



ASSOLOMBARDA  
Confindustria Milano Monza e Brianza

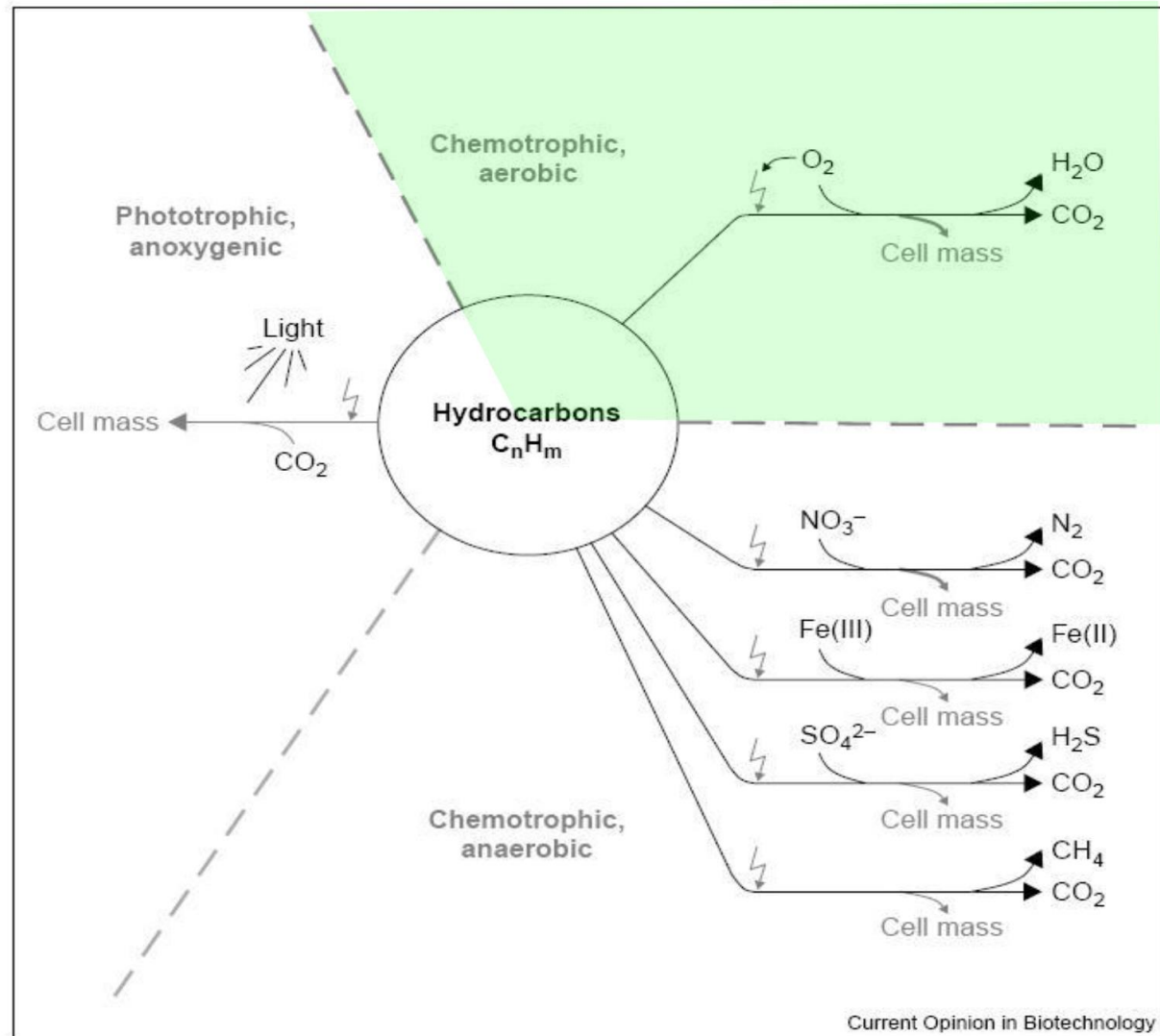
# Marcatori molecolari per il monitoraggio dei processi di biodegradazione in ambienti contaminati

