

**BIOGEST**  
Technologies for nature

WAST WATER CONVERSION PLANT  
**CLF MODIL**



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[www.biogestservice.it](http://www.biogestservice.it)





## C.L.F.MODIL®

- A system which revolutionizes and enhances the use of wastewater, using natural systems of transformation in organic substance
- The **C.L.F.MODIL®** plant is a modern, revolutionary and cheap biological method of purification of slurry and wastewater
- The plant of biodigestion **C.L.F.MODIL®** transforms wastewaters in a mixed fertilizer Amending Compost (D.Lgs 217/06) of high quality for agricultural crops
- The **C.L.F.MODIL®** system works respecting the objectives of Kyoto pact, producing excellent organic substance.

### Aerobic biodigestion is a transformation process

- ❖ biologic ➡ Turned up by microorganisms
- ❖ aerobic ➡ Takes place in presence of oxygen
- ❖ termophilic ➡ Develops heat

The developed heat allows to reach temperatures ables to:

- accelerate the transformation process,
- evaporate big quantities of water,
- igienize the material from unwanted microbes, animals or vegetables.





## SECTORS



BIOGAS  
BIOMETHANE  
DIGESTATE



ZOO  
TECHNICAL  
WASTE



AGRI  
FOOD  
WASTE



ORGANIC  
SUBSTANCE

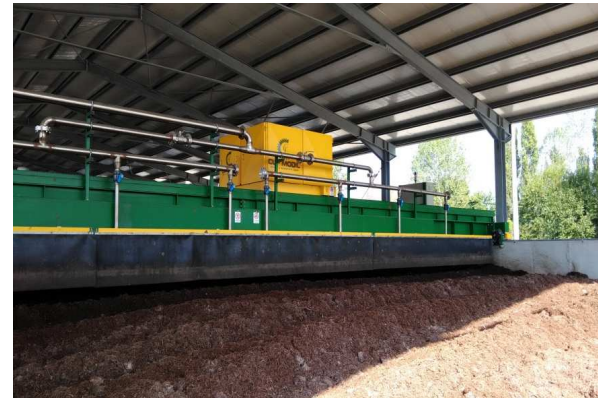


## RESULTS

- **Reduction of wastewater quantity:**  
(from 1/7 to 1/10) of the initial volume
- **Reduction of nitrates:** (over 65%)
- **Reduction of ground needs;**
- **Organic substance production.**



## C.L.F.MODIL® IN THE WORLD

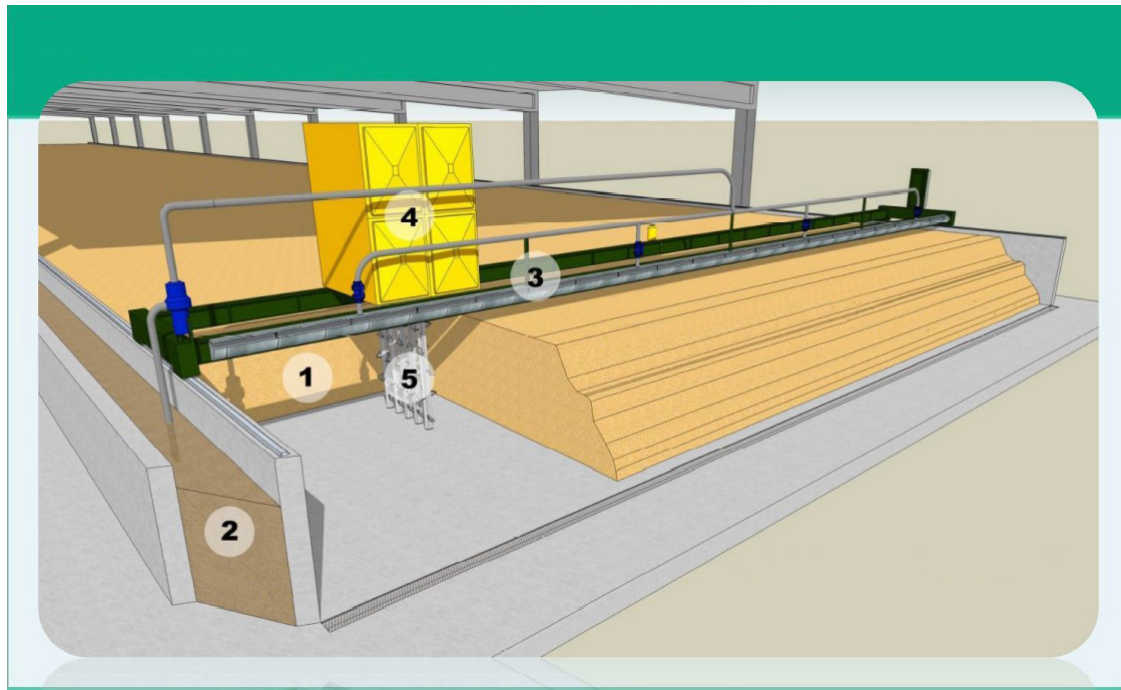


Biogest boasts over 40 still working plants which has been delivered since 2004

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## RENDERING OF A FULL IMPLANT





