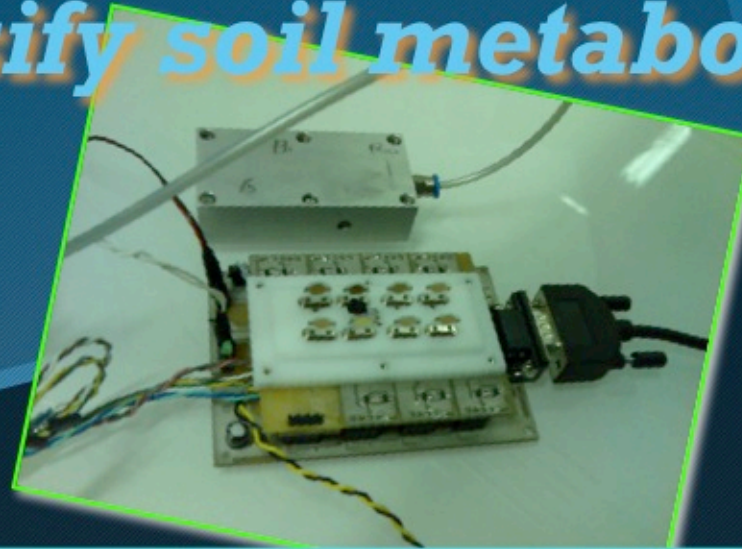




Electronic Nose technology to measure soil microbial activity and classify soil metabolic status



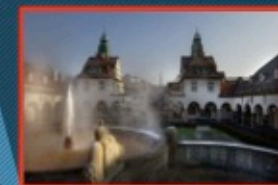
**F. De Cesare^{1,2}, E. Di Mattia³, S. Pantalei², E. Zampetti²,
V. Vinciguerra¹, A. Macagnano²**

¹*Department for Innovation in Biological, Agro-food and Forest Systems, University of Tuscia, Viterbo (Italy)*

²*Institute for Microelectronics and Microsystems - CNR, Rome (Italy)*

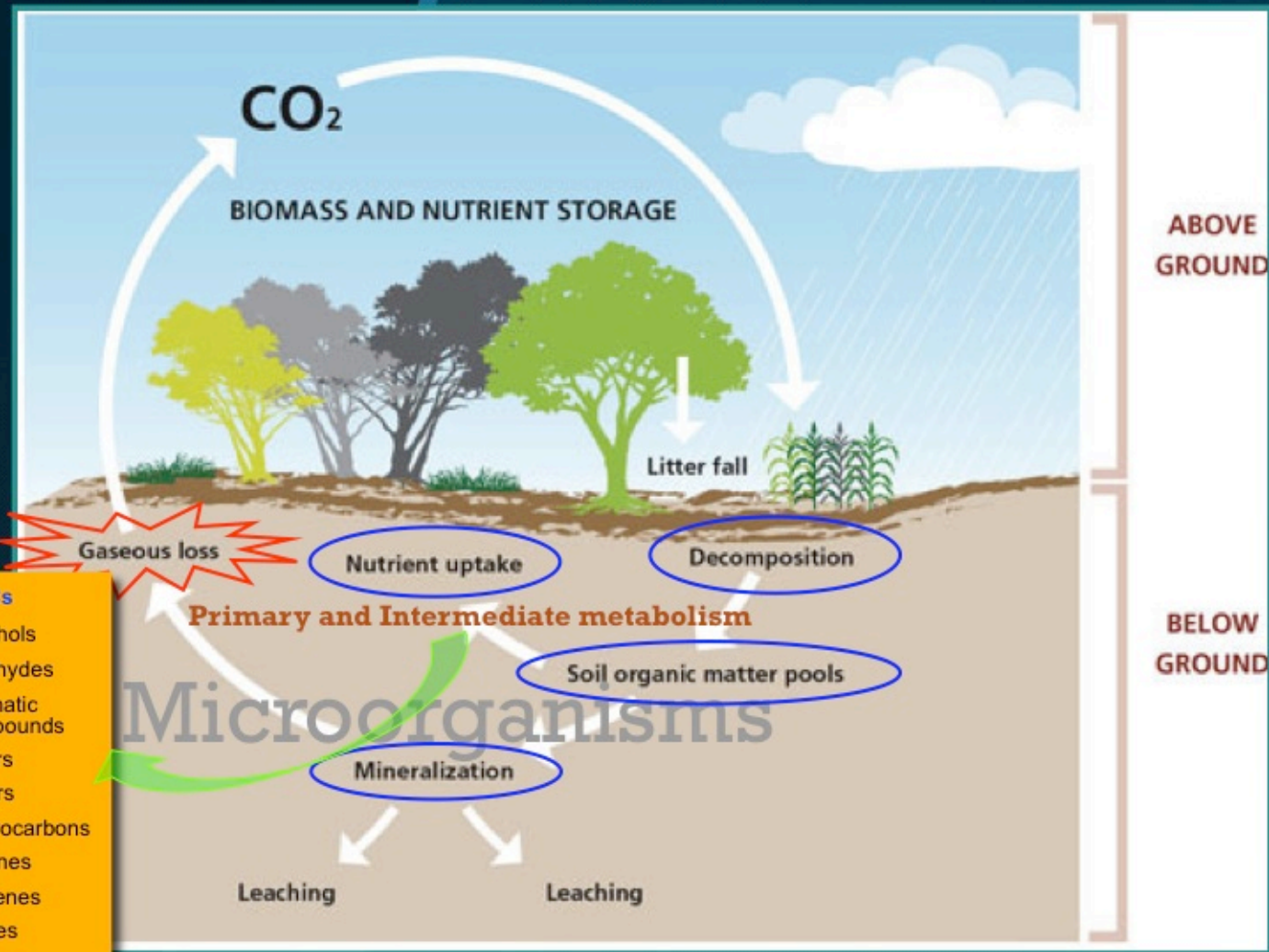
³*Department of Agriculture, Forests, Nature and Energy, University of Tuscia, Viterbo (Italy)*

