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Expertise of the scientific community in the Languedoc-Roussillon region

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▲ *A 40-m³ TRANSPAILLE digester in Senegal.*

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▲ *Composting test on Wallis.*

Upgrading of organic waste by anaerobic digestion and composting in hot regions

Equivalence 1 m³ of methane

- ▶ 9.7 kWh of electricity
- ▶ 1.3 kg of coal
- ▶ 1.15 l of petrol
- ▶ 1 l of fuel-oil
- ▶ 2.1 kg of wood
- ▶ 0.94 m³ of natural gas
- ▶ 1.7 l of fuel alcohol

In hot regions, where average temperatures are high, biological upgrading processes for organic waste are particularly effective. Unlike thermochemical processes, they save part of the organic material, which can then be recycled to preserve soil fertility.

Methanation, or anaerobic digestion, is fermentation in the complete absence of oxygen. Degradation of organic matter leads to the formation of a gas—biogas—which is rich in methane (CH_4). Biogas can be used directly as fuel. The final residue of anaerobic digestion, called methanogenic digestate, can be used directly as fertilizer or composted to improve its properties. Since the late 1970s, with its African partners, CIRAD has been developing various biogas technologies suited to local conditions. Thus, the TRANSPAILLE process will methanate solid waste such as manure, dung materials, cassava peelings or coffee pulp. The AGRIFILTRE® process will filter liquid effluents rich in organic matter so they can soak into straw before anaerobic digestion.

Composting is a biodegradation of organic matter in the presence of oxygen, producing carbon dioxide and water vapour. The reaction is exothermic (raising the temperature of the medium). Because composting is often done in the open air in piles or windrows, it is difficult to control. In creating a model of the composting process, we must formalize the relationship between the physicochemical characteristics of organic waste and the gaseous, liquid and solid outputs. This modelling is used to set the parameters of flow models (operation, area) for an environmental assessment.

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