## CLF MODIL PLANT SYSTEM SCHEME

- 1 - Reactor
- 2 - Alimentation tunnel
- 3 - Overhead crane for wastewater charge and tilting
- 4 - Tilting unity
- 5 - Gauges for aeration and tilting



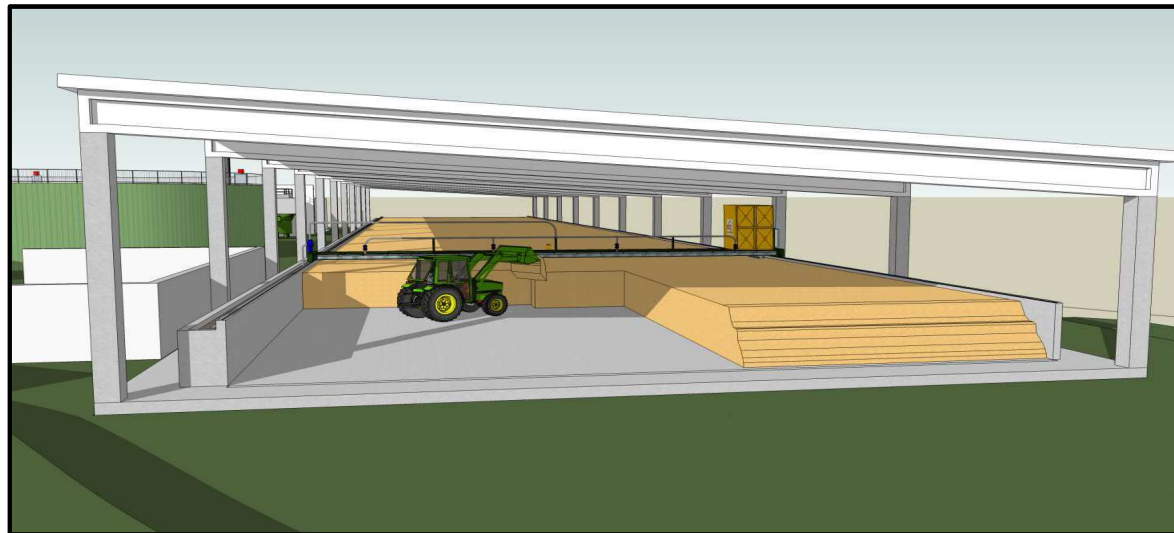
## WORKING STAGES

To begin the working stage of CLF MODIL® is necessary to prepare the substrate in the tank.

Below the phases:

### STAGE 1

In the first stage the tank is filled with dry vegetable material, for example straw, fungal straw, ground pruning, corn stockings, rice chaff ecc.







## STAGE 2

When the tank is full, the plant CLF MODIL® is ready to begin the working cycle. The implant is equipped with a pump that aspires the wastewater from the alimentation tunnel to the intern system that sprays all the bed of lignocellulose material, prepared before in the tank. The wagon goes on longitudinally alternating the stage of moving with the stage of the castle. The castle in the working stage moves orizzontally compared to the tank with contemporary the stage of spreading and working.





## STAGE 2

Spreading and contemporary processing





## STAGE 2

Plant working phase in the return stage to the bottom of the tank.





## STAGE 3

At the end of the process (it can last until 120 days), the material is ready. Starting from ten days before the cycle ending the plant doesn't do spreadings but it only does working cycles to homogenize the amending.



The process can last from 60 to 120 days

The daily absorption of wastewater goes from 12 to 18 L/day x M3







## STAGE 4

When the tank is empty it should be filled with new vegetable material and a new stage begins.