Enzymes in the Environments: Activity, Ecology and Applications - July 2011





NATURAL EMISSIONS FROM SOIL TO ATMOSPHERE

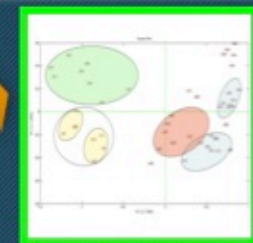
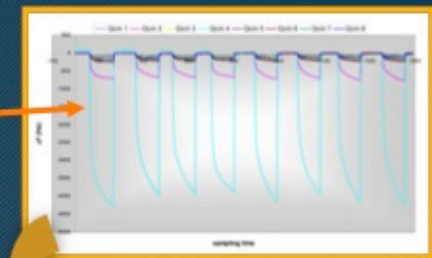
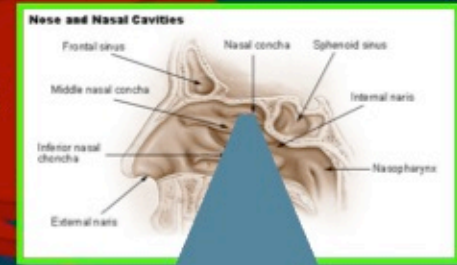


GAS	VOCs
CO ₂	Alcohols
CH ₄	Aldehydes
NO _x	Aromatic compounds
N ₂	Esters
NH ₃	Ethers
	Hydrocarbons
	Ketones
	Terpenes
	Nitriles
	Sulfides



What is an *Electronic Nose (EN)*?

