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Composting with VRM Inoculants

VRM produces a range of Inoculants and microbial formulations used as Composting aids in a number of circumstances. These formulations typically contain a diverse range of microbial elements including yeasts, fungi, phototrophic bacteria, and lactobacillus. Used according to specification, these products have been seen to promote: stability of process (maintenance of temperature and microbial diversity throughout processing term), improvement in end-product volumes and improvements in maintenance of nutrient components retained in composted matter. Following are some responses to questions often asked about compost made using VRM products in relation to that made using other means.

Leachate:

What leachates are expected when making compost using VRM products?

We normally expect that compost produced using VRM products will have some liquid leachate produced along normal gradients for anaerobic composting. Experience tells us however that these leachates will contain a high level of live microbial activity and a low level of nutrient – nutrient typically being low level organic acids (humic, ascetic or other acids) and water in a diluted mixture. We also find that the residual volume of material in compost produced with VRM products is often much higher than that produced with conventional aerobic composting processes (pile may be up to 100% greater in volume at end of process). This suggests a much lower level of leaching/loss of nutrient material than is normally the case.

Biogas:

How do VRM products affect Biogas generation from compost? In particular what are the effects on methane, nitrous compounds and sulphuric acid mists?

This is a difficult question as Biogas components will normally be related to the material being digested. However, some consistent responses related to the use of VRM products are as follows:

Off-gases from composts produced with VRM products typically have much less hydrogen sulphide (H2S) component than those produced using other methods. As to methane – there is evidence to suggest that where the pile remains above 60% moisture there is an equal amount of methane produced in VRM compost to that produced in conventional aerobic processes. Where the pile is less than 60% moisture, the level of methane generation is LOWER in VRM compost and it appears that more of the carbon is retained in the pile. Additionally, volatile nitrogen compounds are typically retained in VRM compost rather than being released wholesale to atmosphere– a factor supported by the higher levels of protein and other nitrous compounds typically found in the compost at completion.

There is no data for Sulphuric Acid mists (H2S04) per se. However, there are numerous examples of composting where the process of odour generation involving H2S (the precursor for formation of H2S04) is greatly reduced. This is because of the culture of purple non-sulphur bacteria which is integral to all VRM products. These species, when properly cultured and introduced, successfully out-compete the Sulphate Reducing Bacteria responsible for conversion of Sulphate to H2S. There is also evidence of successful out-competition of thiobaccillus responsible for the conversion of H2S to H2S04 and the reconstitution of compounds including elemental sulphur which do not result in the release of sulphuric acid mist or leachate.

Fire Risk:

How do VRM products impact on fire risks for compost piles?

Fire risk with VRM compost is mitigated against by two factors: Temperature is generally consistent at 55 – 65 Degrees and does not generally spike to higher temperatures associated with fire. Secondly, composts are typically predominately anaerobic and as such typically wetter and have less available oxygen within the pile to support combustion.

Chemical Contaminants:

How does the use of VRM Inoculants impact on chemical or microbial contaminants?

There is evidence to suggest that VRM Inoculants have an effect on the digestion of persistent organo-chlorines. Species included in the final mixtures for VRM products are selected for their ability to degrade these substances, along with formaldehyde and several other difficult substances. Please note that the unpredictable factor in this degradation process is time. That is, that we note wide differences in the time taken for degradation in varying circumstances – at present too wide to be predictable.

Certain heavy metals have also been successfully treated/dissipated using VRM Inoculants. These include arsenic, lead, mercury, iron and copper. Please note that treatment of these substances will generally involve the reduction of concentration levels through active chelating and dissipation in soils, atmosphere or other media. This is achieved by chemo-autotrophic activity fostered by VRM formulations followed by dissipation via motile microbial activity and the actions of other motile organisms.

There is clearly evidence to suggest that VRM cultures promote an extremely diverse microbial and other biological activity. The diversity present is particularly effective for control of outbreaks of other organisms including aspergillums and legionella species. Please note that control of legionella is at least partly a function of the level of out-competition available against protozoa acting as hosts for the legionella species.