

# CLF MODIL WASTE WATER CONVERSION PLANT

# BIOGEST

Technologies for nature



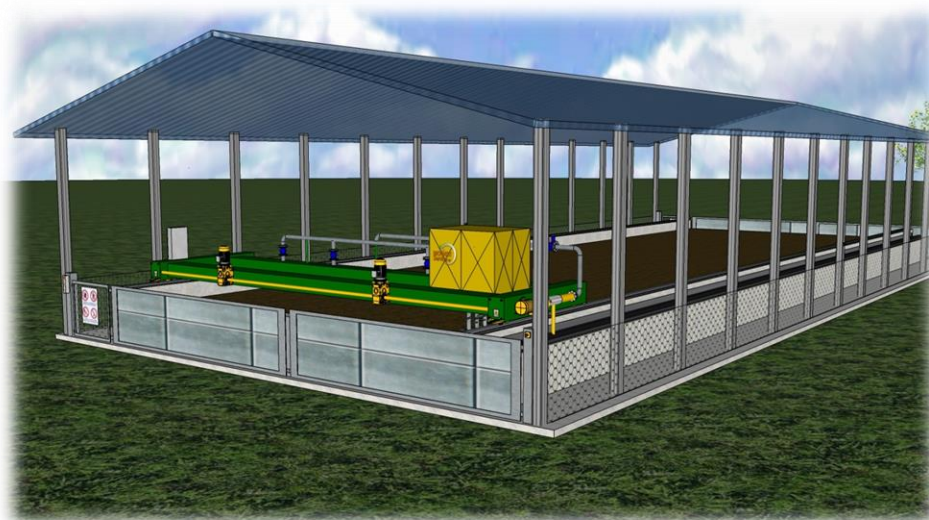
# EXPERIENCE

- MORE THAN 40 INSTALLED IN EUROPE
- THE FIRST ONE HAS BEEN WORKING FOR MORE THAN 15 YEARS
- CONTINUOUS IMPROVMENT IS OUR EVERYDAY GOAL





