

gma

WATER PURIFICATION FROM ORGANIC POLLUTANTS BY USING MICELLE-CLAY SYSTEMS



S. El Hankari¹, L. Scrano^{1*}, C. Belviso², F. Lelario¹, S. Fiore², S.A. Bufo¹

¹Department of Agriculture, Forestry and Environment, University of Basilicata, Italy ²Laboratory of Environmental & Medical Geology, IMAA–CNR, Italy laura.scrano@unibas.it

AIM

Clay minerals are the most important inorganic components in soil for sorption of contaminants. They have large exchange capacity, and appreciable internal and external surfaces accessible to organic or inorganic molecules [1]. Without modification they are ineffective stable sorbents for contaminant compounds. For this reason clay minerals have been treated with surfactants: this process not only changes the surface properties from hydrophilic to hydrophobic, but also greatly increases the basal spacing of the layers [2]. Organo-clay complexes show several applications in the treatment of waste effluents, as extenders for activated carbon, and as components of clay barriers, for example in clay slurry walls, hazardous waste landfills and petroleum tank forms [3]. The aim of this research was to develop a matrix capable of removing organic contaminants from aqueous solutions.



RESULTS

Results of chemical analyses confirmed the usefulness of tested retention process on atrazine. At the end of the batch equilibration period, the disappearance of the herbicide from the treatment solution was 76.5% of the initial amount. This amount was considered as retained by the organoclay. Washing of the air-dried organoclay after sorption, returned 20.1% of retained chemical. Release of the herbicide was controlled again after 6 months of equilibration in water giving 29.5 % of the retained atrazine. Therefore, the organoclay was able to strongly retain 53.9% of atrazine used in the treatment. **Organoclays modified using quaternary** ammonium salts are suitable for waste water cleaning, but these salts could be toxic if released in drinking water. A more concern could receive new natural polymers we are experimenting aiming at the purification of water for human and animal consumption.

described in the interature [4,5]. MMT, surfactant and organo-modified clay samples were analysed by X-ray diffraction using a Rigaku Rint 2200 powder diffractometer with Cu-Ka radiation and graphite monochromator. The X-ray patterns of the unmodified and modified clay mineral showed a basal spacing (d001) of 12.2 Å and 18.7 Å respectively indicating that ODTMA was retained on the MMT.Atrazine was used as sorption model at rate of 0.35 mol Kg-1 organoclay, and retention by surfactant-modified MMT was measured by using a LC/MS system.



[1] H.H. Murray, Appl. Clay Sci. 17 (5–6) (2000) 207–221.
[2] S.A. Boyd, et al., Clays Clay Miner. 36 (2) (1988) 125–130.
[3] M.J. Carrizosa, et al., Appl. Clay Sci. 18 (5–6) (2001) 223–231.
[4] L. Wang, A. Wang. J. Hazard. Mater. 160 (2008) 173–180).
[5] Xi Yunfei, L. Frost Ray, He Hongping. J. Colloid Interf. Sci. 305 (2007) 150-158.