

large amounts of tailings in Romania on which vegetation should recover. The objectives of the study were to determine heavy metal content of the tailings and identifying possible impacts of the tailings on the vegetation in this ecosystem. We studied two tailings dumps in Moldova Nouă (Caras-Severin County), the area with the largest tailings areas in Romania. Heavy metals were determined through atomic absorption spectrophotometry at different wavelengths and data were statistically processed using the SPSS 17.0 – Package for the Social Science Statistics program. Plants were sampled and identified using the quadrant method. Results show that the tailings in the Moldova Nouă area have high concentrations of heavy metals such as iron, manganese, zinc, and nickel. Chromium and cadmium were also found, but in smaller amounts. The large amounts of these heavy metals determined the small number of plants with high or moderate forage value; the larger share was that of plants with no forage value at all, plants that are toxic or pests. Heavy metals such as nickel and zinc are toxic for most plant species when their concentrations in the environment are above admitted limits: this is how we could explain the poor presence of vegetation on the studied tailings ponds.

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Assessment of the nitrogenous and organic matter levels in sheep water sources



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Nitrates and nitrites pollution, both in Romania and at global level has an unprecedented scale in recent years, constituting a major concern for researchers in the field, in order to prevent/limit the effects induced by their increased levels on the soil–water–plant–animal–man pathway.

This study main goal was to monitor the levels of nitrates, nitrites, ammonia and organic matter in water sources (wells, rivers) for sheep from Olt County, Romania, during 2011–2013.

Water sources from sheep farms located in the submountainous, hilly and lowland areas from Olt County, under different climatic, hydrographic and relief conditions, which could require the use of different technologies for soil fertilization were investigated.

The method used were spectrometric techniques for nitrate and nitrites, spectrophotometric method for ammonia, and an automatic system of CBO5 reading for organic matter.

Nitrates registered higher annual average levels in the lowland area in ground water sources (wells). Mean annual nitrates in surface water sources (rivers) were lower than those recorded in ground water sources (wells), since the amounts of nitrogenous substances entrained by the rainwater from fertilized lands were continuously reduced by downstream entrainment. All annual and monthly averages of nitrites levels almost closely followed the nitrates values, but not in terms of overruns the maximum allowed level.

Maximum allowed level overruns of ammonia and organic matter, but even only their presence in water samples from ground and surface sources, were correlated to periods in which fertilization was made with natural fertilizers (manure).

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Research on rehabilitation of ancient oil polluted soil through perennial plant phytoremediation



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On lands with ancient oil pollution, there remain, for a long time, those chemical compounds characterized by high molecular weight, non-polar nature, and low volatility. They cause the formation of soil aggregates soaked with crude oil. The aggressiveness of heavy petroleum polluted soil, manifested by the specific suffering of cultured plants and it ended in their death. To alleviate aggression of polluted soils, they were treated with a mixture of fly ash and sewage sludge (1:1 wt./wt.). The treatment applied of 50 t/ha on a soil with 8% oil products caused the adaptation of a perennial crops of the *Lotus corniculatus* species. In the first year of culture, plants occupied 25–35% of the cultivated area. In the spring of the second year of crop, plants expanded and occupied up to 65% of the cultivated area. Maintaining the trefoil plants culture demonstrates the possibility to rehabilitate soils polluted with 8% oil products. The used phytoremediation variants are based on the common agricultural techniques, the application of fertilizer and fly ash adsorbent agents of petroleum products. Furthermore, the reduction with more than 50% in oil content in 0–20 cm soil profile during the monitored period of 12 months represents the motivation for using trefoil in order to ecologically rehabilitate ancient oil polluted land.

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Optimization of microbial biopreparations for soil quality improvement: Testing new formulations



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Biopreparations (BP) are widely used in the field of agriculture and environmental biotechnologies for many decades. Nevertheless, these technologies are still insufficiently understood. Environmental conditions and application mode influence BP activity. A sustainable carrier should have good water holding capacity, good aeration characteristics, support microbial growth and survival, non-toxic, easily sterilized, manufactured, and handled in the field, environmentally friendly, and have good storage quality.

