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METHANE AEROBIC BIOCONVERSION IN CONTAMINATED SOILS BY UNTREATED PAPER SLUDGE: CRITICAL ISSUES AND DURABILITY

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Abstract

The presence of uncontrolled biogas in old or run out landfills and in recovered sites with untreated paper sludge can lead to diffused methane emissions towards atmosphere during years.
Actually biocover, biowindow and biofilter systems have been developed to intercept and bioconvert methane into CO_2, to reduce the emissions of greenhouse gases towards atmosphere contributing to a reduction of the environmental impact. Furthermore this fraction of CO_2 has not to be accounted according to Kyoto Protocol, because it derives from organic matter. Bioconversion is performed by microrganisms, often contained in soils or in tailored composts. Standards for compost to be used as biocover are defined in Austrian legislation.
In the case of recovered sites with untreated paper sludge there are critical aspects: risk of no interception of confined gas sacs, creation and maintenance gas drainage flux, methods to assess bioconversion effectiveness and maintenance along time. These interventions must last for years and therefore it is necessary to verify that the reduction of the methane concentration and emission is kept down to acceptable levels over time, in an efficient way.
The aim of this work is to adopt techniques for monitoring and control in the long run biofilter behaviour with reference to bioconversion. A correct monitoring system can also suggest the need for any "charge", even timely.
The experience/results of monitoring and control in the long run in an ex-quarry area recovered with untreated paper sludge will be reported. As a consequence of uncontrolled biogas production and migration, a specific site bioremediation treatment was performed according to a patented process; in its framework, about 30 biofilters with tailored composts were installed. Some of them were equipped with piezometers. The concentrations of CH4, CO2 and O2 inside biofilters were monitored over 4 years, which is translated into bioconversion effectiveness control. Also limits and suggestions from experience will pointed out.