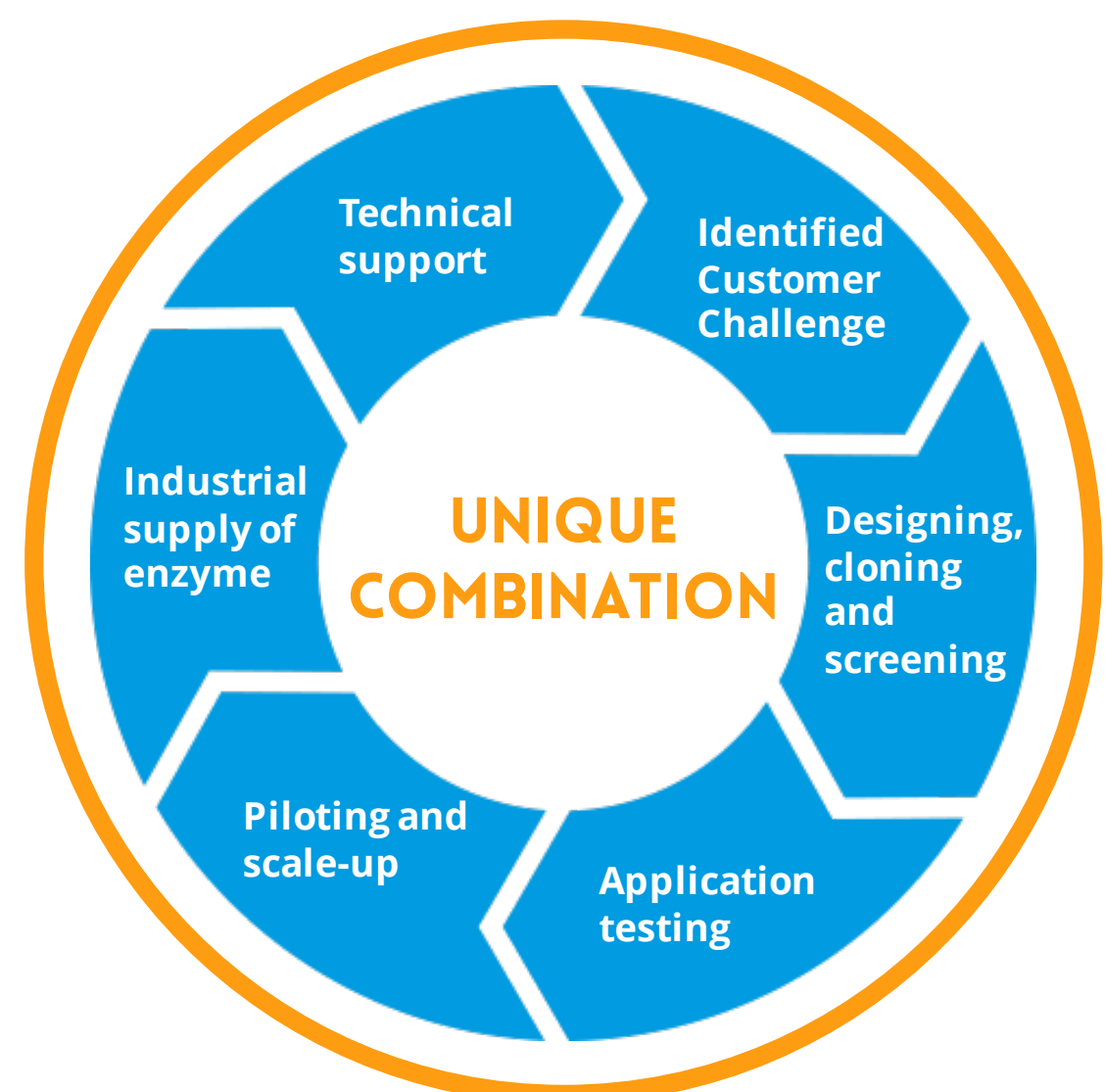


ONE SIZE DOES NOT FIT ALL

METGEN TAILORS SOLUTIONS TO ALL THE CHALLENGES ALONG THE BIORENEWABLE VALUE-CHAIN

Antoine Mialon, Matti Heikkilä, MetGen Oy

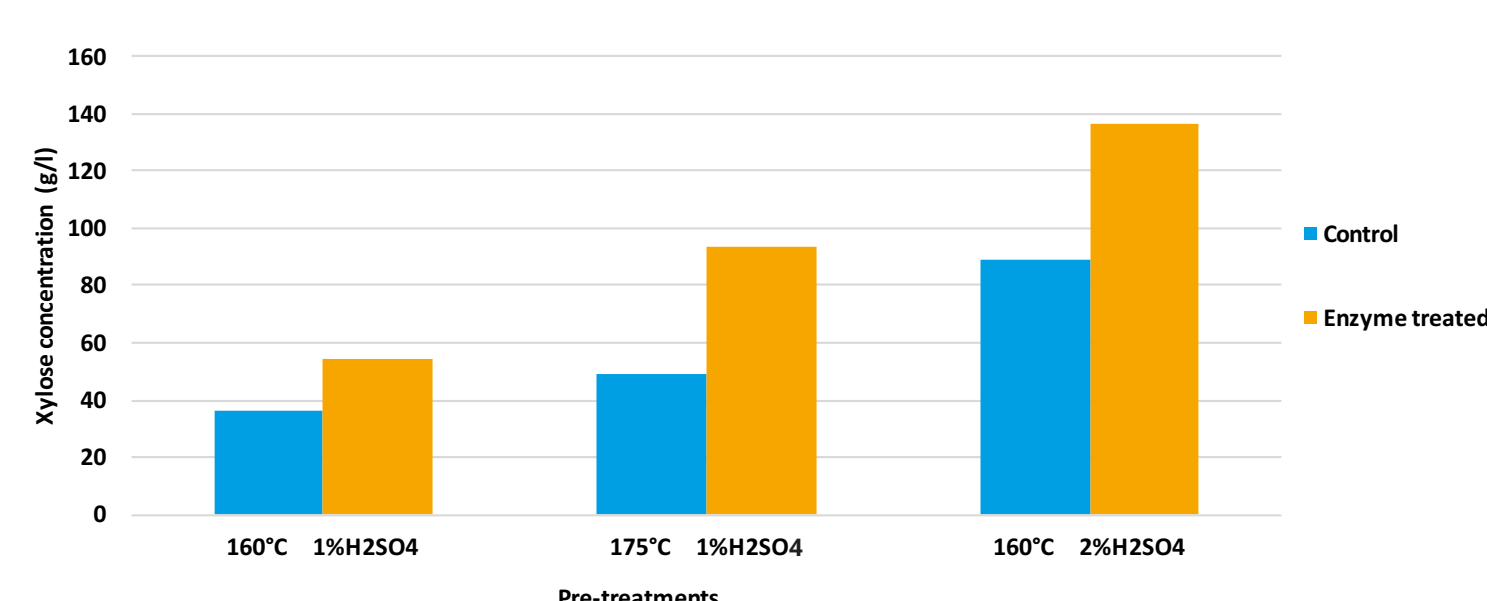


	METGEN	Incumbent companies	Enzyme Resellers	Research	Tollers
Tailored Solutions	✓	✗	✓	✓	✗
Protein Engineering	✓	✓	✗	✓	✗
Process Development	✓	✓	✗	✓	✓
Industrial Production	✓	✓	✗	✗	✓

ENZINE® Technology platform enables creation of disruptive enzymatic solutions for industrial applications – ENZINE® IS:

