Extended Abstract

Clean Technologies Combining Phytoremediation with Biofuel Production—Part II [†]

Maria Paraschiv ^{1,2,*}, Carmen Constantin ^{1,2}, Radu Kuncser ^{1,3}, Marius Enache ^{1,3} and Malina Prisecaru ¹, Ana Cracica ⁴ and Elena Dumitrescu ⁴

¹ University Politehnica of Bucharest, Research Center for Advanced Materials, Products and Processes (CAMPUS), 313 Spl. Independentei, 060042 Bucharest, Romania; manolecarmen2000@gmail.com (C.C.); radu.kuncser@comoti.ro (R.K.); enachemarius93@gmail.com (M.E.); malina_prisecaru@yahoo.com (M.P.)

² National Institute of R&D for Biological Science, 296 Spl. Independentei, 060031 Bucharest, Romania

³ Romanian R&D Institute for Gas Turbines—COMOTI, 220D Iuliu Maniu St., 061126 Bucharest, Romania

⁴ OMV-Petrom—ICPT Campina, 29 Culturii Blvd., 105600 Campina, Prahova, Romania; ana.cracica@petrom.com (A.C.); elena.dumitrescu2@petrom.com (E.D.)

* Correspondence: maria.paraschiv1504@upb.ro

[†] Presented at the 15th International Symposium “Priorities of Chemistry for a Sustainable Development” PRIOCHEM, Bucharest, Romania, 30th October–1st November 2019.

Published: 17 October 2019

Keywords: phytoremediation; biomass; biofuels

Within the CleanTech project, combined technologies are addressed in order to maximize the impact on process efficiency and environmental issues. In this paper, phytoremediation of soil with potential salt contamination [1,2] combined with the production of biomass for 2nd generation biofuels is the path used to fulfill the project’s objectives. For this purpose, several plant species able to produce biomass for biofuels were tested using soil sampled from salt-affected land. Plant species were selected based on the potential to obtain low-lignin biomass for bioethanol synthesis.

For the laboratory study the seeds, provided by certified providers, were tested for direct germination in commercial peat (as reference) and soils with different initial salinity. In this paper, the results obtained using seeds of *Limonium sp.* are considered. Thermogravimetric (TGA) characterization of obtained biomass was performed in order to have a complete image of bio-components content and behavior.

Limonium sp. seeded on soil samples with different salinity (expressed in electrical conductivity, dS/m) did not germinate. Seedlings obtained from germinated seeds in commercial peat have shown good adaptability in different soil structures and salinity levels. Soil electrical conductivity (EC) before and after experimental tests are presented in Figure 1.

Figure 1. EC of tested soils before and after phytoremediation.

Limonium sp. has shown good salt removal capacity. The TGA analyses show that the salts tend to be deposited mainly in roots.

Acknowledgments: This work was supported by the Romanian competitiveness operational program through the knowledge transfer project CleanTech—POC - P40_308, SMIS: 105958 (<http://cleantech.pub.ro/>).

References

1. Farzi, A.; Borghei, S.M.; Vossoughi, M. The use of halophytic plants for salt phytoremediation in constructed wetlands. *Int. J. Phytoremediation* **2017**, *197*, 643–650.
2. Gerhardt, K.E.; MacNeill, G.J.; Gerwing, P.D.; Greenberg B.M. Phytoremediation of Salt-Impacted Soils and Use of Plant Growth-Promoting Rhizobacteria (PGPR) to Enhance Phytoremediation. In *Phytoremediation*; Ansari, A., Gill, S., Gill, R.R., Lanza, G., Newman, L., Eds.; Springer: Cham, Switzerland, 2017; Volume 5, pp. 19–51.

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