NANOPHYTOREMEDIATION OF SOILS POLLUTED BY POLYETHYLENE

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Biological degradation of plastic waste is one of the most promising directions for finding sustainable solutions to the global problem of environmental pollution by plastics. Under standard conditions plastic waste biodegradation goes too slowly, so elaboration of efficient bioremediation techniques depends, among other things, on identification of means that can substantially stimulate this process. The purpose of our work was to test whether phytoremediation of soils polluted by low-density polyethylene (LDPE) waste can be stimulated by nanocomposites consisting of magnesium ferrite and stabilized by polyvinylpyrrolidone ($MgFe_2O_4$/PVP). According to the obtained results, introduction into soil of LDPE films pretreated by $MgFe_2O_4$/PVP caused a substantial growth stimulation of vetch and soybean plants compared to the control variants with untreated LDPE and without LDPE. For example, compared to the

control without LDPE the dry mass of these plants was, respectively, 50,2% and 76,4% higher. It was observed that after 27 days of vegetation the LDPE weight loss was up to 12% in the variants with the $MgFe_2O_4$/PVP pretreatment, while remaining negligible in the control without the nanocomposite. The obtained results demonstrate a substantial potential of nanomaterials in stimulating phytoremediation of soils polluted by polyethylene.

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