**CLF MODIL MDE ECO -  
MDE 3 - 5  
ECONOMIC PLANT  
ENVIRONMENTALLY-  
FRIENDLY FOR SMALL-SIZED  
STOCK FARMINGS**





**CLF MODIL MDR3  
PLANT PROJECTED FOR STOCK  
FARMINGS  
BIOGAS PLANTS MIDDLE-SIZED  
CHEESE FACTORIES**



**CLF MODIL MDR5  
PLANT PROJECTED FOR STOCK  
FARMINGS  
CHEESE FACTORIES  
BIG-SEIZED BIOGAS  
AND BIOMETHAN PLANTS**



**CLF MODIL®**  
IMPIANTO DI BIODIGESTIONE  
REFLUI FANGHI E DIGESTATI



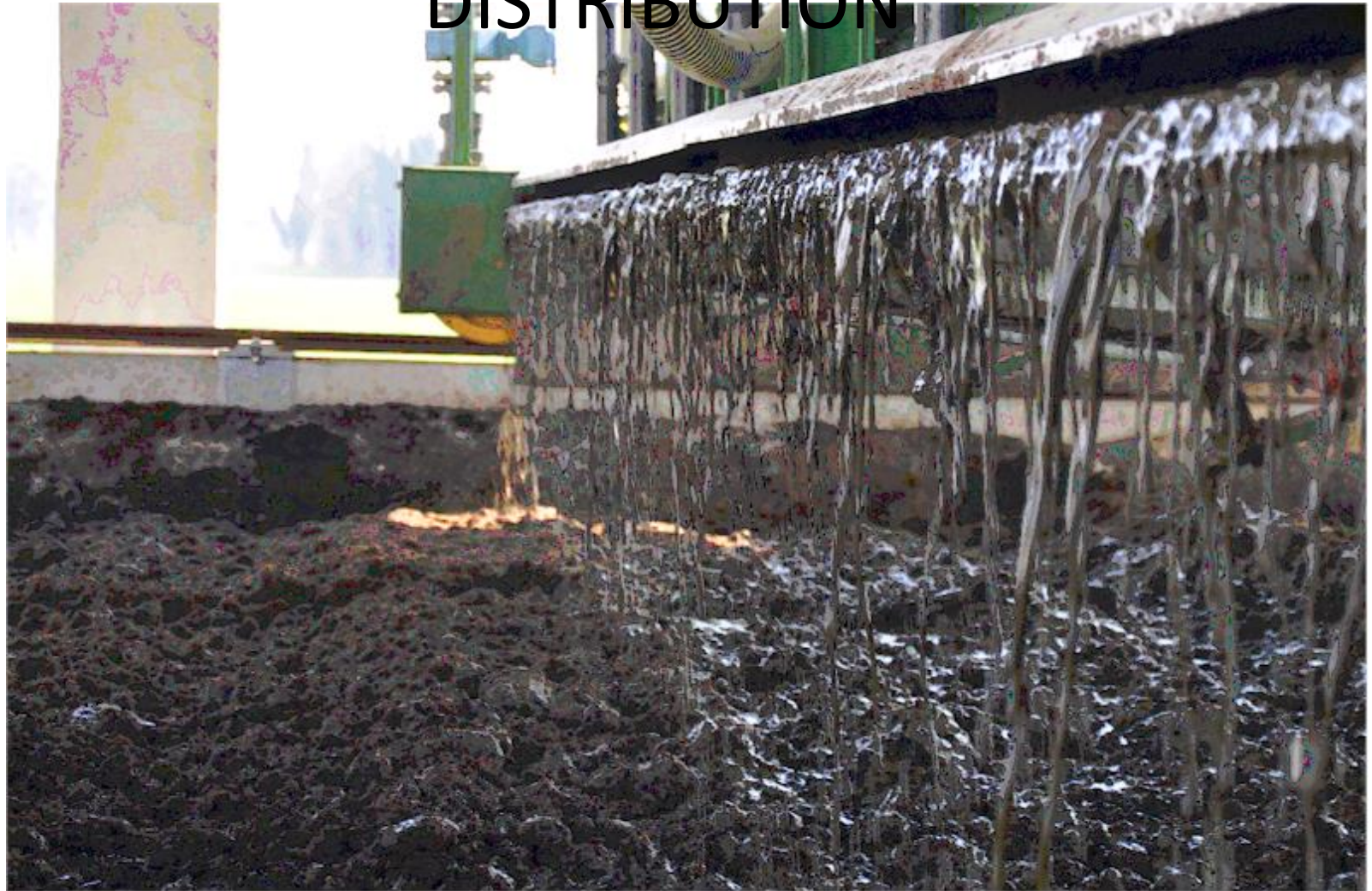


# BIOMASS PREPARATION





# WASTE WATERS DISTRIBUTION



# WASTE WATERS DISTRIBUTION





# WORK AND INFLATION



# END PROCESSING





# EMPTYING



# WHAT IS IT – WHAT IS IT FOR

- A system which revolutionizes and enhances the use of waste waters, using natural systems of transformation into organic compound
- The biodigester **C.L.F.MODIL** is a modern, revolutionary and convenient organic method of depuration of waste waters and effluent
- The biodigester **C.L.F.MODIL** transforms the effluent into a high-quality fertilizer Mixed Composting Soil (D.Lgs 217/06) for agriculture
- The biodigester **C.L.F.MODIL** operates according to the targets of Kyoto, producing excellent organic substance



## DURATION OF THE TREATMENT

- Process can last from 60 to 120 days
- Daily absorption of the reflue goes from 16 to 18 liters a day x M3