Speaker

Andrea Franzetti

29 giugno 2016

# Processi biodegradativi



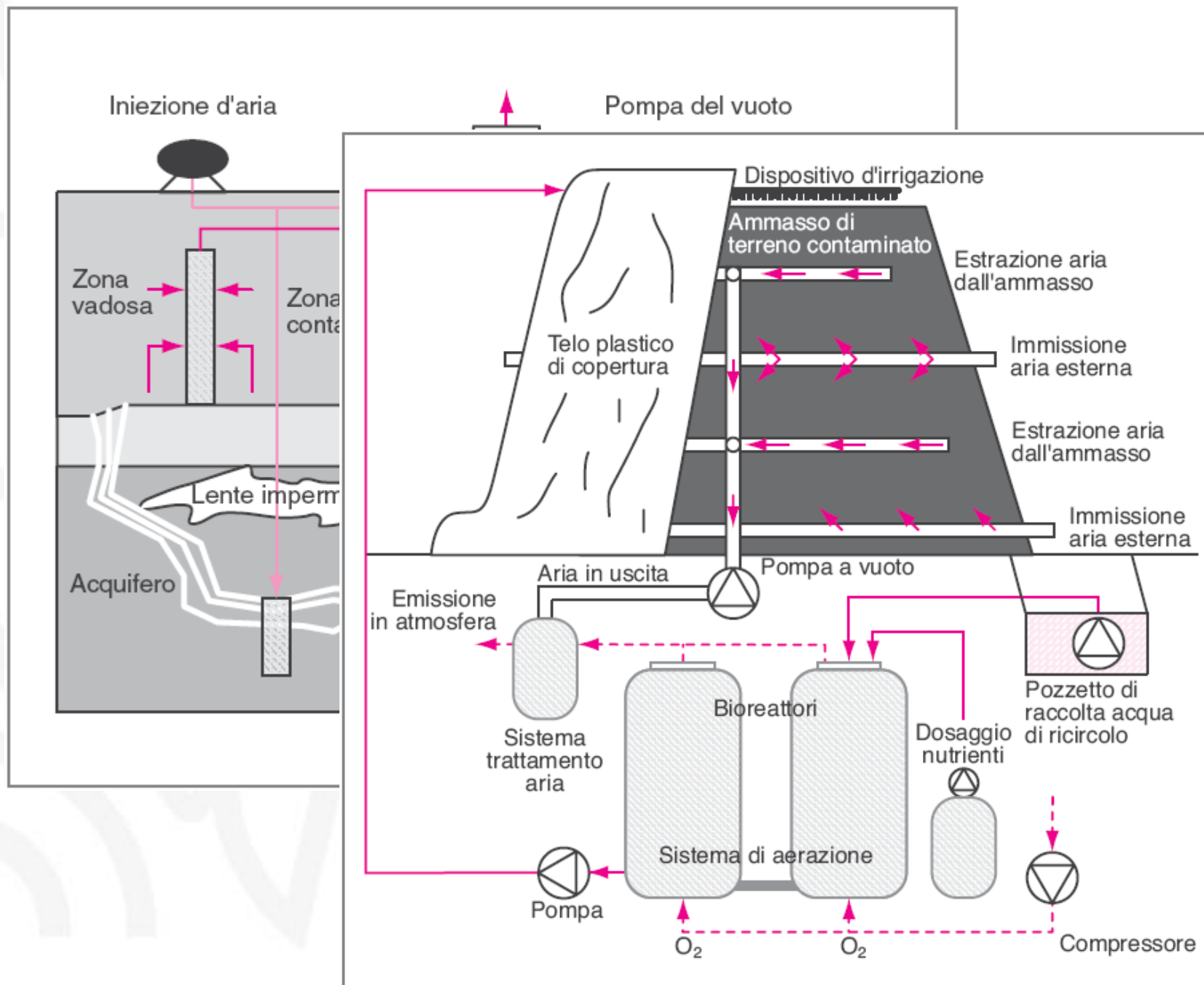
# Le tecniche di biorisanamento

***LA BIODEGRADAZIONE DEI CONTAMINANTI PUÒ AVVENIRE  
NATURALMENTE NELL'AMBIENTE (ATTENUAZIONE NATURALE).....***

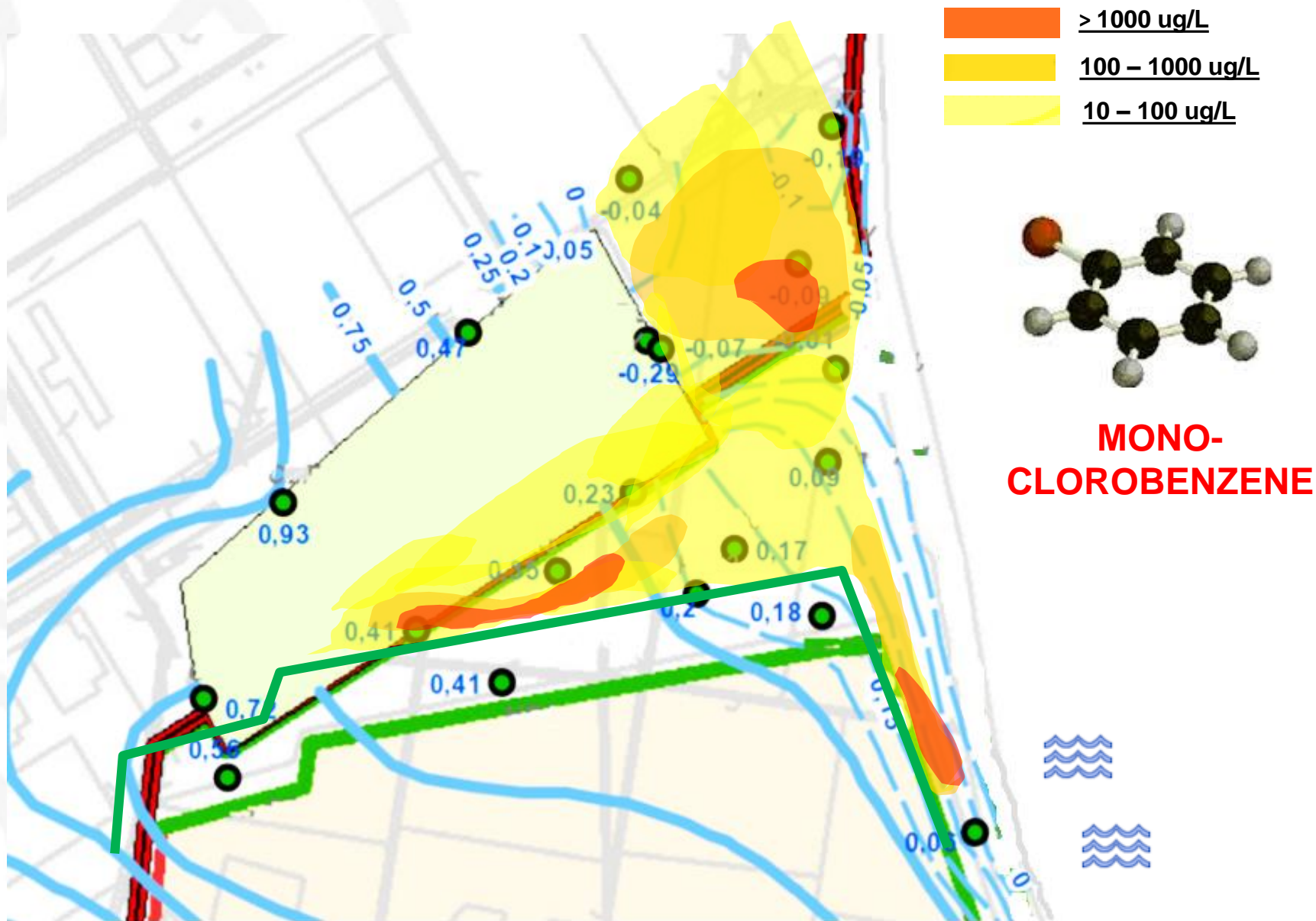
***.... MA CIASCUNO DEI FATTORI CHE INFLUENZANO LA  
BIODEGRADAZIONE PUÒ RALLENTARE/BLOCCARE IL  
RISANAMENTO***



***LE TECNOLOGIE DI BIORISANAMENTO:  
INDIVIDUARE + SUPERARE I FATTORI LIMITANTI***



# Il monitoraggio chimico in situ



# Il monitoraggio dei processi microbiologici

- *Valutare preventivamente la propensione al risanamento biologico*
- *Identificare i processi biologici attivi nel sito*
- *Valutare la risposta delle comunità microbiche alla stimolazione*
- *Seguire il destino e la persistenza di popolazioni microbiche inoculate nel sito o impianto*



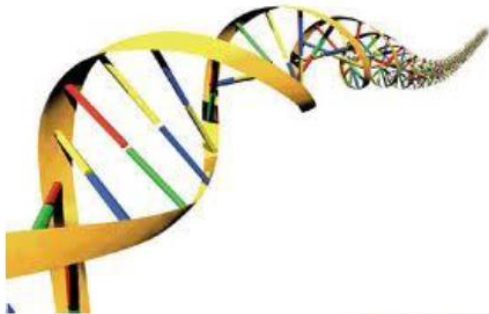
**MAGGIORE CONOSCENZA DEI PROCESSI: CAPACITA' DI INTERVENTO E SUPPORTO ALLE DECISIONI**