It's a sensing device mimicking the olfactory system of mammals

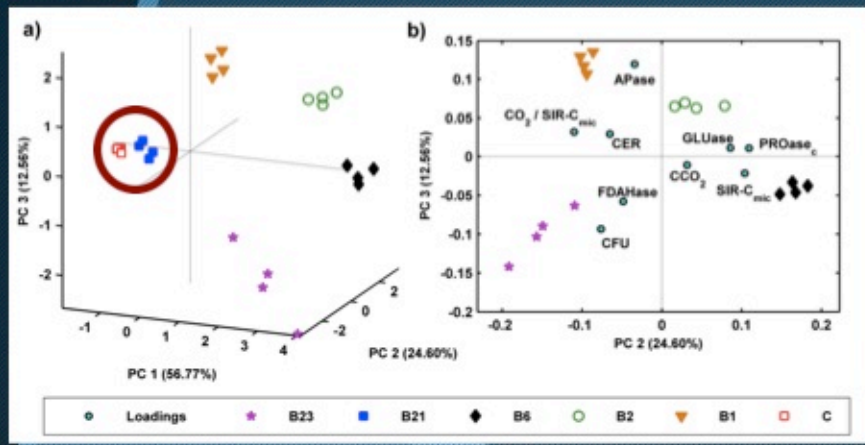
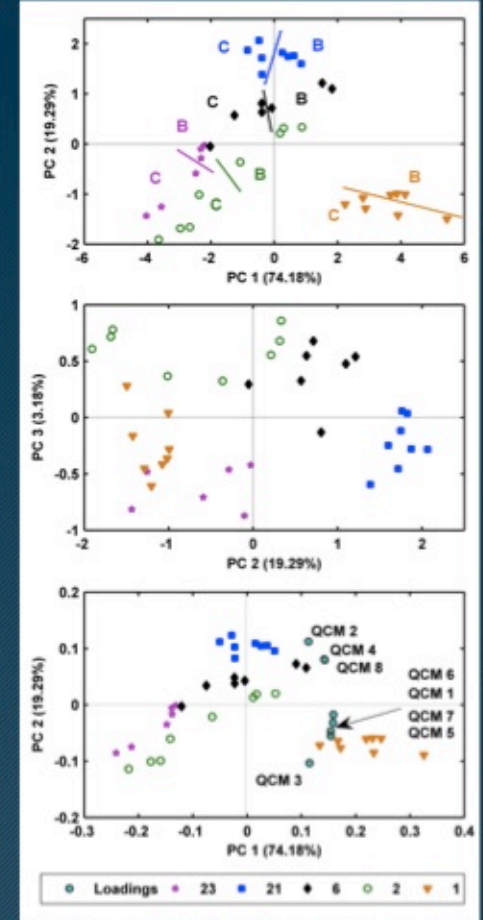
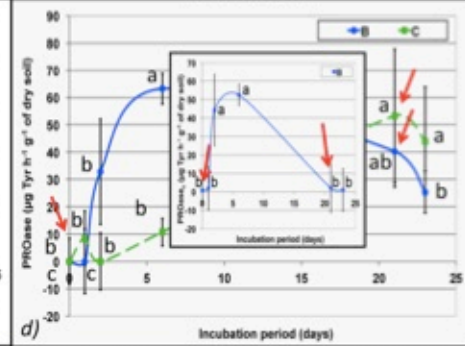
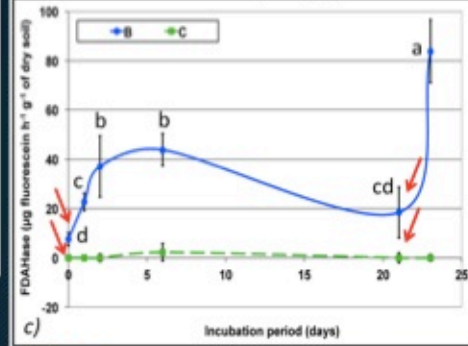
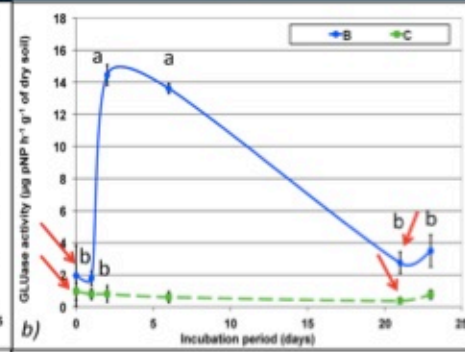
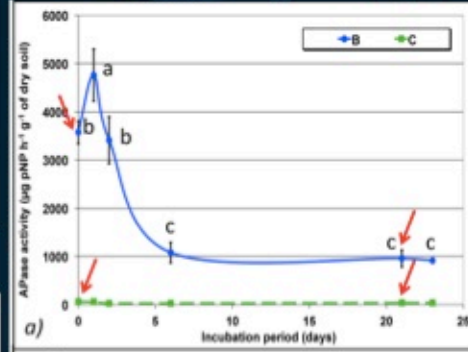
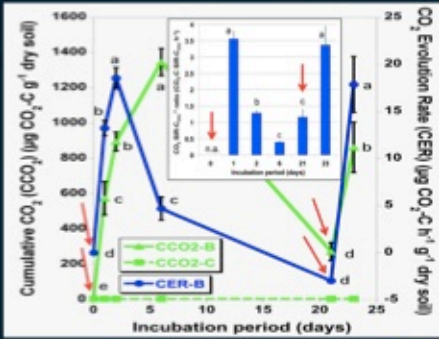
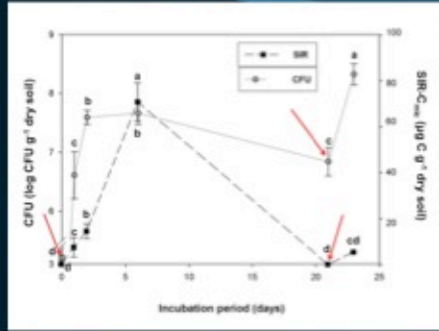


Features:

1. It consists of a sensor *array* capable of perceiving volatile organic compounds (VOCs) and gases present in atmosphere and heaspce of samples (the *odour*).
2. The sensing capacity of *ENs* derives from: 1) changes in the properties of sensors in the array or in their sensitive coating films induced by chemical, physical and phisico-chemical interactions with analytes; 2) transduction of such variations into electric signals; 3) data ~~processing~~ of these electric signals altogether to supply an *olfactory fingerprint*, which is specific for the analysed sample.
3. Typically, sensors in *ENs* are commonly unspecific for single analytes, but they are selective for classes of chemicals (*cross-reactivity*).