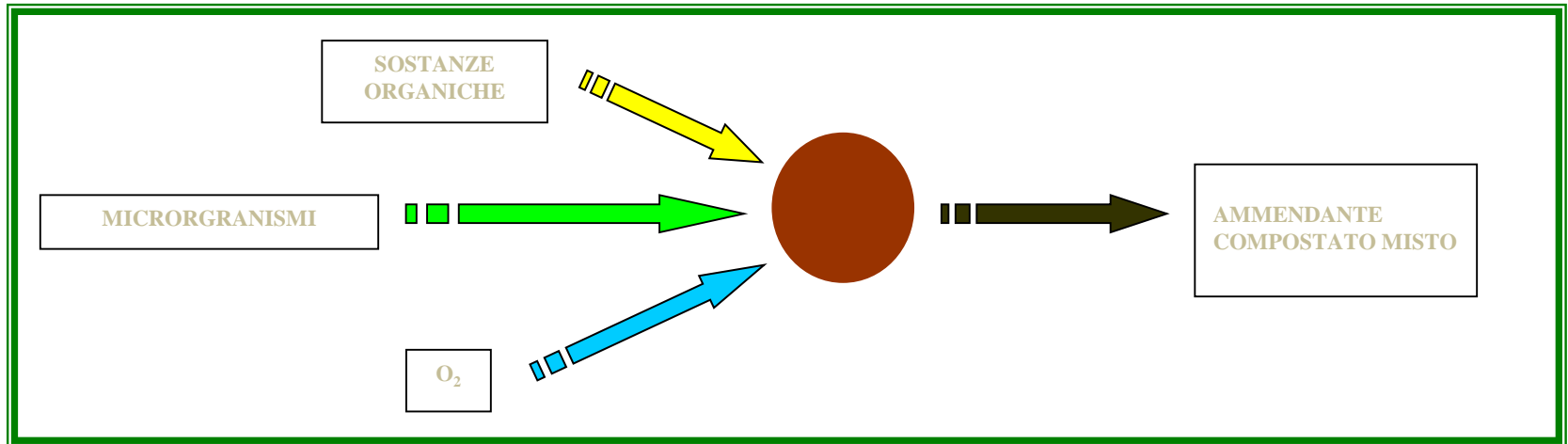
0 gg

60 gg

MAX 120 gg



# BIOCHEMISTRY: MONITORING LEAD BY UDINE UNIVERSITY (PROF R.CHIUMENTI, A. CHIUMENTI)



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





## EMISSIONS CONTROL

The plenum chamber method or static chamber has been used (*closed or static chamber or enclosure*). It is a flow measurement based on the determination of the rate of increase of the gas concentration inside a closed chamber positioned on the emitting surface.



During the monitoring, particular attention was focused on this problem, to verify the environmental sustainability of the process. In particular, the results have shown:

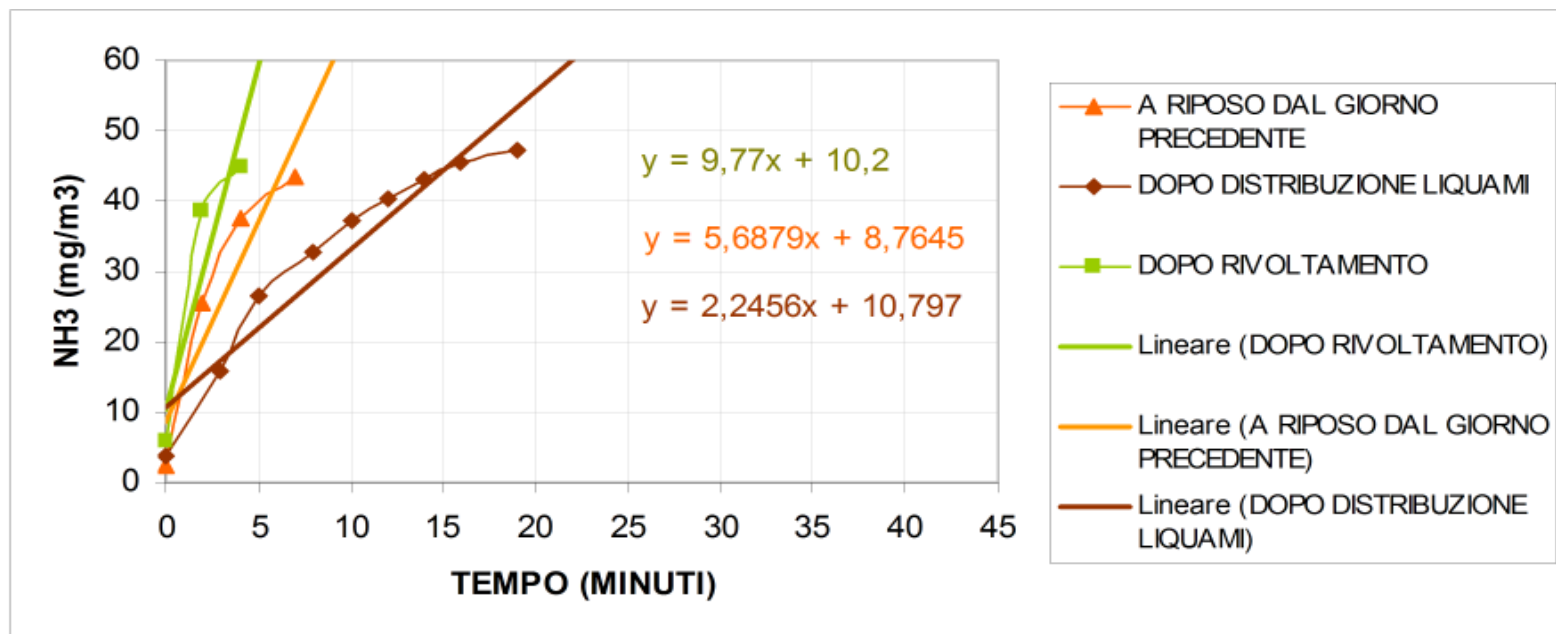
- mass reduction due to evaporation of water;
- reduction of nitrogen with low  $\text{NH}_3$  and  $\text{N}_2\text{O}$  emission;
- reduction of greenhouse gases;
- reduction of smell emissions.

