# Biofilters reduce carbon footprint of old landfill sites

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Researchers in the US are testing biofilter systems as a viable alternative to releasing methane from passive landfill vents into the atmosphere. The technology could reduce the overall impact of old landfills on global warming. Details are reported in the current issue of the *International Journal of Environmental Engineering*.

Organic matter rotting in smaller, old landfill sites generates a slow trickle of the potent greenhouse gas, methane, into the atmosphere, amounting to just 2 or 3 kilograms per day per vent. In contrast to controlled methane generate for biofuel from modern, managed landfills, tapping this slow stream of the gas is not viable technologically or economically. However, methane has an infrared activity 21 times greater than carbon dioxide and so represents an important anthropogenic source of this greenhouse gas when attempting to balance the climate change books. Indeed, landfills contribute 12% of worldwide anthropogenic methane emissions due to the decomposition of organic waste.

Old landfills typically have passive gas vents. Methane is simply released into the atmosphere from these vents, or if the rate of emission is high enough it can be burned, or flared. According to Tarek Abichou and Jeffery Chanton of the Florida State University, Jose Morales of Environmental and Geotechnical Specialists, Inc., Tallahassee, Florida and Lei Yuan of Geosyntec Consultants in Columbia, Maryland, methane oxidation has recently been viewed as a more benign alternative to venting or flaring of landfill methane.

The researchers tested two biofilter designs capable of oxidizing methane gas to carbon dioxide and water. Both are packed with so-called methanotrophic bacteria, microbes that digest methane. They found that the radial biofilter design gave a much higher methane oxidation rate than a vertical biofilter. The higher surface area exposed to methane flow led to greater oxygen penetration into the biofilters, essential for microbial digestion. The radial biofilter has a surface area of well over 1.2 square meters whereas the vertical biofilter amounts to just 0.3 square meters area.

The team also found that the average percent oxidation rate of 20% and higher for the radial biofilter was possible when the air temperature was 20 to 36 Celsius, indicating the optimal soil temperature for methanotrophic bacteria to oxidize methane. Vertical biofilters averaged a little over 12% oxidation.

**More information:** "Mitigating methane emissions from passive landfill vents: a viable option for older closed landfills" in *Int. J. Environmental Engineering*, 2011, 3, 284-297

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