

# Chapter 1

## Deconstruction of the Hemicellulose Fraction from Lignocellulosic Materials into Simple Sugars

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**Abstract** Hemicelluloses hold a great promise for the production of added-value compounds in the biorefinery framework. Specifically, the xylan-rich hemicelluloses from hardwoods and agro-industrial residues present themselves as effective feedstock choices for the biotechnological production of xylitol. This paper reviews the various hemicellulose structures present in such materials and critically evaluates the available processing options to produce xylitol-rich fermentable hydrolysates. Currently, acid-based processes still present the best trade-off between operation easiness and xylitol yield and recovery. Nevertheless, concerns regarding the impact of the fractionation processes on the overall upgradability of all biomass fractions (namely, cellulose and specially lignin) may turn the route to other strategies. Specifically, the combined/sequential use of processes targeting hemicellulose dissolution and hydrolysis might hold great promise for the economical production of pentoses.

**Keywords** Lignocellulose · Hemicellulose · Hydrolysis · Enzymatic hydrolysis · Xylose

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