The loss of nitrogen with low  $\text{NH}_3$  and  $\text{N}_2\text{O}$  emissions is due to  $\text{N}_2$  emissions from nitrification-denitrification. This biological process happens naturally in the lands and is used in the purification process.

The process involves the transformation of ammonia into nitrites and nitrates (nitrification) then used by denitrifying bacteria (denitrification) with the production of  $\text{N}_2$ , main constituent of the atmospheric air. The process has therefore no impact on the atmosphere, rather it prevents the emission of  $\text{NH}_3$  contained in large quantities in digestates and sewage.



## Emissions: clearly below the legal limits

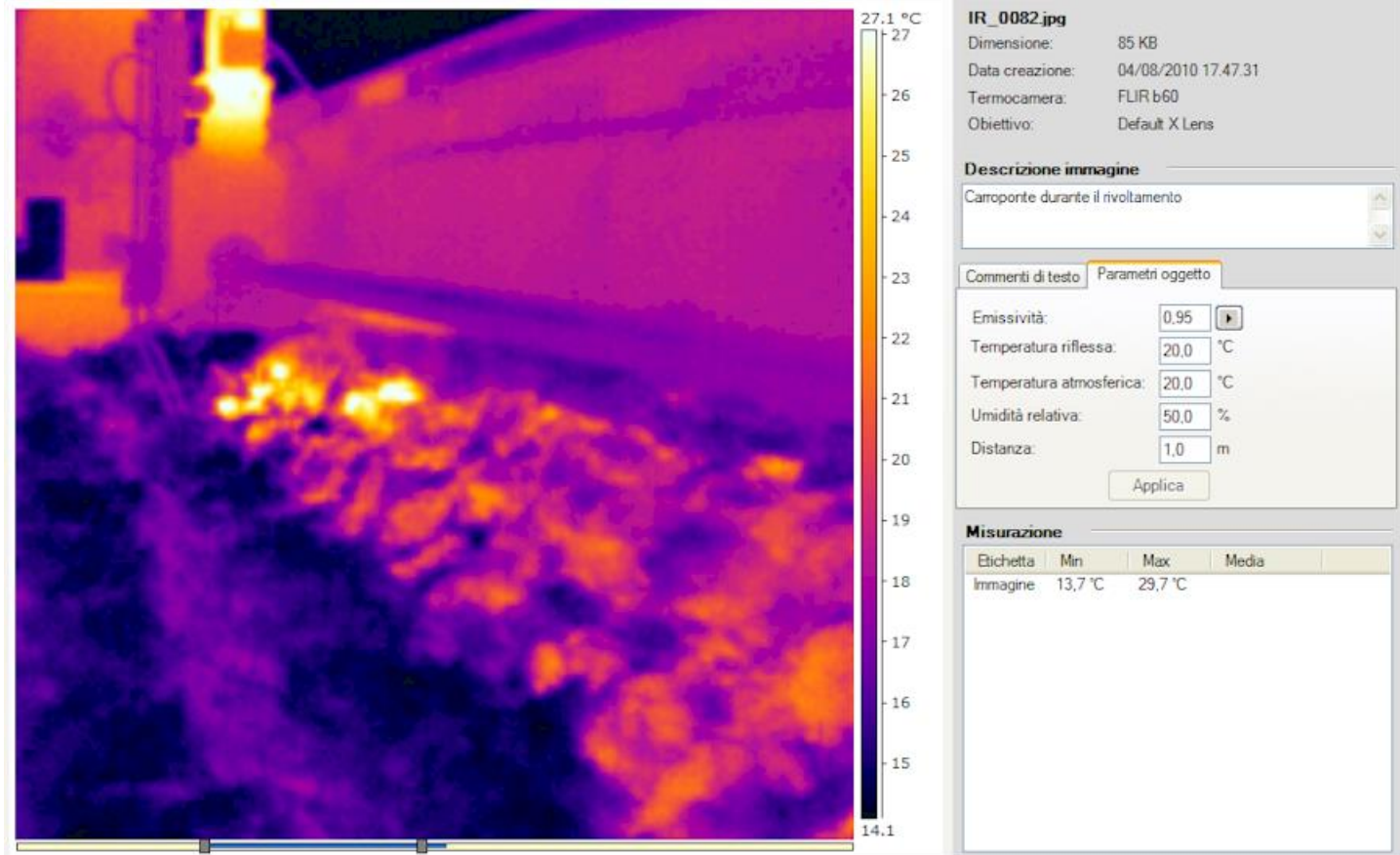


# SMELL CONTROL



The Mannebeck TO7 dynamic olfactometer was used, with four stations, which uses a panel of four people to send a "dirty" air mixture in order to determine the "smell" level of a "dirty" air sample. and "clean air with increasing concentrations until the smell is perceived. The measurement ends when all panelists perceive the smell.

