Linnaeus ECO-TECH 2020
Kalmar, Sweden, November 23-25, 2020

CONTAMINATED LAND: AN UNDERUTILIZED SOURCE FOR THE PRODUCTION OF BIOENERGY AND BIOPRODUCTS

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Abstract
Contaminated land, that is unsuitable for food production, represents an alternative option for crops producing feedstock for bioproducts and bioenergy, which would otherwise be in competition with food production. It has been estimated that there are more than 10 million major contaminated sites worldwide, while in the European Economic Area (EEA)-39 countries the registered contaminated sites are up to 650,000. Even though often perceived solely as a problem, contaminated areas could instead become a real asset that needs to be valued. Various *in situ* and *ex situ* remediation methods have been developed, but most of the traditionally used engineering techniques have proved to be uneconomic or unsustainable. A cost-effective, efficient and publicly acceptable approach of phytoremediation is the phytomanagement of contaminated sites, aiming to produce economic revenue by cultivating suitable crops on contaminated land without causing detrimental effects on human health and the environment. Industrial non-food crops are considered promising candidates since they do not enter the food chain and they can produce raw materials with a relevant economic value. Several recent studies focuses on fast growing, high biomass-yielding and value-added non-food crops, that could be used as feedstock for a wide range of products with different applications on industrial scale (e.g. construction biomaterials, bio-lubricants, bioplastics, pulp for paper, biopolymers, biochemicals, biofuels, biochar, etc). Crops that attracted much interest for their phytomanagement potential are: willows, poplars, miscanthus, hemp, kenaf, switchgrass, giant reed, reed canary grass, cardoon, safflower, castor, jatropha and other. Prospectively, the exploitation of contaminated lands could open new economic possibilities for local farmers and rural communities by increasing the availability of domestic raw materials and the ability to be used in new emerging markets, by creating new jobs and stimulating the innovative entrepreneurship and, in the long term, by supporting the rural renaissance and feeding the bio-based economy.

Keywords: Phytomanagement, phytoremediation, non-food industrial crops.

Acknowledgement: This work was supported by the FORTE project (www.forte-project.gr), under the frame of the bilateral and multilateral joint R&T collaboration between Greece and China. The project is funded by the General Secretariat for Research and Technology (GSRT), under the Operational Programme “Competitiveness, Entrepreneurship and Innovation” (EPAnEk) 2014-2020.

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ISBN: 978-91-89081-03-1