

Circular Agronomics Tech Study

Microfiltered Digestate to Fertigation

Pilot plant in Emilia Romagna (ITA)



MDF

In line with the 2030 targets for sustainable food production, as defined by the Farm to Fork Strategy, digestate and livestock manure should increasingly replace mineral fertilisers. To do this, however, it is necessary to maximise their use efficiency, e.g. by distributing them on growing crops, reducing emissions into air and water bodies. In particular, the liquid digestate contains most of the nitrogen in ammoniacal form, which is ready-to-use for plant nutrition.

The integrated Microfiltered Digestate to Fertigation (MDF) system, developed by CRPA Foundation in collaboration with Saveco Wamgroup (microfiltration) and Netafim Italia (fertigation) aims at distributing the digestate/slurry, mixed with water, through a drip irrigation system. To this aim it is necessary, by means of the microfiltration at 50 μm , to exclude particles that can clog the drippers.

In the scope of Circular Agronomics, a pilot plant was installed at CAT Correggio cooperative, Emilia-Romagna (Italy), and both microfiltration and subsurface drip irrigation trials were conducted using digestate, with rather encouraging results both at the biogas plant and in the fields.

The raw digestate is first separated into a palatable solid fraction and a liquid fraction and the latter is subjected to microfiltration to obtain the microfiltered digestate to be used on growing crops through subsurface drip lines with a total flow of 20 $\text{m}^3/\text{ha}/\text{h}$ (water/microfiltered = 9 w/w) at 1 bar pressure. The microfiltered represents the largest portion of the incoming raw digestate, and the others are the solid fraction deriving from horizontal screw press and the dense fraction from the microfilter. Both of the latter can be used at soil tillage.

Flow rates

Microfiltered digestate produced	4-5 m^3/h
Microfiltered digestate utilised	~2 $\text{m}^3/\text{h}/\text{ha}$

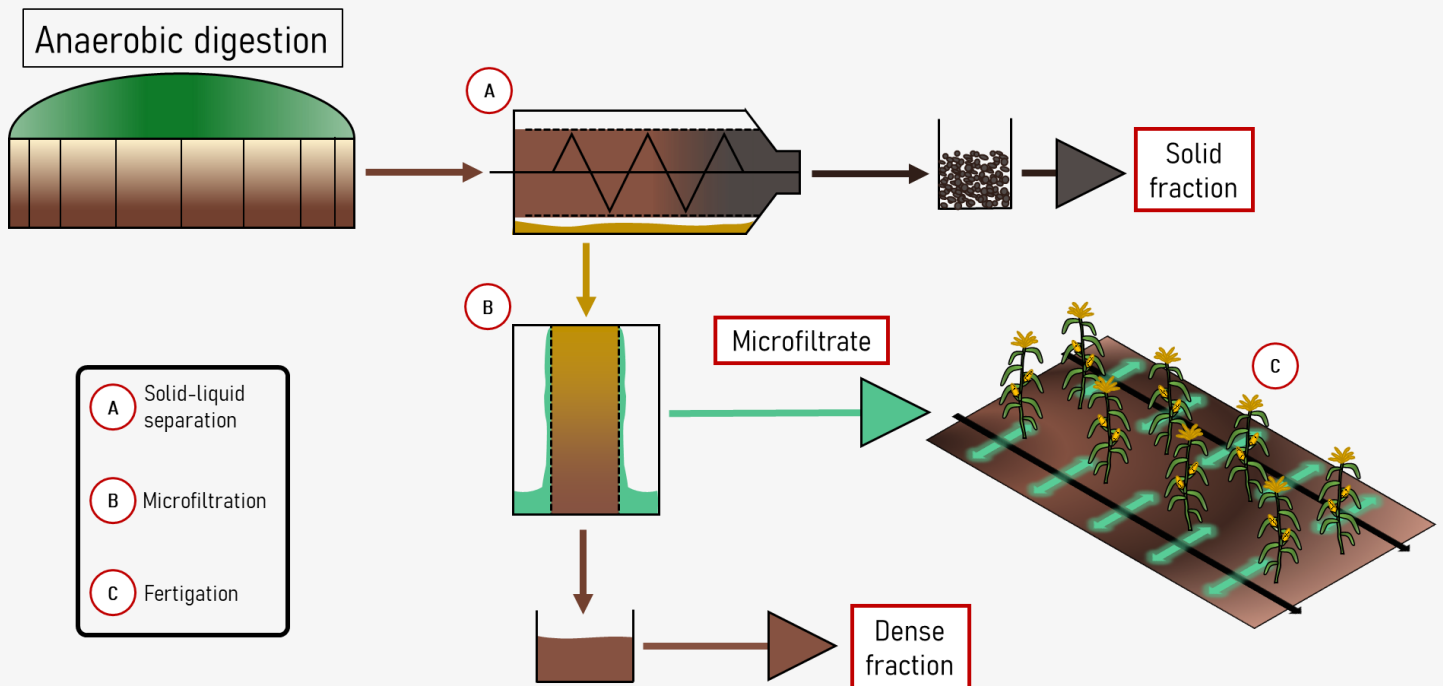
Separation efficiencies (by weight)

Solid fraction	5-10%
Dense fraction	10-35%
Microfiltered	55-85%

No chemicals required



MDF—Microfiltered Digestate to Fertigation



Unique Selling Points



- ➡ Increase nutrient use efficiency of digestate/slurry
- ➡ Reduction of greenhouse gases and ammonia emissions
- ➡ Moderate cost and low maintenance equipment
- ➡ Minimize water and energy consumption
- ➡ Possibility of completely (or almost) replacing mineral fertilisers
- ➡ A complete pilot plant at farm scale developed and validated (TRL 7-8)