# Le tecniche di analisi microbiologica

## ***TECNICHE MICROBIOLOGICHE***



***METODI DI BIOLOGIA MOLECOLARE***



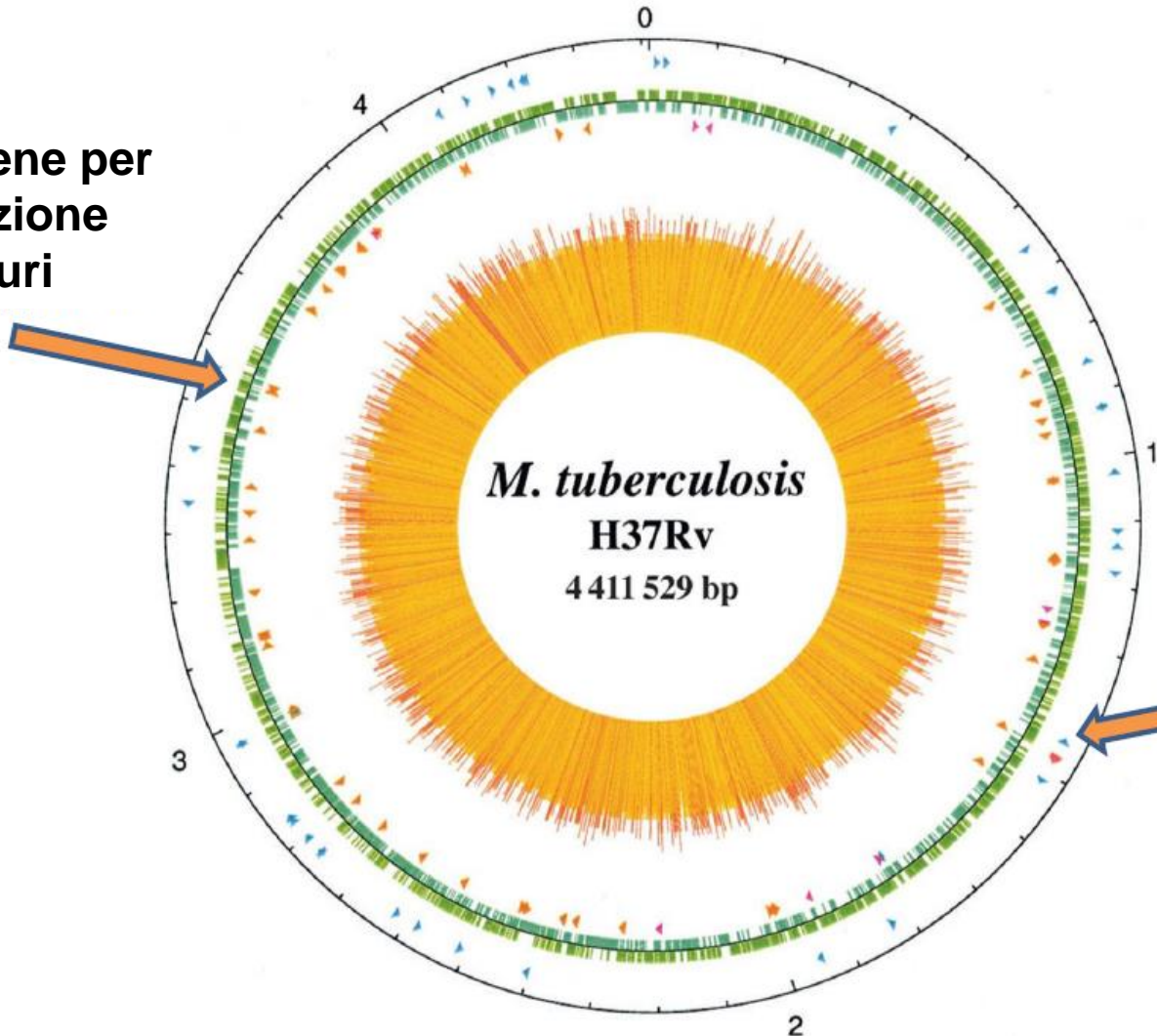
***TECNICHE BASATE SU COLTIVAZIONE***





# I target molecolari

*alkB* – gene per  
degradazione  
idrocarburi



16S rDNA  
– gene per  
l'identifica  
zione

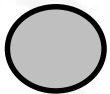
Julian Parkhill



# High Throughput Sequencing

Quali batteri?

Illumina  
ultrasequencing



DNA



PCR 16S rRNA gene

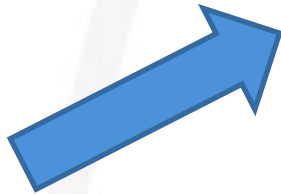
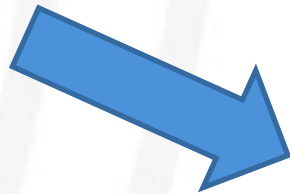
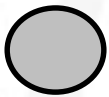


Illumina

Sequenziamento

# Metodi: qPCR

Quanti batteri?



DNA



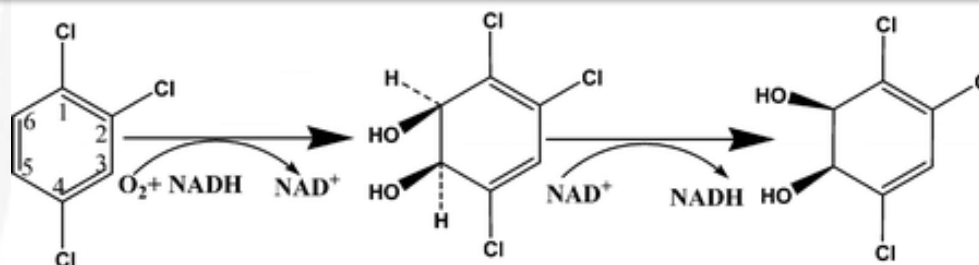
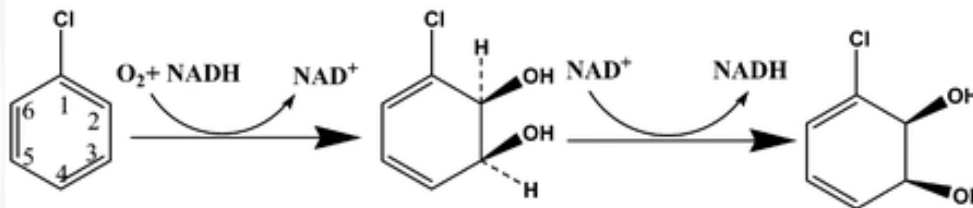
qPCR: quantitative  
Polymerase Chain  
Reaction.



