Phytoremediation driven energy crop production using *Sida hermaphrodita* – Phyto2Energy Project

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The cultivation of energy crops on heavy metals contaminated (HMC) areas offer opportunities, which combine site remediation with energy recovery. Numerous tests have been conducted using phytoremediation in HMC soils with energy crop species. *Sida hermaphrodita* L. Rusby, has shown potential as an energy crop useful in the phytoextraction of HMs. The aim of the study was to investigate the efficiency of using *S. hermaphrodita* in energy crop production in HMs contaminated sites. The study investigated the impact of different fertilizer treatments on the composition of elements in cultivated biomass on HMC arable land and sewage sludge dewatering site, to determine its suitability for energy production in gasification processing. It was found that *S. hermaphrodita* is a species accumulating HMs mainly due to their bioavailability in soil. Lower heating value (LHV) of biomass was higher for biomass cultivated on HMC arable land, when compared to the sewage sludge dewatering site. Despite the presence of HMs in ash after the gasification process, some of it could be used as fertilizer, especially on heavy metal contaminated sites.

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Growth and performance of *Miscanthus* sp. on contaminated arable land – MISCOMAR Project

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Presence of heavy metals (HMs) in the soil is a common environmental phenomenon, especially in the areas affected by past mining and smelting industries. Such areas are usually highly contaminated and consequently, influence cultivated crops. Therefore, if these contaminated areas are considered for arable land, precautions should be taken and when the limits for HMs content are exceeded, such areas have to be excluded from agricultural production for food and feed purposes. Biomass production using perennial plants for energy purposes may offer an alternative; such an approach could provide multiple benefits in terms of both degraded land management, as well as phytoremediation, due to the stabilization or extraction of toxic elements by plants. The aim of the presented study within MISCOMAR project was to assess the cultivation potential of novel *Miscanthus* seeds-based hybrids on heavy metal contaminated arable land, alongside *M.* × *giganteus* propagated from rhizomes. Biomass yield at green (Autumn) and brown (Spring) harvest was assessed, as well as heavy metal concentration in plant aboveground parts.

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