

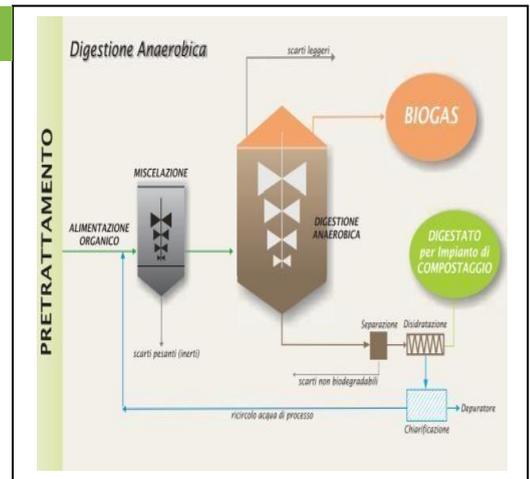
Technology for N&P recovery as compost starting from green waste and pre-digested mixed-waste with "ACEA Pinerolese" anaerobic digestion and composting process



Keywords: •compost • hygienisation • nutrient recovery • biomethane

Key facts:

- **Technology category:** anaerobic digestion
- **Input material:** municipal organic waste
- **Output products:** biomethane + digestate (sludge quite stabilized and hygienized)
- **Capacity:** ACEA PINEROLESE serves an user basin of about 1 million of inhabitants for the treatment of organic waste. The current capacity is 60.000 t/y of organic waste.
- **Focusing geographical areas:** ITALY
- **Technology status:** TRL9
- **EC/MS Authority permits:** During 2005, the compost, called Florawiva, was certified by C.I.C. (Italian Composting Consortium), following a voluntary certification process. At the beginning of 2007, the ACEA PINEROLESE obtained ISO 14001 certification, better known as "ENVIRONMENTAL CERTIFICATION". ISO 9001:2000 certification, awarded in January 2007.



Summary of the technology:

The first phase of the process consists of an anaerobic biodigestion (in the absence of oxygen), which allows to associate the recovery of material (compost) with an innovative energy recovery system (biogas). The organic waste coming from the separate collections undergoes, first of all, a series of volumetric reductions and mechanical selections.

These operations allow the removal of any undesirable fractions, such as plastic and metals. The refined stream is transferred to intermediate tanks, where the material is diluted in water and the material is preheated.

After the preparation phase, the stream is pumped into the digesters. The process involves constant handling of biomass. The extraction of the sludge takes place from the conical bottom of the digester, by gravity mixing. Digested organic waste (digestate) it is dehydrated and then sent to the neighboring composting system. The biogas obtained from fermentation it is conveyed to a gasometer and temporarily stored.

The water used in the process is partly recirculated, while the remaining portion is sent to purifier. Biogas is a natural gas, rich in methane, which can be used as a replacement of common fossil fuels, for the electricity and thermal energy production.

This mixture is naturally generated by the decomposition of organic waste, through anaerobic digestion processes. If not properly treated, it can constitute a problem for the environment, but thanks to a technological system devised by ACEA, biogas represents, instead, a resource.

The biogas coming from the plants of the Integrated Environmental district and also that produced at the landfill (which is approx 3 km from the site) is stored in a gasometer. From here it is sucked, cooled and sent to the otto cycle engines.



The energy recovery system also provides for heat recovery. The electricity produced is used for internal consumption and the excess is transferred to the grid. The system has certificated green and energy efficiency certificates. The same thermal energy is at the service of the biodigestion process and the nearby purifier. It is also used for the heating of the various operating and office spaces.

The enhancement system of biogas for energy purposes developed by ACEA makes it possible to deal with the problem of the effect two-level greenhouse: prevents the dispersion of biogas into the atmosphere, thanks to its capture in all plants treatment, and avoids the use of a similar amount of energy from traditional fossil fuels, also of origin release of carbon dioxide. The energy derived from biogas makes it possible to make the entire Environmental District autonomous, electrically and thermally. Actually, the system's energy availability at full capacity far exceeds internal demand. From this consideration derives the interest of the Pinerolo company to design alternative solutions, thus being able to exploit full local energy resources. This desire to seek ever more innovative systems takes shape in the project of urban district heating. The network, active from the 2008/2009 thermal season, will serve a good part of the city of Pinerolo, providing low environmental impact energy to families and activities in the area.

Competitive position and advantages:

- Anaerobic digestion leads to energetic recovery in the form of biogas (for production of green electricity and heat) and digestate (usually for further post-treatment)
- application without soil damage nor 'burning' of the crop, and/or preventing evaporation of the ammonia.
- The compost supports soil fertility and releases its nutrients slowly, reducing risks of leaching of mineral fertilizers. It is a stabilized product implying that, once applied, no temporary decrease of N-levels occur.

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