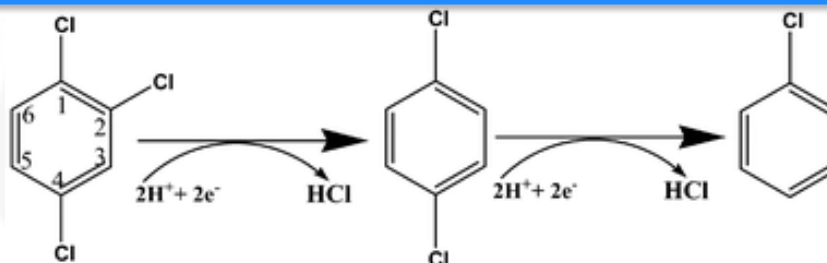
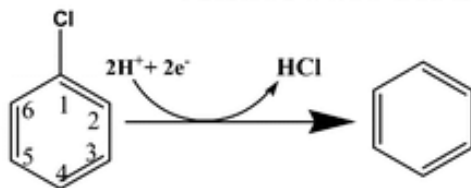
qPCR

# Caso di studio: falda contaminata da monoclorobenzene

## Aerobic Oxidation

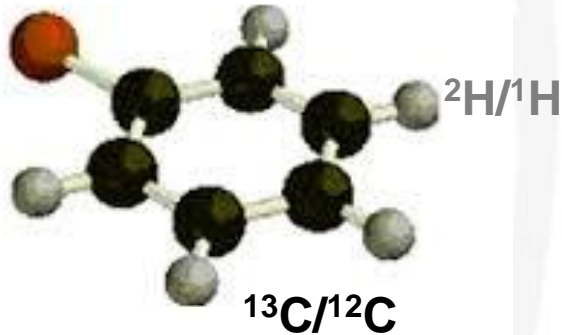


## Anaerobic Reductive Dechlorination



# MCB e CSIA

$^{37}\text{Cl}/^{35}\text{Cl}$

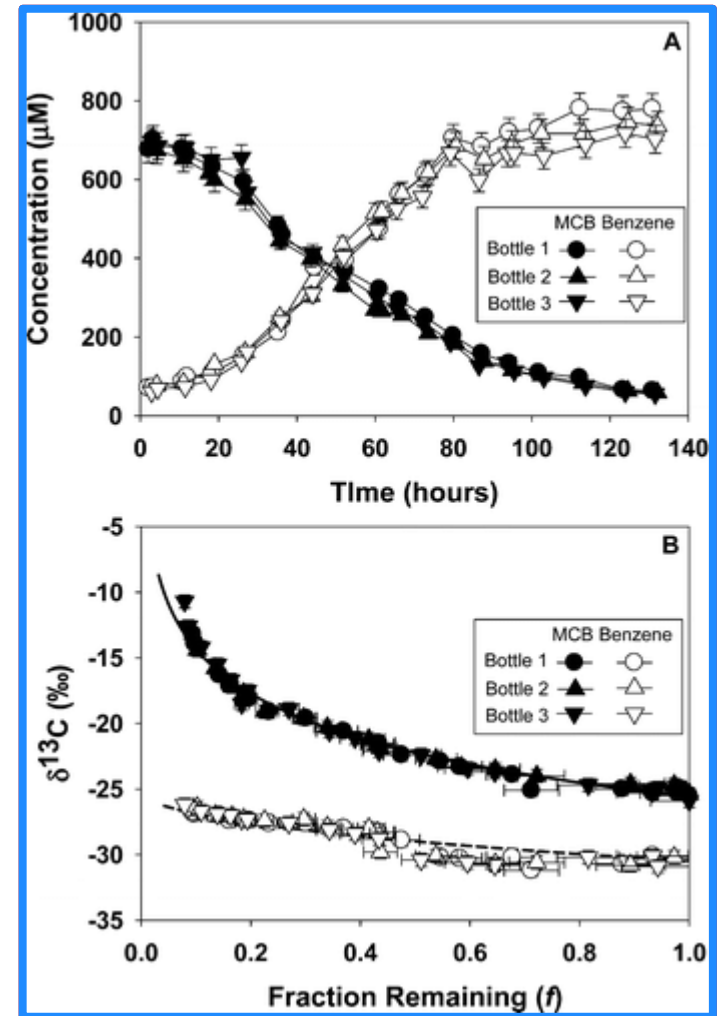


