Geophysical Research Abstracts
Vol. 15, EGU2013-13728, 2013
EGU General Assembly 2013

P losses in soil columns amended with compost and digestate from municipal solid wastes

Marta García-Albacete and M. Carmen Cartagena
Dpto. Química y Análisis Agricola. ETSIA UPM (martagalba@gmail.com)

Sludge's, manures and compost applied to agricultural soils in high quantities and long-term application to increase crop productivity, result in accumulation of soil phosphorous (P). Soluble P is directly available to algae (Sonzogni et al., 1982) and thus particularly relevant to water quality degradation. Transport of P from agricultural soils to surface waters has been linked to eutrophication in fresh water and estuaries (Sharpley and Lemunyon, 1998). Almost 50% of stored water in Spain is degraded by eutrophication processes that cause the proliferation of algae and other organisms and a decrease in oxygen content (Environmental Profile of Spain 2005).

Fertilizers and biodegradable wastes application rates in agriculture are based on nitrogen requirements. This results in a P supply that is in excess of crops needs since the ratio of P to N in waste use to be greater than required by plants (Smith, 1995).

While surface runoff is an important pathway of phosphorus losses from agricultural lands, significant losses can also occur via leaching thought soils. Leaching tests are important for assessing the risk of release of potential pollutants from biodegradable wastes into groundwater or surface water. Percolation tests also get information about the interaction of organic waste with soils.

The study was conducted according to the percolation leaching test CEN/TS 14405 "Characterization of waste-Leaching behavior test- Up-flow percolation test" with three different soils mixed with organic wastes from msw (compost and digestato) and an inorganic fertilizer (NaH2PO4). Each soil was amended with the P sources at rates of 100 kg P ha-1. Leachates were collected and analyzed for each column for dissolved reactive P by inductively coupled plasma atomic emission spectroscopy (ICP) following USEPA Method 3050A digestion (USEPA, 1995).

The fact that P sorption capacity (Xmax, PSI) of the soils was determined using Langmuir′s isotherms and the P forms from organic wastes were extensively characterized allows leaching data could be interpreted on the basis of P-sources chemical properties.