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THE EFFECT OF COLD STRESS ON BIOMASS PRODUCTION OF MISCANTHUS SINENSIS AND ITS ALCOHOLIC FERMENTATION

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RESUMO

Miscanthus sinensis is one of the most important energy grasses, thanks to high biomass production and the ability to grow in marginal lands. However, the reaction of young shoots to cold is a key agronomic trait. Cold stress causes molecular and physiological changes [1], which finally may lead to, besides lower biomass yield, altered composition, and utilitarian properties. This study was aimed to: i/ selection of Low Cold Tolerant (LCT) and High Cold Tolerant (HCT) genotypes of *M. sinensis* on the basis of changes in plant growth and physiology; ii/ preliminary assessment of the impact of cold stress on bioethanol production. Plants of 19 genotypes of *M. sinensis* were grown from 10 to 0.5°C and later revitalised. During both periods, biometric and physiological measurements (electrolyte leakage, chlorophyll fluorescence, and content) were carried out. Statistical analysis of obtained data enabled to classify genotypes according to the cold stress response. The two extreme reactions, marked as Ms12-LCT and Ms16-HCT, were subjected to detailed molecular and biochemical studies. Moreover, their biomass was fermented in the SSF process [2]. Raw ethanol composition was determined using HPLC. Statistical analysis showed that cold-caused possible biochemical changes in the cell wall [3] did not affect bioethanol production for both genotypes. The study indicates that: i/ strategy of cold resistance of HCT genotypes is tolerance instead of regrowth characteristic for LCTs; ii/ biomass of HCTs can be used as full-blown feedstock for 2nd generation biofuels. Acknowledgments This study was performed within project Preludium 15, No. 218/29/N/NZ9/00854, granted by National Science Centre, Poland.

PALAVRAS-CHAVE: cold stress, miscanthus, biomass

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