A NEW SEWAGE AND ORGANIC LIQUID WASTE TREATMENT: THE VERMIFILTRATION

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Liquid waste processing (of slurry, agro-industrial effluents, sewage,...) are usually made by fermentation in tanks (digestor, aerobic and anaerobic decomposition, etc.) with additional pre-treatments (as fat elimination) or post-treatments (as sludge transport and sludge field spreading). In classical processing water and organic matter treatments are linked. Residence time of both water or organic matter varies between 40 mn to 60 days needing both volume and space.

The vermifiltration introduces a splitting between water residence time (a few minutes) and organic matter treatment (some years to a total decomposition). The vermifilter acts as a physical filter and adsorber (separation of solids and volatiles from waste), as a solid state aerobic and anaerobic fermentation device as a sludge decomposer.

The surface needed (<0.1 m^2/inhabitant) is among the smallest and the volume is very reduced due to the speed of water treatment. These induce a low cost.

The efficiency of removal (in % of inflow initial state) observed in the Milipella prototype, Chile, (Toha et al., submitted) is 96% for the biological oxygen demand, 93.5% for total suspended solids, 95% for volatile suspended solids, 82% for nitrogen and 73% for phosphorous.

The vermifilter waste clarification increases the transmittance five folds at 250 nm and 2.4 folds at 550 nm allowing an efficient pathogen UV treatment (*Escherichia coli* in 10 mL: in sewage 10^7 , after filtration 10^5 , after UV treatment = 0).

Earthworms are declogger, decomposer and facilitate in their pellets a nitrification-denitrification process. Studies on mechanisms and ecotoxicology are in progress.

In contrast with classical sewage plant it is not needed to make independently fatty mud treatment, aerobic and anaerobic fermentations, denitratation, dephosphatation treatment and spreading of sludge. A better use of biodiversity could improve the new processing.