ASSESSMENT OF THE ENERGY PRODUCTION POTENCIAL FROM PHYTOREMEDIATION DERIVED BIOMASS

A.P.G.C. MARQUES[1,2], P.M.L. CASTRO[1], N.S. CAETANO[2,3]

[1] *CBQF – CENTRO DE BIOTECNOLOGIA E QUÍMICA FINA, ESCOLA SUPERIOR DE BIOTECNOLOGIA, CENTRO REGIONAL DO PORTO DA UNIVERSIDADE CATÓLICA PORTUGUESA, RUA ARQUITETO LOBÃO VITAL, 4200-072 PORTO, PORTUGAL*

[2] *.LEPABE – LABORATORY FOR PROCESS ENGINEERING, ENVIRONMENT, BIOTECHNOLOGY AND ENERGY AT THE FACULTY OF ENGINEERING OF PORTO (LEPABE-FEUP), RUA DR NORBERTO FRIAS, 4200-465 PORTO, PORTUGAL*

[3] *CIETI/ISEP (School of Engineering, Polytechnic of Porto), Rua Dr António Bernardino de Almeida 431, 4249-015 Porto, Portugal*

Abstract

There are presently more than 3 million contaminated sites all over EU, according to the EEA (report 25186 EN). Heavy metal (HM) contamination is of particular concern, as metals are not degradable and only transferable form one matrix to another [1]. Phytoremediation, a biologically based technology, is gaining attention from the public and is an attractive low cost alternative for soil requalification, by establishing a vegetation cover which will stabilize the site, avoiding dispersion of contamination and simultaneously removing pollutants present in the brownfield [1]. Although the fate of harvested biomass is a common obstacle for its implementation, it may represent an opportunity for producing energy. However, and although it has been proposed theoretically as an excellent option, the information available in literature concerning practical applications is scarce, despite the considerable degree of success reported [2,3,4].

The use of biomass grown in degraded and abandoned soils, not involving agricultural soils for energy crop cultivation, may increase the sustainability of utilizing biomass for energy generation, while it may allow for increasing the available agricultural soil through the consequent gradual decontamination of such brownfields.

This work presents a novel integrated strategy comprising the utilization of all plant parts (maize and sunflower) parts for the generation of several energy products. Combinations of the selected energetic plants and plant growth promoting microbiota was assessed, and the soil and plant status was monitored to further understand the effects on crop productivity and soil remediation. At this stage harvested plant tissues were used for oil extraction and bioethanol production. The quality of the generated products was assessed and is discussed in this work to understand the effect of the HM soil contamination in the quality of the final products.

References

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