industrial by-products via enzymatic hydrolysis with cellulose-degrading enzymes: Part I – the superiority of hydrolytic enzymes versus conventional hydrolysis

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Historically relevant crops Triticum aestívum L. and Secale cereále L. are widely used in the production of bakery products. From the total volume of grain cultivated, roughly 85% is used for the production of flour from starchy endosperm, while the remaining part consisting of 10-15% bran, and 3% of germ is discarded or utilized rather inefficiently. The limited value attached to bran is associated with their structural complexity, i.e. the presence of cellulose, hemicellulose, and lignin which makes this material suitable mostly as a feed supplement, while in food production their use is challenging. Underestimation of bran as a food ingredient brings about a rise in food waste. Based on FAOSTAT data estimated in 2018, wheat and rye bran increase corresponded to 110 Mt and 1.6 Mt, respectively. To valorize these by-products to food and pharmaceutical applications, additional pre-treatment is required. Considering the evidence of the presence of ferulic acid (FA) in plants, a compound in 99% covalently bound to arabinose residues in arabinoxylans via ester linkages and integrated into the cell-wall matrix, biorefinery process using cellulose-degrading enzymes (C-DEs) will afford a selective production of this highly demanded bioactive. The limited information on the recovery of FA from wheat and especially rye bran through C-DEs promoted the design of this work to focus on the evaluation of the release of FA from this material through environmentally-friendly biorefining process.

Keywords: Recovery; biorefining; valorization; by-products; ferulic acid; enzymatic hydrolysis; dietary fiber

Biography:

Vitalijs Radenkovs is a Post Doc leading researcher position in Institute of Horticulture, LatHort, Dobele, Latvia

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