

*Horizon 2020 Work programme*

Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy

*Call*

H2020-FNR-2020: Food and Natural Resources

*Topic name*

FNR-16-2020: ENZYMES FOR MORE ENVIRONMENT-FRIENDLY CONSUMER PRODUCTS

*FuturEnzyme:*

Technologies of the Future for Low-Cost Enzymes for Environment-Friendly Products

Final ID: 101000327

### 30/09/2022

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Genetic engineering: first round completed

MS16

## Document information sheet

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| **Work package:** | WP5, Enhancing enzymes through innovative engineering |
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| **Document version:** | 1 |
| **Date:** | 30/09/2022 |
| **Starting date:** | 01/08/2021 |
| **Duration:** | 40 months |
| **Lead beneficiary:** | FHNW |
| **Participant(s):** | FHNW, CSIC, BSC, Bangor, UHAM, UDUS, Inofea AG, Eucodis |
| **Dissemination Level:** | - |
| **Type** | - |
| **Due date (months)** | 16 |
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## Genetic engineering: first round completed

## 1.SCOPE of DELIVERABLE

## Report/material available – this milestone will attest the realisation of the first genetic engineering tests.

## 2. Engineering based on activity

The lipase Lip5 was thoroughly studied in terms on activity. The tests showed it possesses high stability in the detergent solution (washing liquor), but with low activity toward long-chain lipids. In order to expand the substrate range, two mutants were proposed after computational analysis of the protein structure, which were expressed and experimentally tested. These were named FELip5\_W89ML60F and FELip5\_Lid, and showed improvements towards long chain triglycerides, and even with complex fatty acid mixes for the latter.

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| --- |
| EstLip\_Lip5 |
| EstLip\_FELip5\_W89ML60F |
| EstLip\_FELip5\_Lid |

## 3. Engineering PluriZymes

In addition to that, partners CSIC and BSC contribute with the development of disruptive PluriZymes (enzymes with two different active sites) with multipurpose activities. A PluriZyme with two-esterase and one-protease active sites, and a PluriZyme with transaminase and hydrolase active sites have been designed. Based on these successful experiments, a pipeline for introducing additional active sites to the best selected enzyme targets is available at partner BSC.

## 4. Conclusions and future actions