RESULTS-1



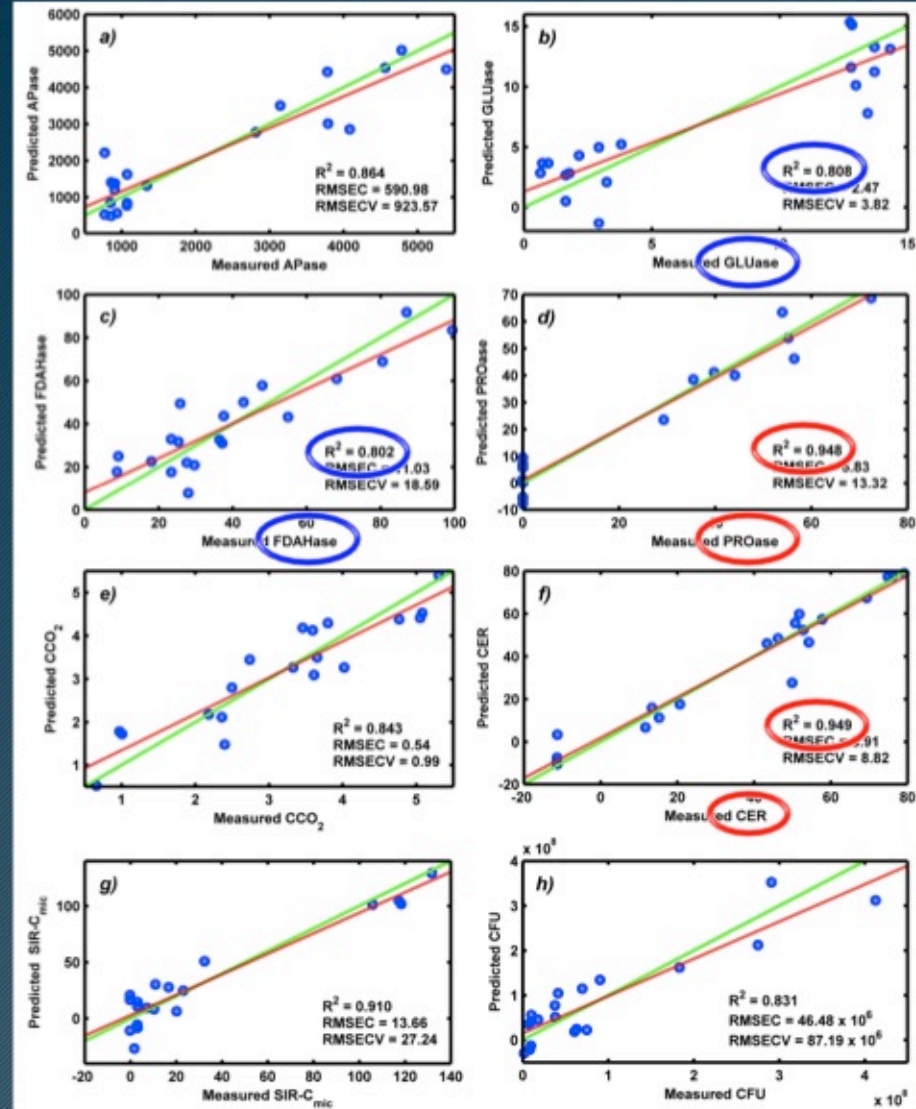
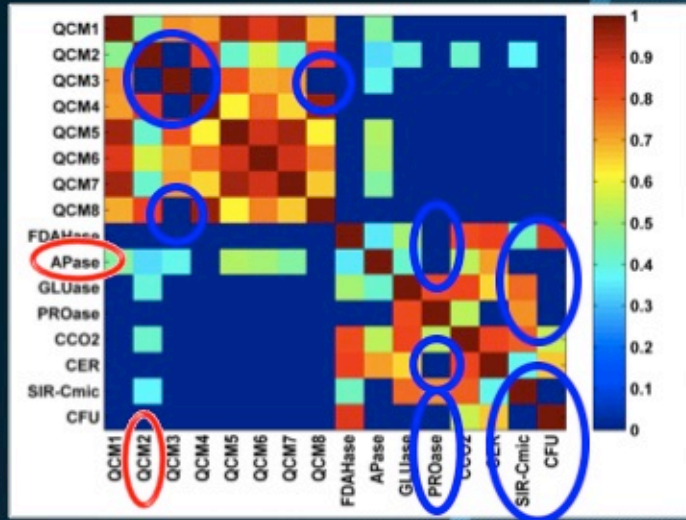
Microbial measurements

EN measurements



RESULTS-2

Microbial and EN measurements





RESULTS-3