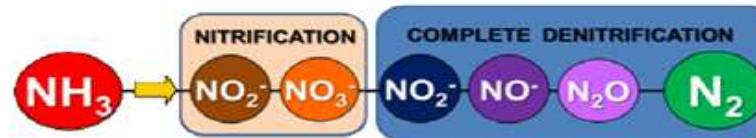


## REFERENCES

Particular attention was put on this problematic during the screens, in order to verify enviromental sustainability of the process. The results show:

- Mass reduction due to water evaporation;
- Nitrogen reduction with low emission of  $\text{NH}_3$  and  $\text{N}_2\text{O}$ ;
- Greenhouse gasses's emission reduction;
- Smell reduction

The loss of nitrogen with very low emissions of  $\text{NH}_3$  and  $\text{N}_2\text{O}$  happens thanks to the emission of  $\text{N}_2$ , as result of Nitrification-Denitrification. This biological process is using in the depuration and happens normally in the ground.



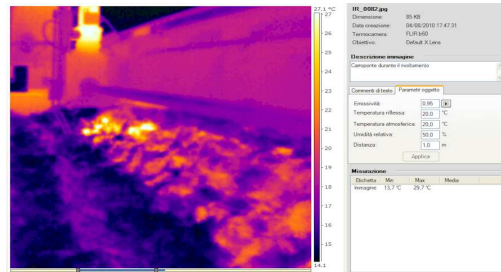
The process includes the transformation of ammonia in nitrate and nitrated (nitrification). Then, denitrifying bacteria act on them (denitrification) producing  $\text{N}_2$ , the major component of our atmopshere.

The process has not an enviromental impact, on the contrary it prevents the emission of  $\text{NH}_3$  which is in big quantity with slurry and wastewater

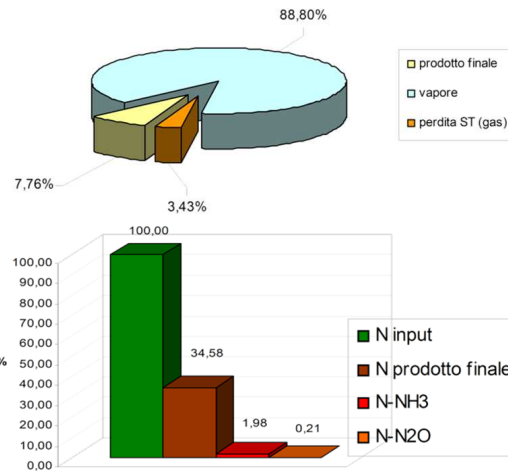
*Prof Roberto Chiumenti rural building and country Udine University*



## EXPERIMENTS



The temperature turned up to be very variable with values until 60°C and decreasing in the end of the cycle.



**Reduction of mass: 80-90%**

**Reduction of nitrogen :  
60-70%**

*Prof Roberto Chiumenti costruz. rurali e territorio Università di Udine*





## RESTRUCTURING EFFECTS

USING LIKE FERTILIZER THE FINENT IS GUARANTED TO THE GROUND A GRADUAL RELEASE OF NUTRIENTS, IN PARTICULAR OF NITROGEN. IN FACTS IS A WELL KNOWN DATE, THAT COMPARED TO THE TOTAL OF NITROGEN PRESENT IN THE FINENT, THE 10-15% IS MINERAL NITROGEN IMMEDIATELY AVAIBLE, THE 10-20% IS NITROGEN THAT BECOME MINERALIZED DURING THE FIRST YEAR OF AGRICULTURE AND THE 65-85% IS NITROGEN OF RESERVE THAT REMAINS IN THE LAND.

*Prof Ermes Frazzi Agricultural Engineering Piacenza University*





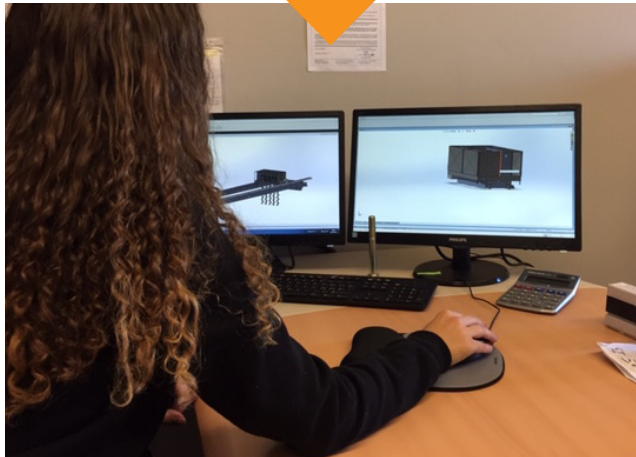


## HUMUS FUNCTION IN LANDS



### *ORGANIC SUBSTANCE*

BIOGEST SRL WITH HIS STAFF  
CAN MAKE AVAIBLE INTERESTED BUYERS  
FOR THE WITHDRAWAL OF THE FINENT  
MADE BY CLF MODIL® IMPLANT



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