Seven types of ceramic beads fabricated from Latvian Devonian clay were evaluated in terms of their appropriateness for bacterial cell attachment and further use for soil cleaning/air biofiltration technologies. Activity of microorganisms was tested in experiments under laboratory and mini-field conditions and evaluated by enzyme activity and plating methods. SEM micrographs of the bead

surface showed uneven distribution of bacteria on the surface. The craters (pores) of beads seem to be the most appropriate sites for bacteria attachment. Conversely, ceramic beads made from quaternary deposits of Prometejs clay (800–1150 °C) inhibited bacterial growth.

Besides, peat and humic-rich peat extract, sapropel, biochar, clay powder, straw etc. were evaluated as potential amendments to soil for optimizing interrelations between autochthonous and introduced microorganisms, higher plants, contaminants, etc.

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Composite clay sorbents for immobilisation of biomolecules and cells



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An efficient tool for new application possibilities in biotechnology is the modification of natural materials. A good approach in this respect is clay modification or synthesis of composite/hybrid sorbents with high sorption capacity. We have developed an approach of clay modification with reactive organic functional groups (NH₂, SH, COOH, epoxypropyl) and the obtained composite sorbents have high sorption capacity in respect to enzymes (superoxide dismutase, catalase) or biomolecules (sterols, FMN, etc.). The immobilisation yields are high and the chemical bonds are stable. Another approach is based on synthesis of clay–mineral phase sorbent synthesis. As the most prospective in this respect can be considered clay modification with iron oxohydroxides or oxyapatite. The obtained sorbents thus have a combination of basic clay properties (high surface area, ion exchange capacity) with properties of the mineral phases immobilised onto clay surface. The obtained composite clay sorbents were characterised by means of determination of their sorption capacity, in respect to phenolic substances, metal ions, BET surface, SEM and other methods. The versatile application potential of the obtained sorbents in several fields for immobilisation of biomolecules and cells has been demonstrated.

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Study regarding the current situation of farms in Romania



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Agriculture is a sector with great potential, occupying, by tradition an important place in the structure of the Romanian economy. This is an important factor in maintaining social stability and eco-

logical balance; it is the branch that provides food for population and important quantities of raw materials for non-food industries and other industries. This paper aims to analyze the evolution of farms in Romania, as a basic element of economic development. The excessive fragmentation of agricultural property and lack of association leads to a permanent duality, represented on the one side by the semi-subsistence and subsistence farms, and on the other hand by commercial holdings. In the case of commercial holdings there is still an imbalance, in terms of utilized agricultural area by family farms and agricultural companies with legal personality, the last ones largely managed to adapt to the needs of a competitive agriculture. From the investigations made that number of farms with utilized agricultural area of less than 1 ha decreased in 2013 compared to 2010, with about 76,000 farms or 3.8%, them holding still, a large share, 54.5% from the total, used agricultural surface which returned on average in 2013, on a farm was 3.60 ha, compared with 3.45 ha in 2010.

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Cost/Benefits analysis – A sufficient process in choosing investment



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The article deals with a comparative study of investment options regarding a standard water – treatment plant vs. a biological water – treatment plant. The analysis is made by ERR and ENPV reported to a financial discount rate for projects financed by public funding. The method of valuation used within the study was a Cost–Benefit Analysis. Research was made during a training program regarding financial resources for projects during the programming period from 2014 to 2020. Training aimed members of staff involved in the management of the Environment Operational Program.

As far as a standard water – treatment plant is concerned, investment rises to 652,000 Euros, while for a biological water – treatment plant is of 403,400 Euros. For both plants the considered operating period is of 25 years. The result of the carried – on analysis is a recommendation made by the authors of the study regarding the fact that a biological water – treatment plant is better suited in terms of costs for the equivalent of a 3000 – inhabitant community taking into account the following reasons: ERR is of +7.33%, ENPV is of +72,000 euros reported to a financial discount rate of 4.00%, thus the cost of water – treatment is bearable even by low-income inhabitants of rural areas.

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