Case study
Catalonia, Spain

What ? Organic fertiliser production and reduction of GHG - NH_3 emissions

How ? Solar drying technology and Precision Feeding (dairy farm)

Circular Agronomics

Fertiliser production
(Vila-sana)

Pig manure valorisation through fertiliser production

Enhancement of a full-scale pig manure treatment facility (anaerobic co-digestion of pig manure, efficient solid-liquid separation) through innovative processes:

- ✓ Solar drying for concentrated fraction of digestates
- ✓ Stripping (N-recovery) for centrates (clarified fraction of digestates)

*Rotary mixer



Designed by EMA



*Solar dryer (EMA) Area of the solar dryer: 660 m2/u (2u)



**Biogas plant (PORGAPORCS)

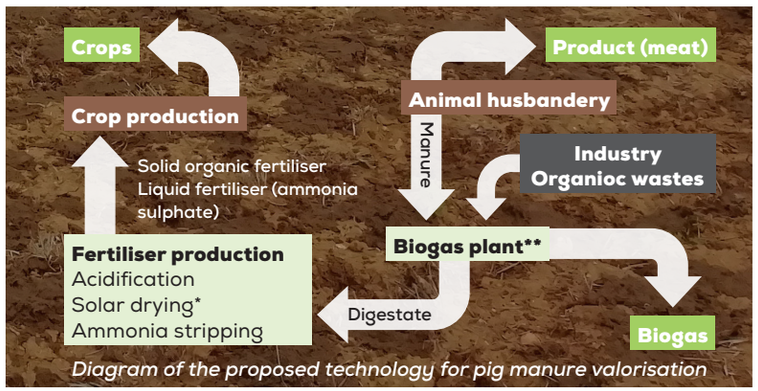


Diagram of the proposed technology for pig manure valorisation



Raw digestate



Dried digestate

Parameter % wet weight	Raw digestate	Dried digestate
Dry matter	7.82	88.90
Total N	0.51	6.99
Total P	2.50	2.27

Agronomic assessment
(Suchs and Osona)

Organic fertilisers and products from Vila-sana are assessed in field crop rotations, as well as through phytotoxicity and growth tests.

Field scale

Rotation 1
Wheat
Barley
Triticale

Rotation 2
Canola
Pea
Wheat



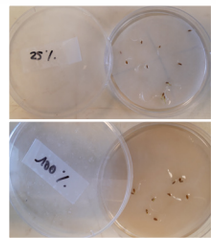
Fertilisation with **raw digestate**



Control mineral fertilisation



Fertilisation with **dried digestate**



Phytotoxicity test

Phytotoxicity essay

Germination index and root development measurement.

Growth test

Combination of fertilisers and peat as a substrate for lettuce plants growth.

Growth test (pots)



Comparison of fertilisation strategies

(application methods, timing and dosage) of fodder crops production with dairy farm manures.

Organic fertilisers from Monells are assessed in fodder crop (ryegrass) production and soil nutrients management.

Fertilisation with CF and PF manures



Fertilisation with composted CF-manure





Fertilisation with mineral fertiliser



Storage on farm

Phosphorous management through crop rotations and intercropping systems are assessed as a strategy for improving soil nutrients management.

Long-term fertilisation trials
(Baix Empordà)

Long-term organic fertilisation trials

Long-term available fertilisation trials on arable crops, using different organic products (manure, slurry, slurry fractions).

- ✓ Evaluation of C sequestration in the soil over several years linked to the different organic products used;
- ✓ Evaluation of nutrients, namely P, accumulation in the soil profile and the effects on soil quality characteristics.





General views of fertilisation fields

Precision feeding - Dairy farm
(Monells)

Ruminant production and fodder crops production

- ✓ Evaluation of the impact of different bedding materials on GHG - NH_3 emissions.
- ✓ Assessment of the impact of precision feeding versus conventional feeding, comparing:
  - Dairy production indexes;
  - GHG - NH_3 emissions inside the farm & during fertilisation;
  - Manure characteristics.

Distribution of Feed N intake (100%):

Body N losses 5%;
Milk N output 15-40%;
Urine N output 15-45%;
Faecal N output 25-40%.

Conventional Feeding (CF)	Precision Feeding (PF)
2 pens with 15 cows each	
Conventional TMR for 30 kg milk cow	Precision TMR for 25 kg milk cow
No extra feeds	Extra feeds during milking

TMR - mix of concentrate feeds



Dairy cow eating in the precision feeding system



Storage of cow manure at the dairy farm