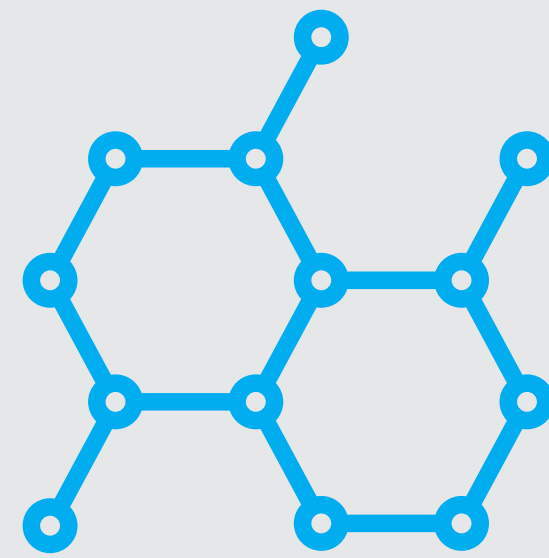
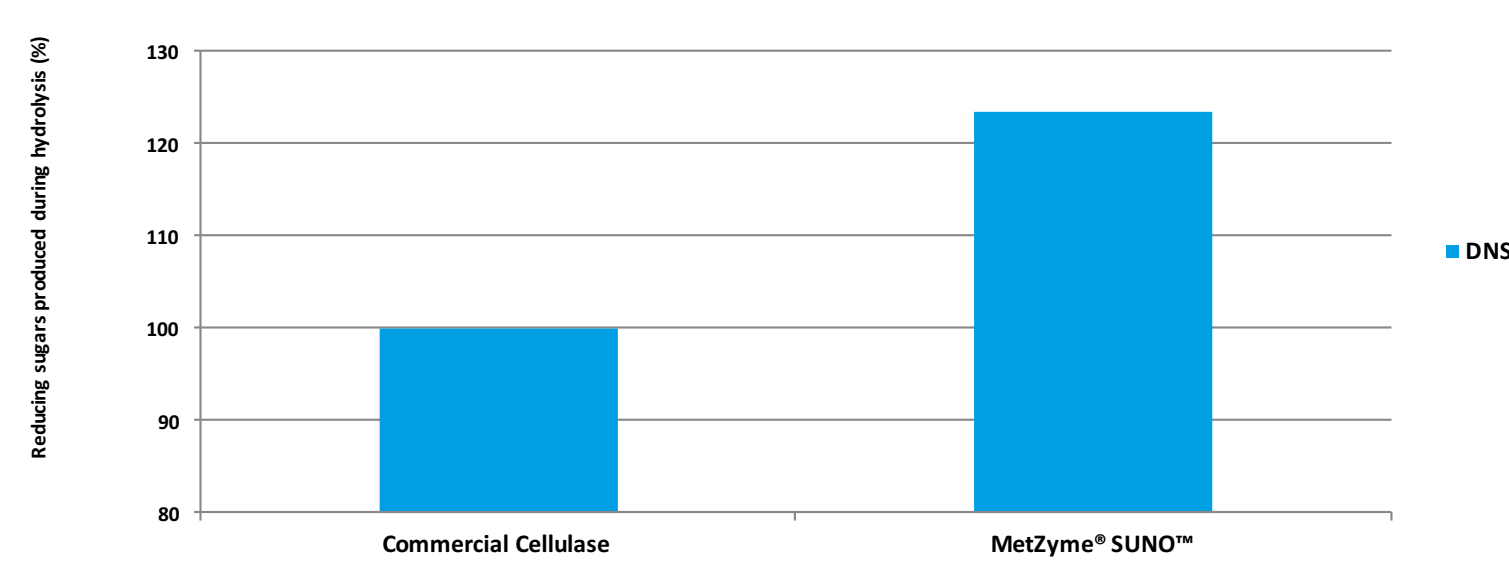
- **FAST:** Industry leading short development cycle
- **FLEXIBLE:** Tailored enzyme design approach to meet challenging industrial conditions
- **ADAPTABLE:** Can produce large amounts of different enzymes cost-effectively and supply globally
- **PROVEN:** Developed several novel enzymes with IPR from concept to customer validation at industrial scale

MetZyme® LIGNO™ improves xylose yield in liquid fraction after pretreatment up to 60%