**AEROBICA**  $\text{C}_6\text{H}_5\text{Cl} (\text{O}_2) \rightarrow \text{CO}_2$

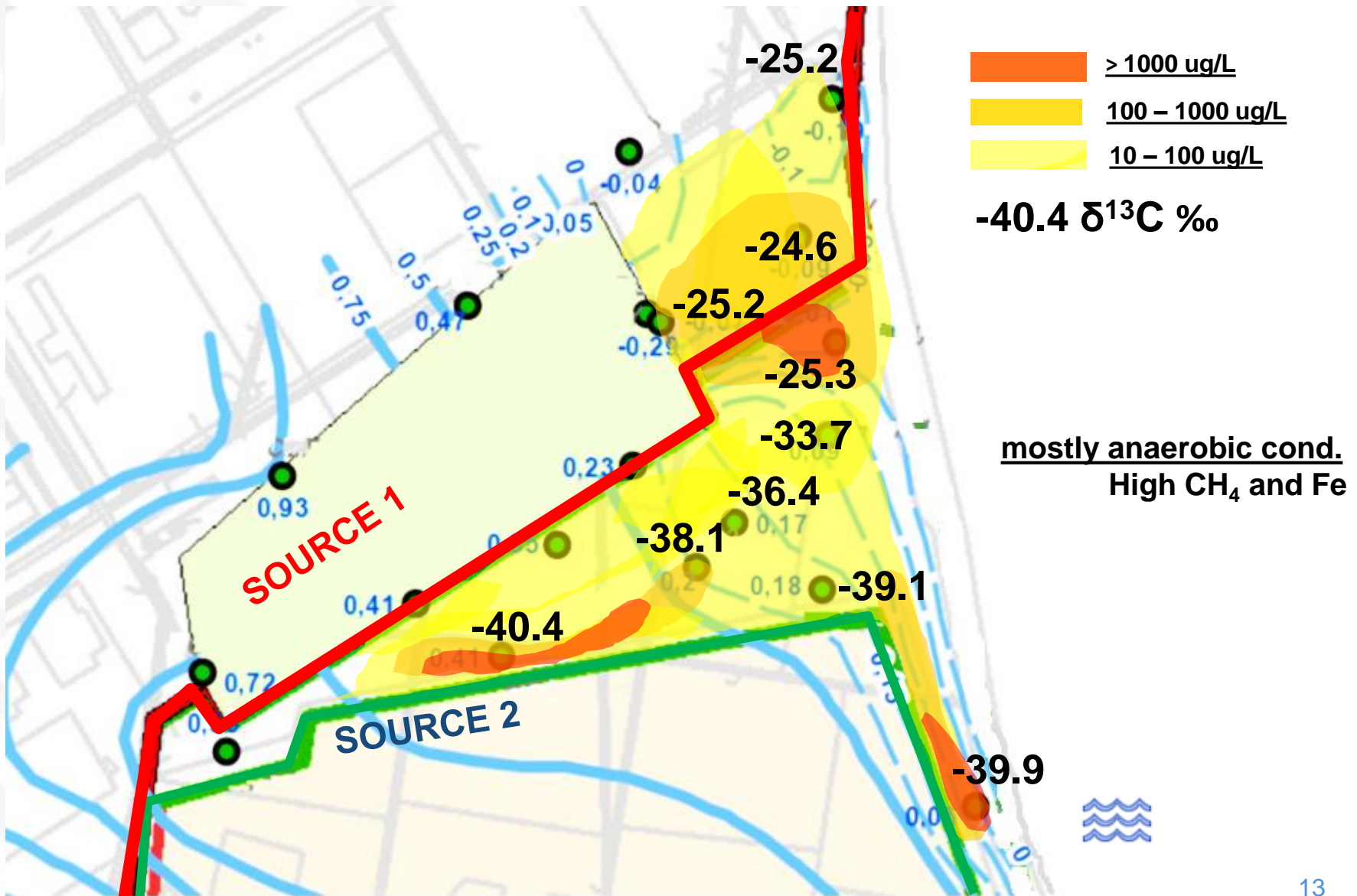
No arricchimento  $^{13}\text{C}$

**ANAEROBICA**  $\text{C}_6\text{H}_5\text{Cl} \rightarrow \text{C}_6\text{H}_6$  (benzene)

Arricchimento  $^{13}\text{C}$  approx. -5 ‰



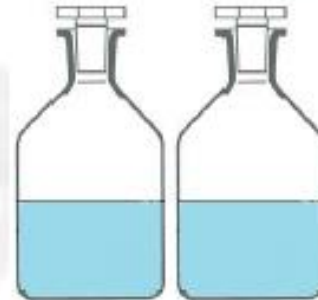