# RESULTS



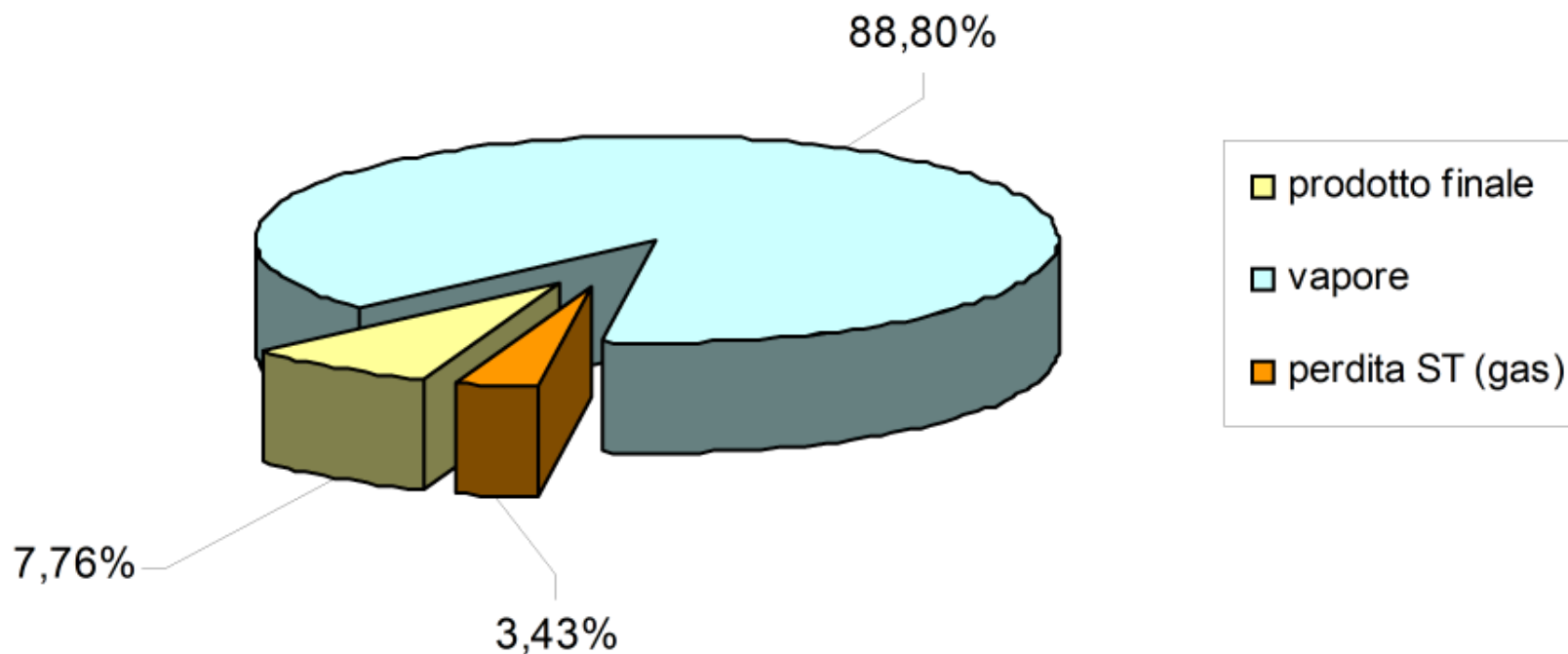
The temperature was very variable with values up to 60 ° C and generally decreasing towards the end of the cycle.

