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Chemical pretreatment and enzymatic hydrolysis of reed as a substrate for bioethanol production

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Among the possible alternatives to produce biofuels, bioethanol production from agricultural by-products and wastes or dedicated energy crops using a microbial biotechnology is seen as an attractive approach to produce a proven vehicle fuel in large amounts already today. In this respect, the aim of our project is to provide a sustainable technology for the production of bioethanol using reed as biomass resources which is available both in Hungary and Portugal.

Experiments were carried out on *Phragmites australis*, which reed species is available in large quantities in Central Europe. In this study reed was pretreated in order to make it accessible for enzymatic attack. Chemical pretreatments of reed were carried out at 120°C for 1 hour duration by 1(v/v)% sodium-hydroxide, potassium-hydroxide, sulfuric acid and phosphoric acid, respectively. After pretreatment all material was analyzed and enzymatically hydrolyzed to test the efficiency of pretreatment. According to these experiments sodium-hydroxide was found a suitable pretreating agent and was selected for detailed investigations.

Research was carried out in experimental series based on factorial design. Three factors (concentration of base, pretreatment duration and temperature) at two levels were examined in order to optimize reed pretreatment. The 2³ factorial design was also set up to determine the relative importance of the factors and their interactions. All pretreated materials were analyzed and enzymatically hydrolyzed in order to test the efficiency of pretreatments. Hydrolysis was carried out at a substrate concentration of 3% (w/w) dry material at 20 FPU/g DM enzyme loading for 48 h. Detailed results of the pretreatments and enzymatic hydrolysis will be presented.