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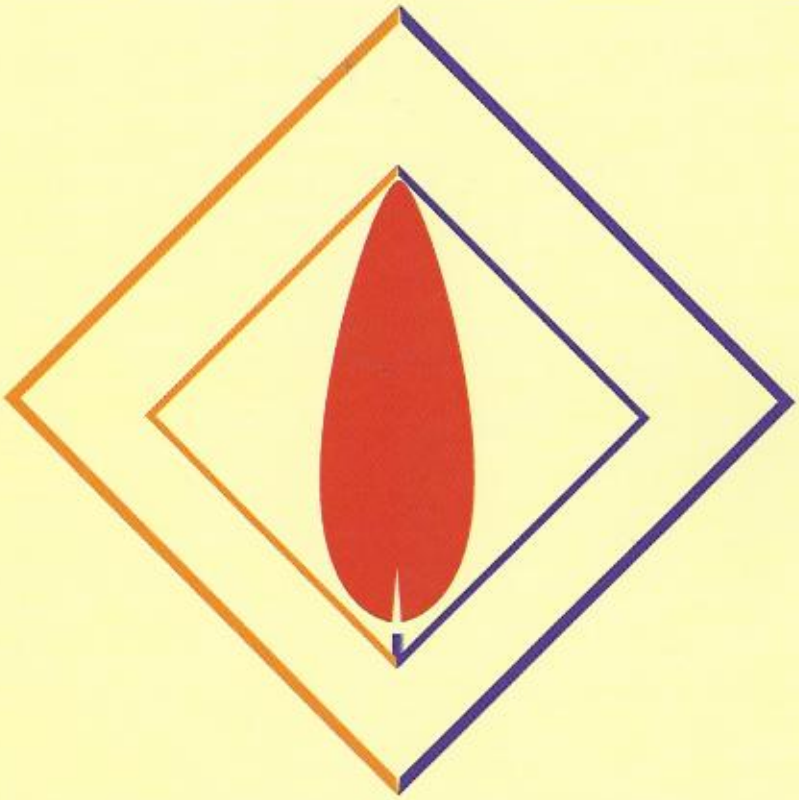

BOOK OF ABSTRACTS

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PHYTOREMEDIATION AS AN EFFECTIVE METHOD TO REMOVE HEAVY METALS FROM CONTAMINATED AREA. PART I. LABORATORY TEST RESULTS OF THE GASIFICATION OF HEAVY METAL CONTAMINATED ENERGY CROPS

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ABSTRACT

The contamination of Europe's soil and air is the result of over 200 years of evolving industrialization and a disregard for the proper disposal of the by-products resulted from this process. In the later part of the 20th century people began realizing that necessary actions have to be taken in order to limit the amount of pollution that the environment is receiving and also ways to remediate as much damage as possible that has been done. One of the most important and frequent type of soil contamination is heavy metal contamination. Phytoremediation is one of the techniques used for remediation of contaminated areas. It has the advantage that it can be applied to both organic and metal contaminants. In the present work the results of the gasification tests carried out on the heavy metal contaminated (HMC) samples of *Miscanthus* x *giganteus*, *Sida hermaphrodita*, *Spartina pectinata* and *Panicum virgatum*. The gasification tests for the HMC biomass samples were conducted using a fixed-bed gasification facility. The gasification tests for each biomass type were performed at six air ratios values: 0.12, 0.14, 0.16, 0.18, 0.23 and 0.27. The atmospheric air as a gasification agent was used. Influence on the fuel type and gasification parameters on the gasification gas parameters was analyzed.

Results shows that at lower values of air ratio, CO content was found to be low and it starts to rise until the optimum air ratio of 0.18 and later drops for higher air ratio. It was observed for all analyzed energy crops. CO_2 shows an inverse relation with CO as the reactions that produce those gases are competing for the same reactants namely carbon. The concentration of carbon dioxide is generally expected to be minimum of the optimal air ratio range between 0.18-0.24. Additionally, it can be concluded that the highest values for the lower heating value (LHV) are obtained for an air ratio of 0.18. The best result is obtained from the gasification of *Miscanthus* x *giganteus*, 3.68 MJ/m^3_n

with the other three types of biomass obtaining significantly lower values. More so, *Miscanthus* shows higher values for the LHV at other air ratios the other biomass types, including the optimal 0.18 values. *Spartina pectinata* shows the lowest variation of LHV between the different values of λ.

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