MWP – Young Researcher Abstract 2023

Project title: Intensification of softwood-to-ethanol processes – design of efficient enzymatic hydrolysis after mild steam-pretreatment	
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Abstract (approx. 200 words)**:**

Fabio's research focuses on the pretreatment and enzymatic hydrolysis steps within the biorefinery scheme to produce bioethanol from spruce. Forestry biomass could represent an alternative feedstock to the non-renewable ones for ethanol production in Sweden. However, to use spruce in a biorefinery, the use of harsh pre-treatment (i.e. steam explosion using SO_2 as catalyst) is necessary to overcome the recalcitrance of the biomass to the enzymatic hydrolysis. Harsh pre-treatments result in the formation of inhibitors, that decrease the efficiency during the fermentation, and the loss of the hemicellulose, which lowers the total yield of the process. Therefore, the aim of his project is to increase the saccharification efficiencies of mild steam-pretreated spruce that retains the hemicellulose in the material lowering also the amounts of inhibitors.

Fabio is investigating the different factors that affect the spruce recalcitrance such as the accessibility and the diffusion of enzymes into the steam-pretreated spruce, the presence of the lignin-carbohydrate bonds and also establishing advanced enzymatic hydrolysis designs.

Key words:
Saccharification, spruce, steam explosion