

#FACT3 IMPROVED ENZYMES FOR MORE EFFICIENT BIOCONVERSION

Tailor-made enzymes

For biorefineries, the market typically offers only a general combination of enzymes. This makes the enzymatic hydrolysis process quite slow and costly. The tailor-made enzymatic cocktail developed by BIOrescue partner MetGen reduces the **time** and **quantity of enzymes needed** for the hydrolysis sugars **by at least 20%**.

Besides that, these enzymes can survive in harsh industrial environments which opens the door for novel applications and combination with other enzymes.

20% LESS time and quantity of enzymes needed for the hydrolysis



Sugars conversion

MetZyme[®] SUNO[™]

MetGen's proprietary enzymatic solutions tailored to extract the sugars from the mushroom compost in an optimal way

Benefits:

Achieves a **maximal conversion yield (>95%)** when converting pretreated mushroom compost into monosugars.



Lignin conversion

MetZyme[®] PURECO[™]

MetGen's innovative alkaliphilic laccase, which is an integral part of METNIN[™] lignin fractionation technology to produce highly reactive depolymerised lignin in a very sustainable and efficient manner.

Benefits:

- Avoids the use of **heavy metals** or toxic solvents.
- Operates in mild process conditions
- (temperature below 60°C) to effectively break down lignin preserving its desirable properties.
- Produces **highly active lignin fractions** specifically tailored for different applications.

Increasing sugar yields with modified enzymes

In BIOrescue, researchers at the University of Naples developed **13 modified cellulase enzymes**, which show two to four times better sugar hydrolysis yield than the original one. To do this, the researchers introduced changes in the DNA sequence of the cellulase's gene coding to **obtain 30,000 variations of it.** They screened all the modified enzymes and tested the most active in biomass conversion to finally identify the 13 best performing ones. Concretely, this improves the bioconversion process and significantly reduces its cost.



13 modified cellulase enzymes 2 to 4 times more efficient than the original one

Why choose cellulase? This enzyme has around three times more efficient sugar extraction yield than commercial enzymes.

Why are enzymes important?



Enzymes are **necessary in all the steps of the bioconversion process and for any kind of feedstock** to produce countless bio-based products and chemicals. It has been calculated that biomass pretreatment and enzymatic hydrolysis alone account for around 70% of the total biorefinery processing costs.



Read more here http://bit.do/improved-enzymes

www.biorescue.eu

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Bio·based Industries Consortium

The BIOrescue project has developed a new biorefinery concept to demonstrate the production of high-value value products from used mushroom compost and other underutilised feedstocks. It has received funding from the Bio-Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme, under Grant Agreement N°720708.

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Horizon 2020

European Union Funding

for Research & Innovation

