

Medicine physicians rarely provide pre-hospital care directly. Total length of training is similar between Emergency Medicine physicians in the United States and Ukraine, who complete two years of internship at the end of medical university.

Conclusion: Emergency medical care delivery in the United States and Ukraine differ significantly in both structure and training. These differences are of particular relevance to Ukraine given the recent governmental reforms and changing landscape of healthcare and medical education.

## **PHYTOREMEDIATION OF POLLUTED SITES BY *MISCANTHUS GIGANTEUS*: CURRENT ISSUES (LITERATURE REVIEW) AND FUTURE BIOMEDICAL FRONTIERS**

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Pollution of soil causes environmental concern and adverse effects to human and environmental health in many countries. Remediation of former military and mining sites is an important strategy for regional sustainable development. Phytoremediation using the second-generation bioenergy species *Miscanthus × giganteus* is an effective method for cleaning the soil from heavy metals.

International cooperation project (Czech Republic, Kazakhstan, Slovakia, the USA and Ukraine) is studying the benefits of *M. × giganteus* cultivation at the soils taken from the mining and former military sites contaminated by As, Pb, Zn, Co, Ni, Cr, Cu, V, Mn, Sr, and U as well as at the soil artificially contaminated by Zn and Pb (green house/laboratory test conditions) and is characterizing the behavior of the plant in relation to the nature and concentrations of the metals in the soils. On other hand there are several test fields of plant growing directly in tested sites (natural conditions).

Combination of phytotechnology with production of biofuel crops is the innovative approach in sustainable management of polluted soil. *Miscanthus* growth was tested at different soil types of modeled rock substrates: loess-like loam (LLL), a rocks mix (RM), red-brown clay (RBC), green-gray clay (GGC), black soil (BS)+green-gray clay (GGC); black soil (BS)+red-brown clay (RBC); black soil (BS)+loess-like loam (LLM); and black soil (BS). Cultivation of *Miscanthus* at the contaminated soils has an important economic benefit. The biomass produced by the plant can be used for production of bioethanol or solid biofuel.

The research results illustrated that different types of modeled rock substrates were suitable for growing of *M. × giganteus* as raw material for renewable energy. From the substrates tested the LLM, LLL+RBC and RBC+BS showed the best growth of *Miscanthus* during two vegetation seasons.

*M. × giganteus* was an excluder plant for nine highly toxic elements (As, Pb, Zn, Co, Ni, Cr, Cu, V, U) and an accumulator species for the moderately dangerous elements (Mn, Sr). There were differences in heavy metal content in the above-ground biomass of *Miscanthus* depending on the dark-gray schist clay (DGSC) stratum depth. All researched heavy metals: Fe, Zn, Cu, Pb, and Mn showed a similar character in decreasing the metal content in the above-ground biomass depending on the stratum where plants grew: from 0 to 20 cm to 40–60 cm. The results illustrated that the maximum uptake on stratum of 0–20 cm was observed for Fe and Pb; on stratum of 20–40 cm the maximum uptake was fixed for Zn and Cu, and on stratum 40–60 cm the maximum was detected for Mn. The adaptive potential of *M. × giganteus* to produce a stable yield at the mining and post-mining lands is essential. The small accumulation of heavy metals in the above-ground biomass showed a good prospect of this energy crop for cultivation on the phytomeliorated mining lands. The results illustrated that application of amendments permitted to obtain the similar *Miscanthus* yields as at the arable lands. The attention should be done to using of sewage sludge as a promising substitute of organic fertilizers while growing *M. × giganteus* on the post-mining lands.

Due to the presence of population in areas of former military sites (possible test areas: Mymon, Czech Republic; Sliach, Slovakia and Kamenetz-Podilsky, Ukraine) and mining lands (possible test areas in Donbass, Ukraine) using local ground water resources and soil for recreation and agricultural cultivation purposes it is important to study the influence of *Miscanthus* phytoremediation to human health. Future research can be focused on biomonitoring of heavy metal traces in human organism (hair, nails, blood and urine) in dynamics with combination of local *Miscanthus* phytoremediation in industrial field scale. Epidemiologic investigations of different groups of local population (workers, elder people, children) may be another essential part of future investigation.

## **HYGIENE ANALYSIS OF THE WORK CONDITIONS OF THE PROCESS OF PROCESSING POLYMERIC WASTE**

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The processing of polymer waste has been and remains one of the hazardous industries of the processing industry and requires a deep and comprehensive analysis of the production environment from a hygienic point of view in order to minimize the negative impact on the health of personnel and the environment.

According to the analysis of literature data, in the conditions of processing polymeric waste, a complex of negative factors affects the body of an employee: chemicals, dust, vibration, noise, hypothermia, high humidity, etc.