Experiences of acidogenic treatment of waste in landfill environments

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The degradation of landfilled MSW can be described to proceed through a sequence of degradation states as depicted in figure 1.

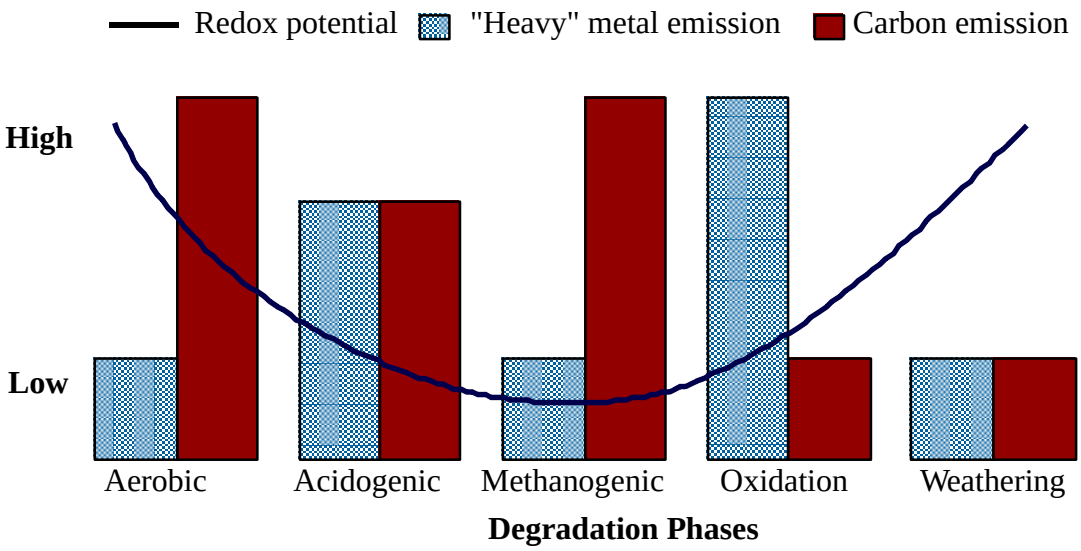

Figure 1 Degradation states in landfill environments. The different degradation states or phases typically occurring in MSW landfills.

The acidogenic degradation step is characterised by an uncompleted anaerobic degradation resulting in end products like organic acids, alcohols, hydrogen and carbon dioxide. In most cases this is seen as detrimental to landfill operations and much effort have been investing in developing schemes to avoid having acidogenic conditions in landfills and the most usual strategy is to promote methanogenic conditions.

Looking instead at possibilities to benefit from the acidogenic degradation process, there are some properties of it that could be of interest:

It is easy to establish:

It often develops spontaneously, but it can also be induced by simple means such as ample water addition.

It is a flexible and fairly stable process:

Acidogenic conditions can be maintained under a broad pH-regime (about 3-9).
The degradation rate can be controlled by water fluxes
It is usable at a broad range of temperatures (at least from +5 up to 50).
It can be used in sequence with either methanogenic or aerobic degradation.

Other advantages of using an acidogenic landfill process includes the possibility of improving the prospects for recycling organic wastes that are contaminated with metals, since most hazardous elements will be leached faster than organic materials. It may also be advantageous that methane emissions over the landfill surface may be almost eliminated.

The points above will be illustrated with results from various investigations made over the last decades.