EXPLOITABLE FOREGROUND

Engineered thermostable cellobiohydrolases for improved lignocellulose hydrolysis

Explanation and Purpose

Despite extensive screening and protein engineering efforts, there is still a need for better enzymes for the bioprocessing of lignocellulosic biomass. At present, the *Trichoderma* cellulases are the most commonly used industrial enzymes in biomass hydrolysis and other applications. The industrial processes are normally carried out at 45-55°C due to the instability of these fungal enzymes to tolerate higher temperature.

For applications it would, however, be desirable to have enzymes that are more active on crystalline substrates and/or work at higher temperatures. Thermostable enzymes could additionally render the enzymes stable against other harsh application conditions i.e. inhibitors, solvents, etc.

VTT has improved the thermostability and activity of a fungal GH7 family cellobiohydrolase by different protein engineering approaches. Several cellobiohydrolase variants having improved activity in biomass hydrolysis have been created. Superior performance at elevated temperatures has also been demonstrated.

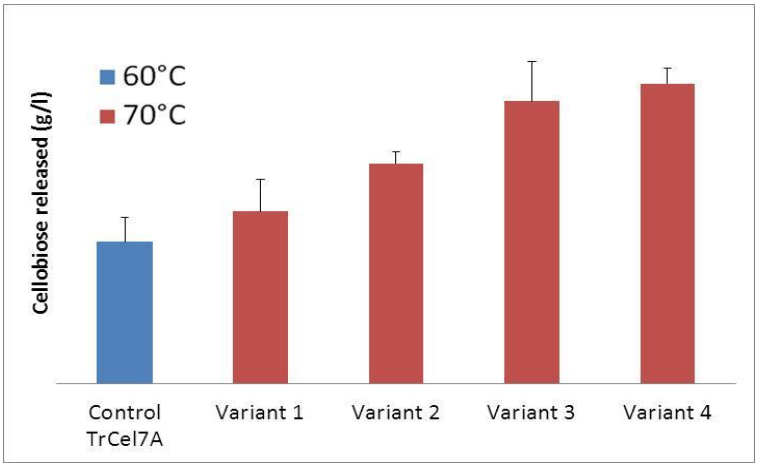

Figure: Hydrolysis of pretreated Arundo donax. The novel thermostable cellobiohydrolase variants were assayed at 70°C after 48 h by measuring the released cellobiose. The reference assay was conducted at 60°C with Trichoderma reesei Cel7A.

Further Research and Exploitation Strategy

The cellobiohydrolase variants are now being tested in more detail in combination with other thermocellulase components provided by the NEMO partners, using process concepts where elevated temperatures are applied. An invention disclosure has been written at VTT and the possibilities to patent are being evaluated.

Novel Microbes and Enzymes for 2nd Generation Bioethanol Production

NEMO for bioethanol

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SEVENTH FRAMEWORK PROGRAMME

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