# Caso di studio



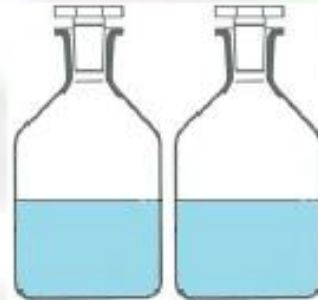
# Caso di studio



**Water sampling**

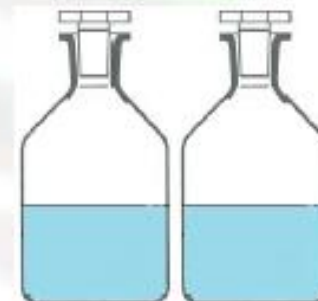


**O<sub>2</sub>**



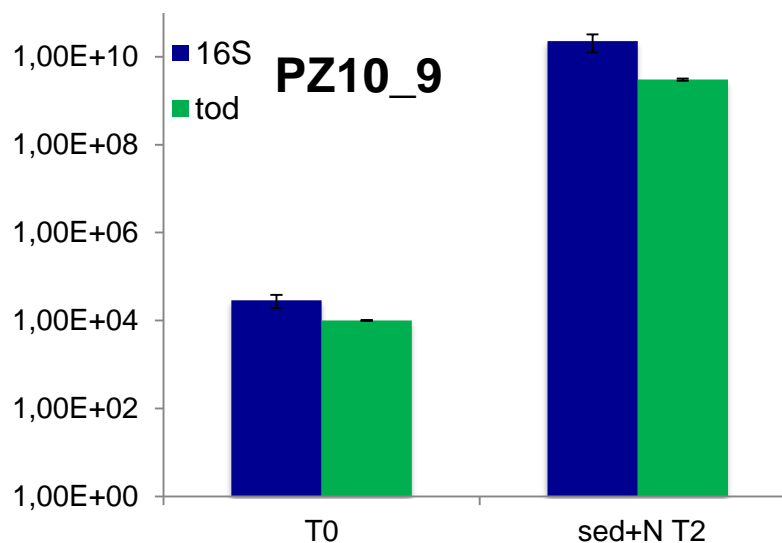
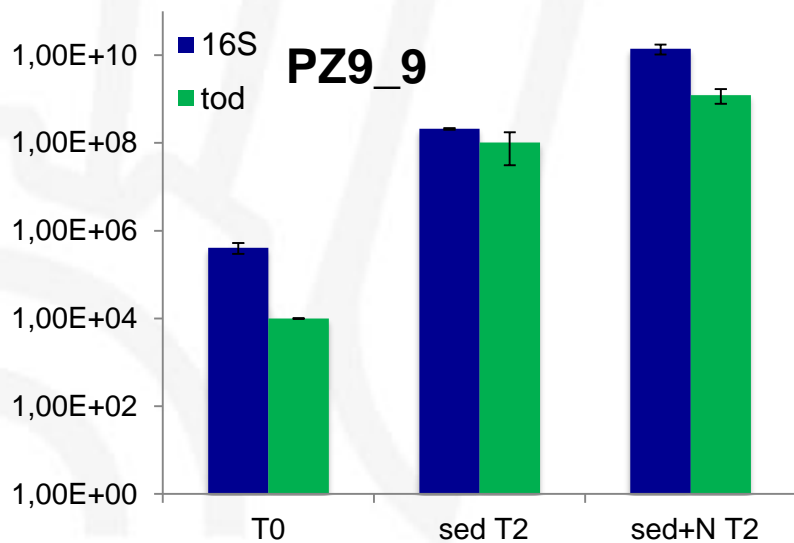
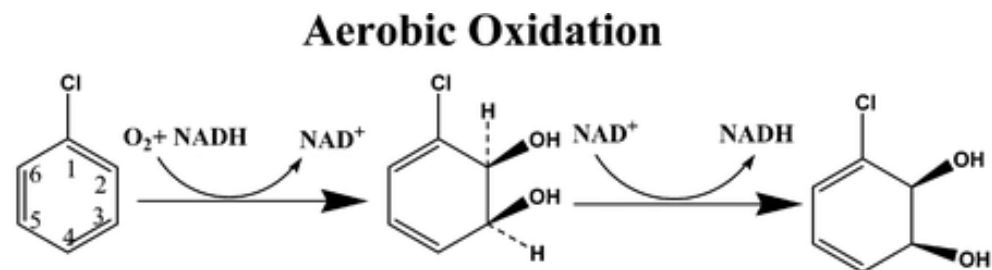
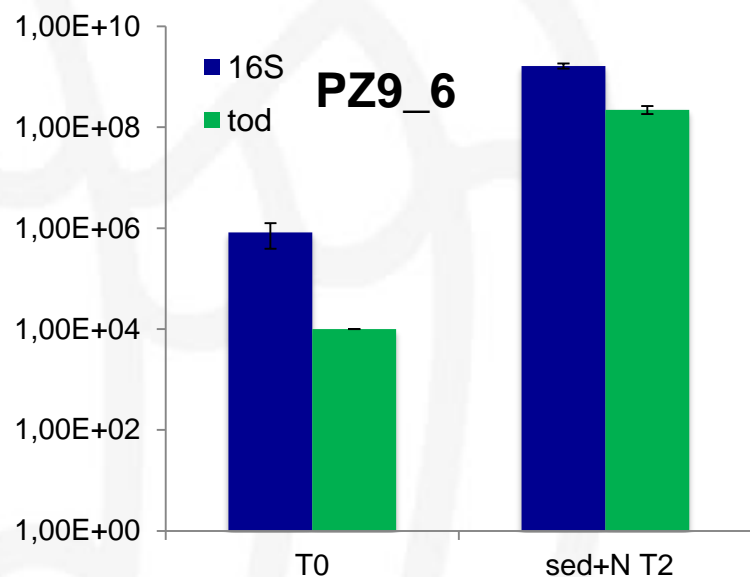
**O<sub>2</sub>**

