

ABSTRACT

the habilitation thesis „*Municipal organic waste management and environmental protection*”, developed by Assoc. Prof. Ilie Leonard

In this habilitation thesis with the title "*Municipal organic waste management and environmental protection*" I have presented the results of scientific research that had as main objective to emphasize the impact of applying municipal organic waste on agricultural land as a solution to their recycling and environmental protection.

The subject is one of great interest both nationally and internationally. The strong development of urban areas, the progress of civilization in recent years have led to increasing amounts of sewage sludge and the need to impose recycling. So, waste water, sludge from treating them are a product of civilization.

The major objective of the sludge treatment in the treatment water plants is to avoid the negative impacts of environmental pollution and human health. Sludge quality varies widely depending on the origin of municipal wastewater entering the process is nearly impossible to predictability the composition, and also their management.

In the context of sustainable development it is necessary to improve techniques adopted in respect of the disposal and/or recycling of sewage sludge in accordance with the legislative and economic criteria for each country, agricultural use is a measure agreed by the EU as the best environmental practice.

Management issues of sewage sludge is a necessity due to major investments made so far and which will be maintained for the construction and rehabilitation of water treatment plants, such as Romania complies with the conditions of the Treaty of Accession. In these conditions will result an estimated increase to five times of sewage sludge production in the next period (2010-2018).

Recycling sewage sludge on agricultural land is generally regarded as the best environmental practical option. However, sewage sludge contains heavy metals that accumulate in arable soil layer because they are not quickly leachate and which plants accumulates is very little compared with the contribution. Increasing concentrations of heavy metals in soils may affect on long-term their fertility and agricultural productivity.

Promoting technologies without waste or to start switching technologies producing waste with actions of recovery, is one way of avoiding ecological crisis and raw materials, about combining saving resources with environmental protection.

For the specific case of sewage sludge results from water treatment plant, their reintegration into the circuit of matter in nature is achievable in several ways, including application on agricultural land is one of the most practical, it has the following advantages:

- the use of large amounts of plant nutrients (humus, nitrogen, phosphorus, potassium, etc.);
- reducing the use of chemical fertilizers needed to maintain high levels of agricultural yields;
- utilization soil mineralization capacity of organic substances, water processing and decontamination by physical factors, chemical and biological.

The results obtained from scientific research demonstrate the positive effects of using municipal waste on soils properties and the crops:

- significant results have been achieved on improving the main chemical properties of soil (organic carbon, nitrogen, phosphorus, potassium, pH etc.);
- were established rates of sewage sludge that can be applied to agricultural land for increases the agricultural yields without the risk of accumulation of heavy metals in the crop yield in amounts over the maximum allowable limits and thus no risk of translocation in the food chain;
- with transfer coefficient was established to prioritize crops studied by the risk of transfer of heavy metals;
- micromorphological analysis showed the favorable effect of the use of sewage sludge on soil porous system, the stability of structural aggregates of water, increase water retention capacity etc.

The conclusions of the researches conducted so far allowed making recommending on recycling organic waste such as fertilisers on agricultural land, as a way of recycling and environmental protection.