



“Gheorghe Asachi” Technical University of Iasi, Romania



RECOVERY OF SEWAGE SLUDGE ON AGRICULTURAL LAND IN LOMBARDY: CURRENT ISSUES AND REGULATORY SCENARIOS

**Maria Cristina Collivignarelli¹, Alessandro Abbà^{1*}, Sergio Padovani²,
Maurizio Frascarolo³, Dario Sciunnach³, Maurizio Turconi³, Marina Orlando⁴**

¹University of Pavia, DICAr Department of Civil and Architectural Engineering, 1 via Ferrata, 27100 Pavia, Italy

²ARPA Lombardia, Cremona Department, 1 via S. Maria in Betlem, 26100 Cremona, Italy

³Region Lombardia, Department for Environment, Energy and Sustainable Development, 1 Piazza Città di Lombardia, 20124 Milan, Italy

⁴Region Lombardia, Department of Territory, Urban Planning and Soil Conservation, 1 Piazza Città di Lombardia, 20124 Milan, Italy

Abstract

Issues concerning the treatment and the recovery/disposal of sludge derived from the municipal WWTPs (Wastewater Treatment Plants) are gaining importance both in Italy and abroad. In Lombardy Region this aspect is particularly relevant due to both the amount of sludge produced and its remarkable reuse in agricultural soils. This paper discusses different strategies for land application of sludge in order to provide technical and regulatory guidance at regional level. The work is based on a survey concerning qualitative and quantitative characteristics of sewage sludge (derived from WWTPs and sent to Sludge Treatment Plants – STPs – authorized for the treatment on behalf of third parties) reused for agricultural application. Then, the effects of six different regulatory scenarios (considering the rules of the European Commission, national legislation and the laws of regions neighbouring to Lombardy) on the qualitative characteristics of sludge reused in agricultural soils have been evaluated. The results of this work have been incorporated into regional guidelines that were approved with Decree of Regional Government (DGR) n. X/2031 dated 1 July 2014. On the basis of this work, the principles of the regional guidelines are: 1) improvement in the quality of the sludge spread on agricultural land; 2) protection of the high-quality sludge (ingoing to the STPs), avoiding its mixing with other sludge suitable for agricultural reuse, but with qualitative characteristics closer to the regulatory limits; 3) minimization of the problems concerning the odour emissions (one of the main critical issue).

Key words: agricultural use, heavy metals, Regional Guidelines, sewage sludge

Received: December, 2014; *Revised final:* June, 2015; *Accepted:* June, 2015

* Author to whom all correspondence should be addressed: e-mail: abba78@unipv.it; Phone: +39 0382985314; Fax: +39 0382985589