**N, P**

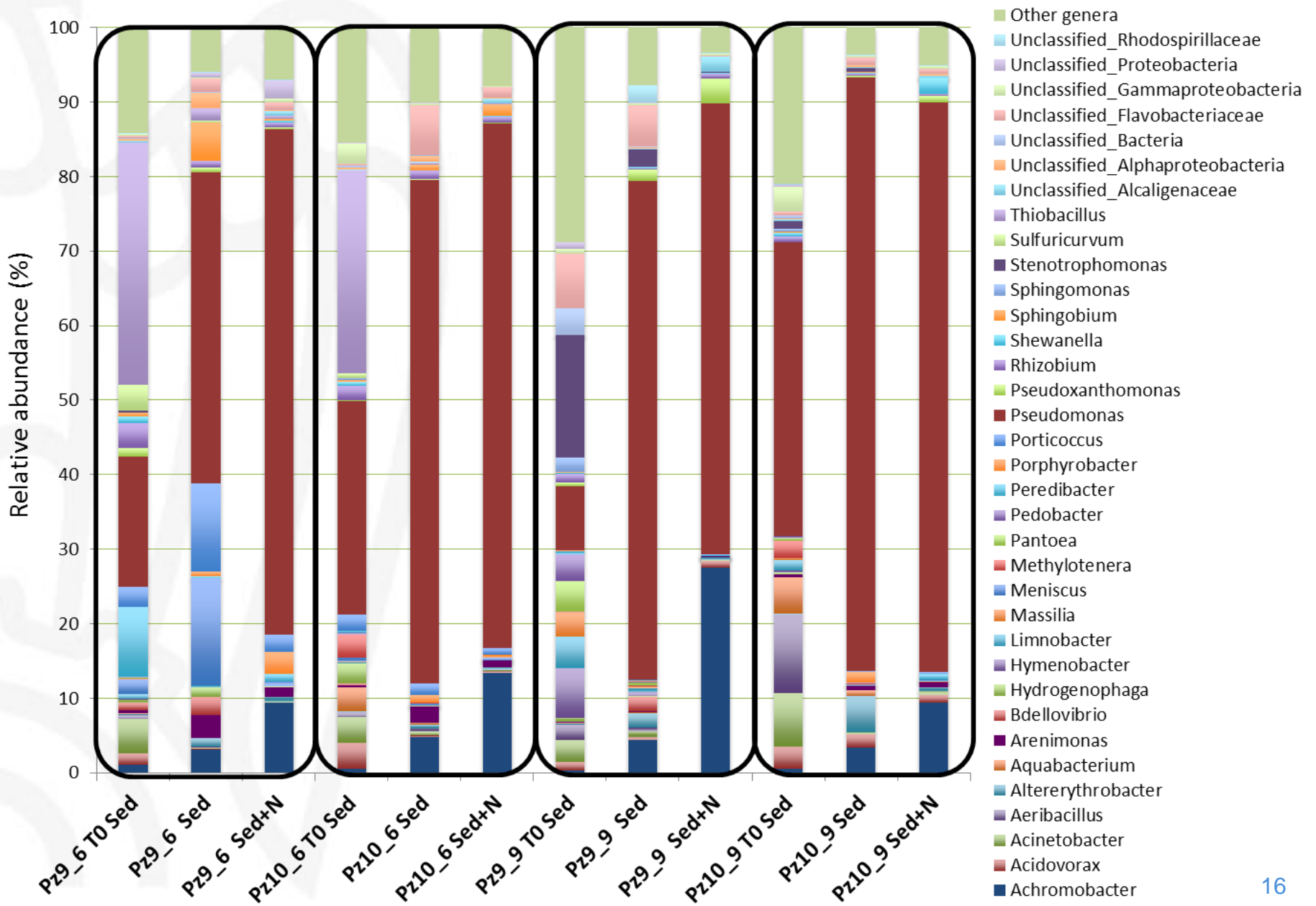


**STERILE**

# Caso di studio









# Grazie per la vostra attenzione!



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