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

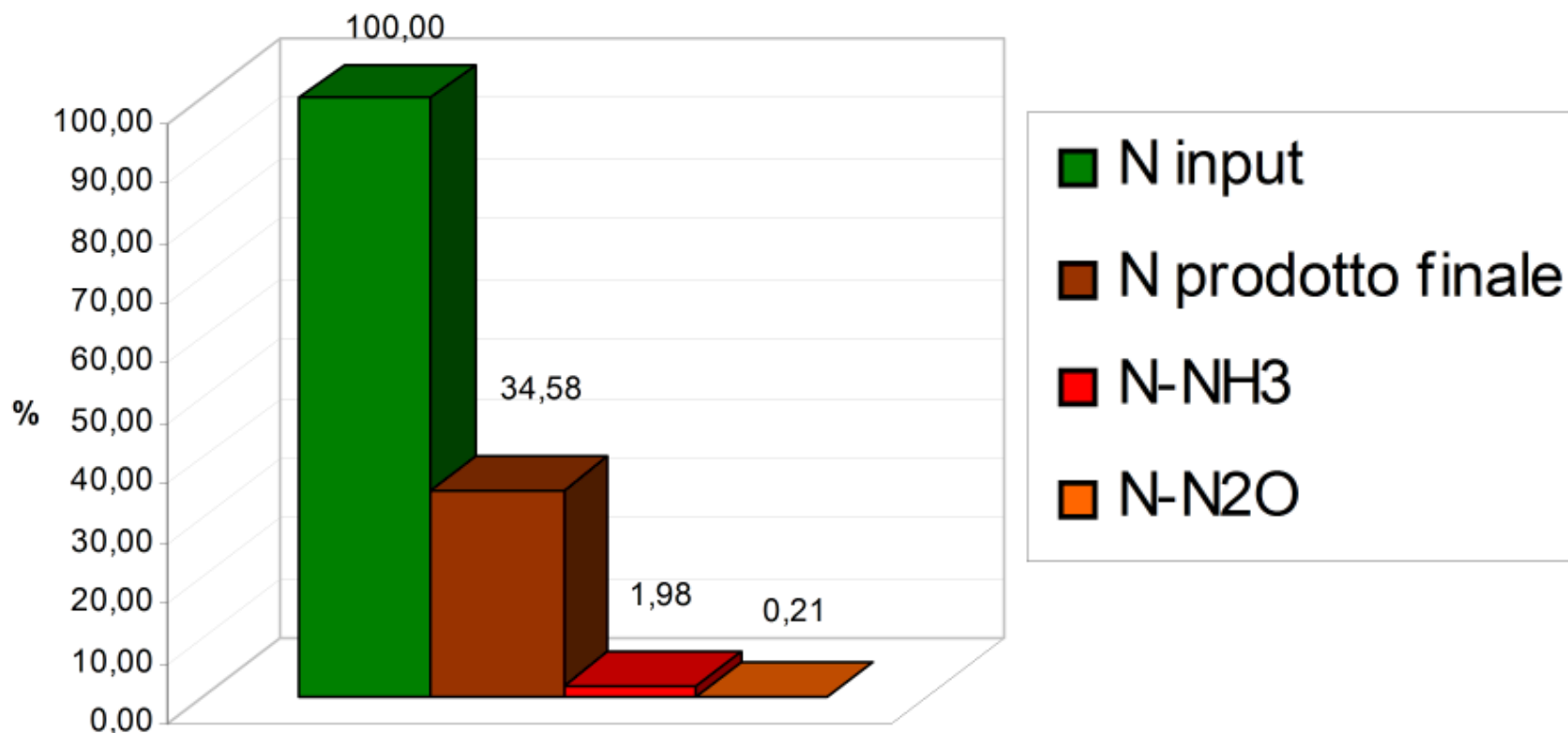


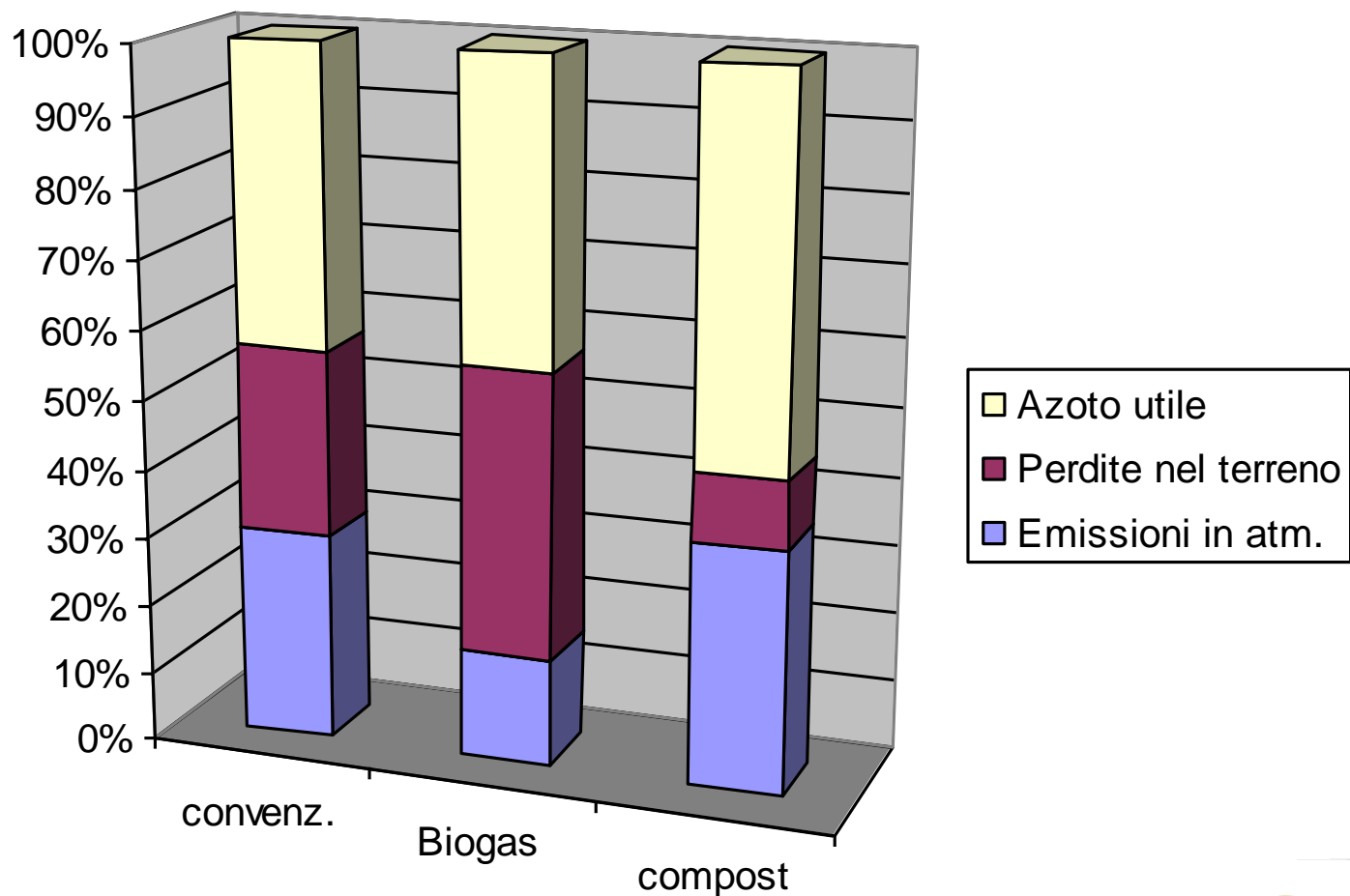


## Mass reduction : 80-90%



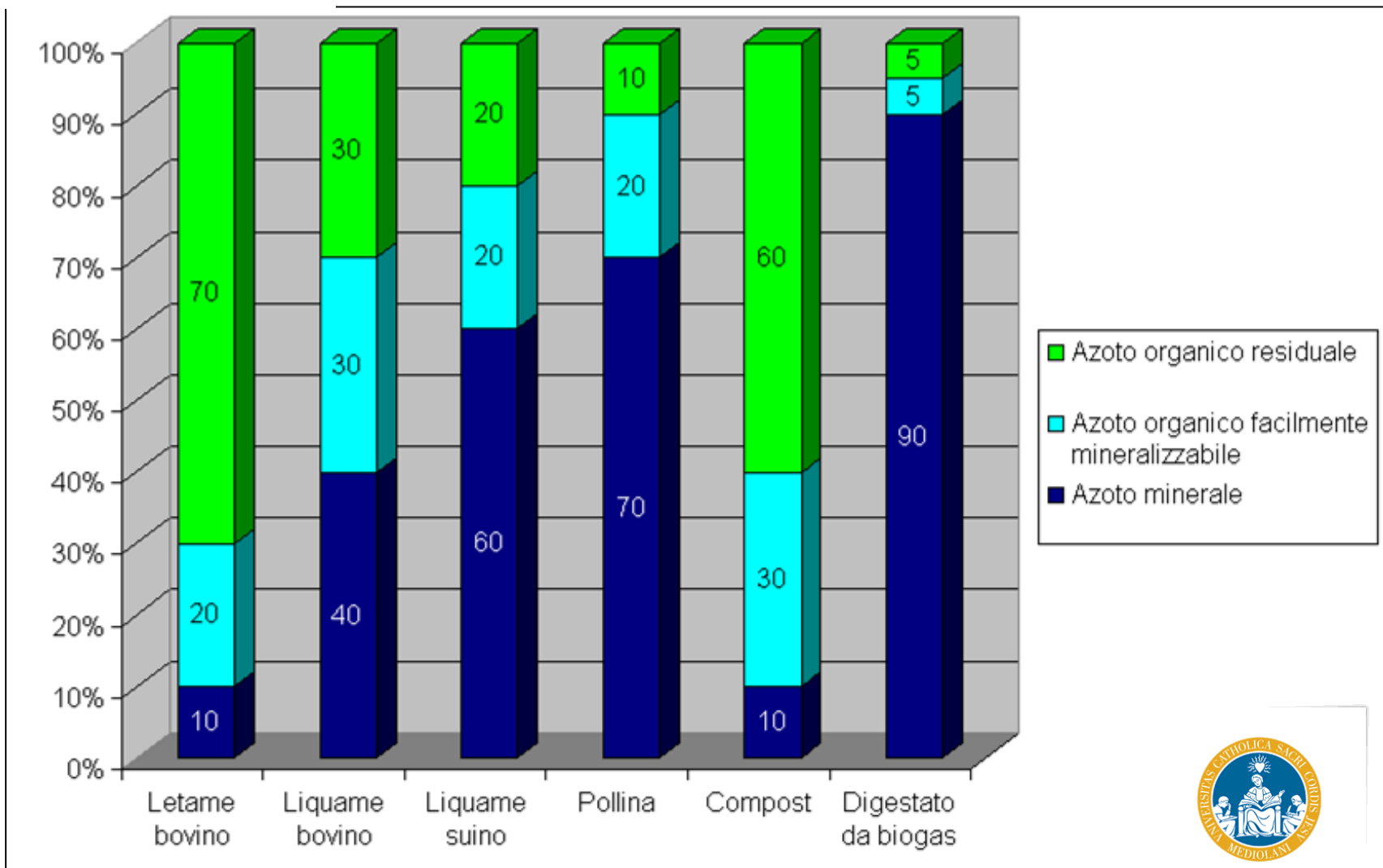
## Nitrogen reduction : 60-70%







Parametri	U. di M.	Compost	Limiti. D.L. 748/84
Acidità	pH	7,57	6-8,5
Umidità totale	%	57,96	<50%
Densità apparente	g/cm <sup>3</sup>	0,7	-
Carbonio totale	% s.s.	35,6	>25%
Acidi umici e fulvici	% s.s.	10,71	>7%
Azoto totale Kjeldhal	% s.s.	2,78	-
Azoto organico	% s.s.	2,43	-
Azoto organico sul totale	%	87,41	-
C/N		12,58	<25
salinità	meq/100g	126,27	-
Pb	mg/kg s.s.	< 0.5	<140
Cd	mg/kg s.s.	< 0.5	<1,5
Ni	mg/kg s.s.	7,71	<100
Zn	mg/kg s.s.	147,8	<500
Cu	mg/kg s.s.	32,5	<230
Hg	mg/kg s.s.	0,02	<1,5
K totale	% s.s.	1,33	-
P totale	% s.s.	0,83	-
Ceneri	% s.s.	29,01	-
