

## TRAINING MATERIAL

### Title:

Technology for N&P recovery as solid digestate starting from manure and slurry combining mobile cavitator and anaerobic digestion (ID:262)

### Training:

#### **What is the technology?**

It is a mobile slurry manure cavitator plant developed by the LifeDOP project to recover slurry and manure in order to produce optimized material for anaerobic digestion. The technology is inserted in a set of management practices within the production chain of Parmigiano Reggiano and Grana Padano PDO.

#### **Who is the vendor of the technology?**

The technology has been developed within the LIFEDOP project. The project involved actors scattered throughout the Parmigiano Reggiano and Grana Padano supply chain in the Mantua area for the demonstrative creation of a sustainability project. LIFE is the funding instrument that funded the LIFEDOP PROJECT within the climate and environment action program. The general objectives of the project are to support the implementation, updating and development of European environmental policies by co-financing valuable and replicable projects on a European scale. The LIFE program started in 1992 and has since funded around 3954 projects, contributing over 3.1 billion euros to the protection of the environment and the climate.

#### **Which are the advantages of the technology and the problems addressed?**

##### **Problems addressed**

Lombardy Region, in Italy, produces 40% of the national pork. An equivalent percentage also applies to cow's milk production. This results in a high livestock load per unit area.

The constraints imposed by the Nitrates Directive 91/676/EEC, which came into force in 1991, have therefore led to serious management problems for farmers.

On the other hand, on the commercial side there was an increasing difficulty in accessing the market. The ever-increasing quality expectations of the end consumer have recently joined a new ecological sensitivity, which determines environmental guarantee requests that fall on the entire supply chain: organic certification, animal welfare, recyclable packaging, just to name a few examples.

The sustainability, to be productive and legislative imperative, it also became a value added in the narrative and marketing of agro-food product improvement of nutrient management.

##### **Advantages of this technology**

Processing slurry and manure by cavitator technology allow to obtain a material more manageable for biogas plants, characterized by high homogeneity, high dry matter content (about 16%), high pumpability and without inert materials.

The obtained material (from slurry and manure processing) can replace the silage maize as feedstock sent to biogas plants reducing the cost to produce renewable energy.

So it allows to increase the environmental sustainability of the energy unit produced (carbon footprint calculation) and to decrease the impacts of the production of milk, thanks to the better management of slurry and avoided methane emissions.

Finally the digestate obtained is a better “fertilizer” than slurry, as I allow better management, higher nitrogen efficiency and lower emissions in the environment (air emissions, GHG emissions and leaching in waterbodies).

A schematic list of the advantages of the pre-treatment of manure by using this technology and the subsequent management practices adopted within the production chain are the following:

-valorization of slurry in anaerobic digestion plants thanks to the cavitator equipment that assure:

- a material suitable for biogas plants thanks to for biogas plants;
- high homogeneity;
- high dry matter content (16%);
- high pumpability;
- absence of inert materials.

- traceability of slurry exchanges;

- better management of liquid digestate for virtuous use with increase of environmental sustainability (carbon footprint calculation);

- Optimization in the management of farm storages for slurry;

- Increasing the environmental sustainability of the energy unit produced (carbon footprint calculation);

- improvement of the profitability of the biogas plants in the area concerned.

Finally, thanks to anaerobic digestion treatment of slurry and solid manure, it is easier and cheaper to export solid digestate, and to treat liquid fraction for instance by stripping unit, this is due to the fact that the digestate from slurry and manure is more rich in nutrients respect to the digestate coming from maize.

#### **How does the technology work?**

A full-scale pre-treatment plant was developed (Figure 1). It works by sieving, shredding and cavitating a liquid-manure mixture to make the most of the material in the anaerobic digestion plants in the area.



Figure 1. Mobile slurry-manure cavitator pilot plant.

In Table 1 you can find the main features of the mobile slurry manure cavitator plant in terms of: technology category, input/output materials, capacity, focusing geographical areas and technology readiness level.

Technology category:	before anaerobic digestion
Input material:	manure and slurry cavitate them
Output products:	homogenised material more suitable for anaerobic digestion and more productive
Capacity:	60.000 t/year - 25 t/hours
Focusing geographical areas: ITALY	ITALY
Technology status:	TRL8 - system complete and qualified

Table 1. Features of the mobile slurry-manure cavitator mobile plant.

### How/where to use the technology?

Examples of applications are the Parmigiano Reggiano and Grana Padano supply chain in the Mantua area for the demonstrative creation of a sustainability project. The pretreatment of the effluents for the valorization in biogas plants presupposes the realization of a prototype of a mobile cavitator. This tool treats slurry and manure to produce optimized material for anaerobic digestion. Usually the valorisation of effluents towards biogas plants encounters the following barriers:

- lack of a characterization of materials and information on methanogenic potential;
- difficulty in loading and mixing fibrous materials.

In Figure 2 you can see the numbers concerning the two dairy chains of the Grana Padano and the Parmigiano Reggiano, interested by the LifeDOP project and by opportunity to use in the future the mobile slurry manure cavitator.

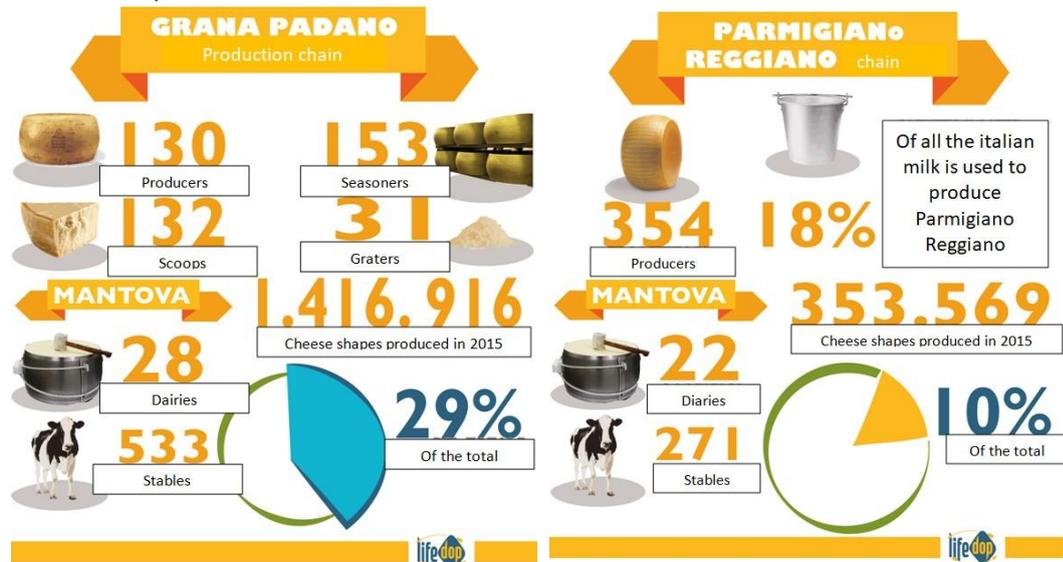


Figure 2. Dairy chains of the Grana Padano and the Parmigiano Reggiano interested by the LifeDOP project.

### Which are the authority permits and in which EU countries?

No authorization are needed for the use of the cavitator, and no patent is linked to the prototype.

### How much does it cost?

The processing of the material cost 4€/ton as average, including all the operational costs.

For more information: [https://nutriman.net/farmer-platform/technology/id\\_262](https://nutriman.net/farmer-platform/technology/id_262)