Case study
Emilia-Romagna, Italy

What ? Increase of nutrient use efficiency and reduction of GHG – NH_3 emissions

How ? Microfiltered digestate to SDI, conservation agriculture

Circular Agronomics

Digestate/slurry microfiltration
(CAT, Correggio)

The raw digestate (or slurry) is first separated into a palatable solid fraction and a clarified fraction and the latter is subjected to microfiltration at 50 µm with an innovative equipment that allows to obtain the microfiltered digestate to be injected in the drip lines for fertigation (see next phase).



Flow rate microfilter: 4-5 m^3 of microfiltered digestate per hour.

Separation efficiencies (by weight, depending on type of material):

- ✓ Solid fraction (horizontal separator) 5 – 10%
- ✓ Dense fraction (from the microfilter) 10 – 35%
- ✓ Microfiltered 55 – 85%

Subsurface drip fertigation
(CAT, Correggio)

The microfiltered digestate is then mixed with the irrigation water and distributed through a subsurface drip irrigation (SDI) plant, on maize (2019) and sorghum (2020).

Three treatments are compared with: 1) microfiltered digestate through SDI; 2) soluble urea through SDI; and 3) business as usual with sprinkler irrigation and granular urea. The nutrient use efficiency is measured and compared.



Drip Line type: pression compensated (flow rate 1 l/hour, spacing 0.50 m).

- Drip lines are buried at a depth of 25-30 cm, the distance between them is 1 meter, total length of each drip line is 350 m
- Total surface of each plot (treatment) is almost 1 hectare (25 m large x 350 m long)
- Flow rate per hectare: 18-19 m^3 /hour for water, 1-2 m^3 / hour for digestate
- Six interventions of almost 10 m^3 /ha of digestate injected (each) during the maize cultivation
- SDI treatments coupled with minimum tillage

Conservation tillage practices
(Ciato Farm, Parma)

Two levels of conservation tillage practices (minimum tillage and no tillage) are compared with the conventional tillage practices, based on ploughing, on a large field with two hectares for each treatment.

Main equipment used :

No tillage → Direct seeder



Minimum tillage → Disc harrow



Conventional tillage → Plough and hoe



No exogenous organic matter is used, only recycling of that produced in the field (crop residues and roots), derived from maize (2019), winter wheat (2020) and rapeseed (to be confirmed for 2021).