sostanza volatile	% s.s.	70,99	-



*Prof. Ermes Frazzi ingegneria agraria Università di Piacenza*



UNIVERSITÀ  
CATTOLICA  
del Sacro Cuore

# Restructuring effect

Using the fertilizer as a compost guarantees a gradual release of nutrients, in particular nitrogen, to the soil. It is an established fact that, compared to the total nitrogen contained in the compost, 10-15% is readily available mineral nitrogen, 10-20% is nitrogen which is mineralized during the first year of cultivation and 65 -85% is reserve nitrogen which remains in the soil.



# THE FUNCTION OF HUMUS IN THE SOIL.

ENERGY

FERTILITY




ENVIRONMENT

LANDSCAPE



# AEROBIC BIODIGESTION

**is a process of transformation:**

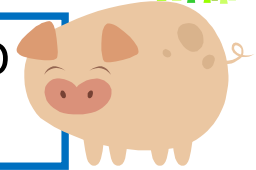
- ❖ organic       carried out by means of microorganisms
- ❖ aerobic       occurs in the presence of oxygen
- ❖ termophil       develops heat

**The heat developed permits to reach temperatures which can:**

- accelerate the transformation process,
- evaporate large amounts of water,
- sanitize the material from unwanted microbial, animal or vegetable presences.



## BOVINE AND SWINE LIQUID AND SOLID EXCREMENTS



## LIQUID AND SOLID POULTRY AND RABBIT EXCREMENTS



## ORGANIC REFLUE, SLUDGES AND DIGESTATES COMING FROM BIOGAS AND FROM FOOD INDUSTRY





# RESULTS

**To reduce reflue volume from 1 to 7 and 1 to 10 of the initial volume**

**To reduce nitrates (over 65%)**

**To reduce the need for land**

**To obtain precious organic substance**



*From diamonds nothing is  
born, from manure flowers are  
born.*

*F. De Andrè - Via del campo*

# BIOGEST

Technologies for nature

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