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Management of litter from dry toilets: comparison of the environmental impact onto the soil between three composting practices

Composting at plot level of dry matter in litter toilets in on-site sanitation context

Operating principle of the compost: storage in a 1m³ covered area. No management of temperature, humidity or aeration due to study standards.

Green waste employed: sawdust and shavings at toilet level and straw at composting level

Duration and sites: 1,5 years on 6 sites

Place of valorization: plot level (no authorized transportation)

Watertight composting area: only in health or environmental issues areas

Standards and regulatory : authorized in non-collective sanitation regulatory (arrêté du 7 septembre 2009 "prescriptions techniques en ANC")

Parameters and indicators monitored:

Liquid phase: pH, TSS, COD, BOD, NH₄⁺, NTK, ASR 37°C, E. Coli, weight production

Solid phase: %H, DM, OM, Ctot, Ntot, K₂O, P₂O₆, ASR 37°C, E. Coli, T°C, weight production

Injunctions:

Liquid phase management: no runoff outside the composting area.

Around 1,3 L/day of liquid product by a 4 persons family.

To reduce this volume urine should be separated.

The flow of liquid phase respect in term of quality and quantity the "ANC" standards. Soil permeability must be over 5 mm/h. Environmental impacts are insignificant. Solid phase management: data collected does not show if the degradation is aerobic or anaerobic. The composting is not characterized (T°C, pH, %H). Sanitary risks only occur during the management of the liquid phase. This must be avoided. Solide matters are in adequation With NFU 44-095 in a 6 month treatment.



Composting on an approved composting platform of litter collected on events

Operating principle of the compost: Co-composting on an approved and collective platform (public or private)

Green waste employed: sawdust and shavings at toilet level and various provenance at composting platform level (garden green wastes and poultry litter in the study cases),

Duration: 8 months – 3 events on 2 composting sites

Place of valorization: sold to farmers

Watertight composting area: yes, with a specific device to collect leachate

Standards and regulatory : NF – U44-051. Composting practices respect standard specifications

Parameters and indicators monitored:

Liquid phase: pH, MES, COD, BOD, NH₄⁺, NO₂⁻, NO₃⁻, K₂O, PO₄³⁻, NTK, ASR 37°C, E. Coli, helminths eggs, salmonella,

Solid phase: pH, %H, DM, OM, Ctot, N_{tot}, K₂O, P₂O₆, ASR 37°C, E. Coli, T°C, helminths eggs, salmonella, HAV, DBO_{5/28}, ARS and ARD

Injunctions:

There is no impact (sanitary or environmental and even on composting process) to compost litter of dry mobile toilets on composting collective platform. The mix with green wastes show an elevated ratio interesting for helping toilets matters degradation. Dry mobile toilet matter's must be accept on all approved composting collective platform. A waste national code (as green waste) must be given by regulation administrative to facilitate the acceptance of this matter on composting collective platform

Composting on private property of the litter collected in event-delivery by an outhouse provider

Operating principle of the compost: composting on a private platform by renter

Green waste employed: sawdust and shavings at toilet level and various provenance of the green waste at composting platform level (garden green wastes and jagged straw in the study cases),

Duration: 1 year – 4 events on 2 composting sites

Place of valorization: at plot level

Watertight composting area: no, direct infiltration of leachate

Standards and regulation : no one are adapted to dry toilets matters nowadays in France regarding this practices

Parameters and indicators monitored:

liquid phase: pH, MES, DCO, DBO, NH₄⁺, NO₂⁻, NO₃⁻, K₂O, PO₄³⁻, NTK, ASR 37°C, E. Coli, helminths eggs, salmonella,

Solid phase: pH, %H, MS, MO, Ctot, Ntot, K₂O, P₂O₆, ASR 37°C, E. Coli, T°C, helminths eggs, salmonella, HAV, DBO_{5 et 28}, ARS and ARD

Injunctions:

A scale effect for good composting (increase of temperature) regarding individual on-site sanitation context is not proved. Study rules for users are no return and no

management of humidity (by adding dry matters for example). Matters must be mixed with a diversity of green waste as garden waste, kitchen organic waste or vegetable garden waste. Liquide phase must be collected and stored in

a fully and watertight tank in order to manage humidity (if needed to increase it for a good composting process). Platform must be

watertight in health or environment areas. These areas are defined by administration in the land use plan. The

composting must be managed by a recognized graduate of composting. The platform must adhere to rules

including: statement, log book, defined areas, etc.



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