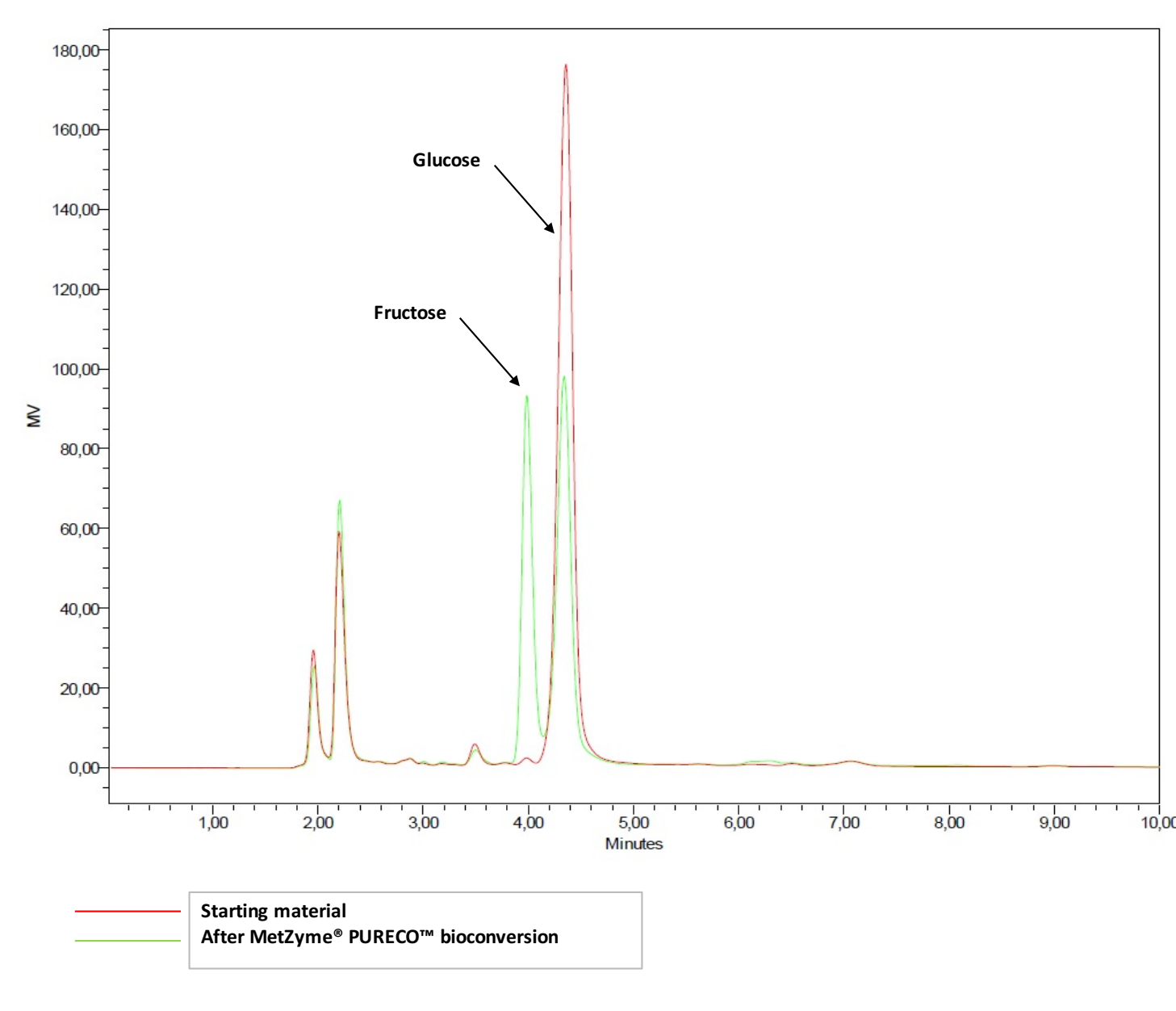
MetZyme® LIGNO™ is designed for delignification of woody substrates. LIGNO™ has its original application in pulp & paper industry where it saves refining energy and improves fibre properties. Same functionality allows improved fractionation of biomass in any biorefining process using lignocellulosic feedstock.

MetZyme® SUNO™ improves hydrolysis yield on pretreated wood (50°C 72h)



MetZyme® SUNO™ is designed for wood-based sugar platforms. It allows for more thorough hydrolysis of recalcitrant biomasses. Tailored solution for specific substrate and process, enabling more complete separation of fractions and also addressing certain chemical compounds with down-stream operations in mind. For example inhibitors can be oxidized during hydrolysis.

MetZyme® PURECO™ products are tailored for specific biochemical conversion beyond sugars. MetZyme® PURECO™ glucose/xylose isomerase is designed for unparalleled performance in unpurified hydrolysate



MetZyme® PURECO™ product family addresses the specific conversions towards value-added chemicals beyond sugars. These novel enzymes enable Wood-to-Chemicals value-chain and with that the renewable chemical building blocks for better products and materials. Opportunities include, but are not limited to, bioplastics, sorbitol, xylitol, furfural, 5-HMF, and organic acids. New technologies supporting Biofuels – such as jet fuel, biogas, or even lignin-based marine diesel – are made available to the industry.

EXAMPLE CASE: HORIZON 2020 PROJECT RETAPP – ENABLING THE VALUE-CHAIN FROM WOOD TO PLASTIC PACKAGING



MetZyme® LIGNO™ is used for better separation of hemicellulases in pretreatment stage. Resulting soluble fraction has most of the xylose for further conversion to value added chemicals.



MetZyme® SUNO™ provides higher hydrolysis yields, increased dry-matter content, and more affordable production of glucose.



MetZyme® PURECO™ is used to convert glucose to fructose. Fructose is chemically converted first to 5-HMF, then to FDCA, and ultimately to PEF resin. Xylose is converted to xylulose, but it can also be further converted to xylitol or furfural.

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