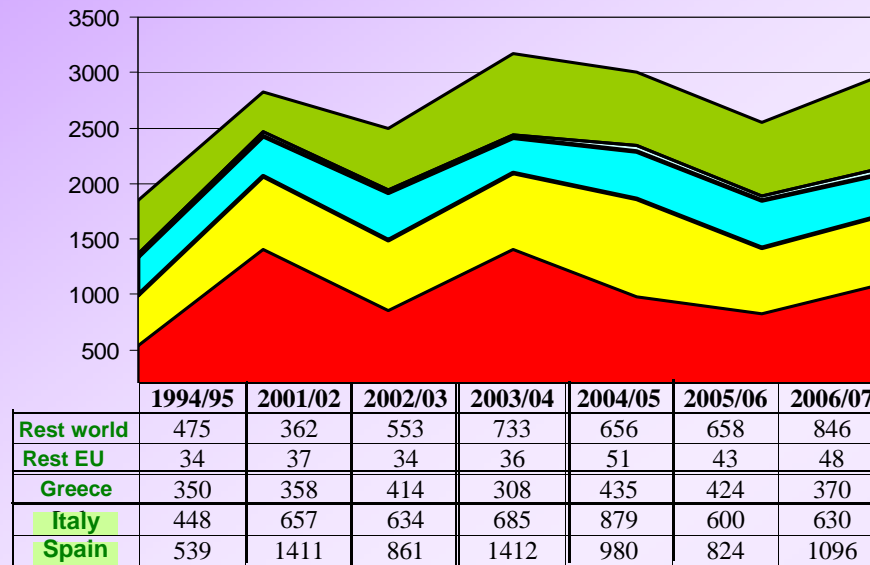


Effect of olive mill wastes on the microbial ecology of soil



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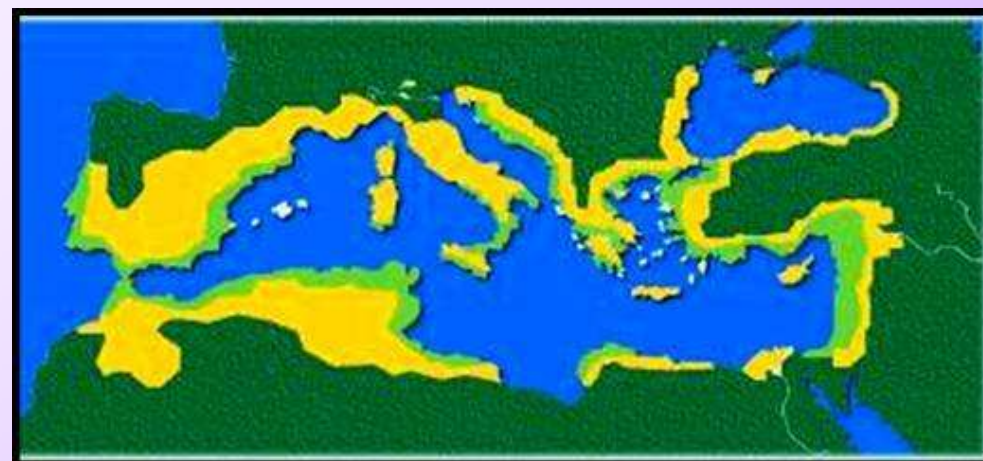
Olive oil production



Fuente: COI and M.A.P.A.



Olive oil industry
in the Mediterranean area



Olive mill residues

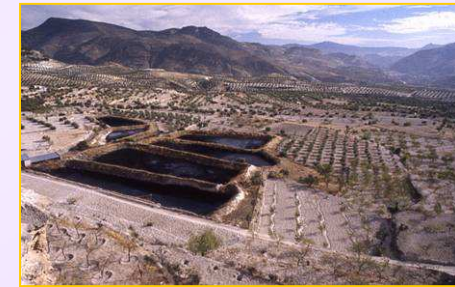


TWO PHASES



Consumption of water

Olive mill wastewater



Evaporation of olive mill wastewater



OLIVE OIL

ALPEORUJO



3.200.000 tons of alpeorujo

Orujo oil



DRY OLIVE RESIDUE (DOR)

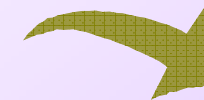
USES OF DOR

Energy production

- Incineration
- Electrical energy



Ruminant feeding



Fertilizers

Compost of DOR



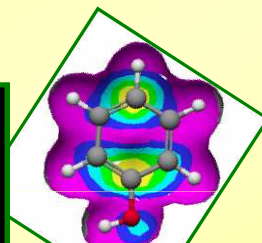
Valorization for extraction of high added-value products

- Hydroxytyrosol
 - Pectin
- Pharmaceutical and food industry

Olive mill residues toxicity



DOR (Dry Olive Residue)



Phenols
Volatile fatty acids
Alcohols



TECHNOLOGIES THAT
MINIMISE
THEIR ENVIRONMENTAL IMPACT

**BIOLOGICAL
PHYSICAL**

**METHODS for
elimination or transformation of
olive oil residues**

**Microorganisms possessing the ability to degrade
phytotoxic substances**

Saprobe fungi

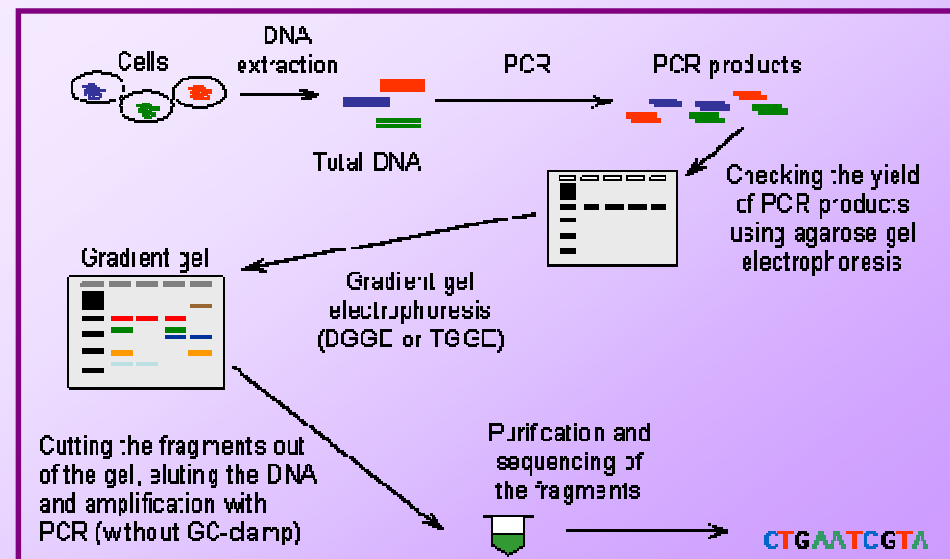
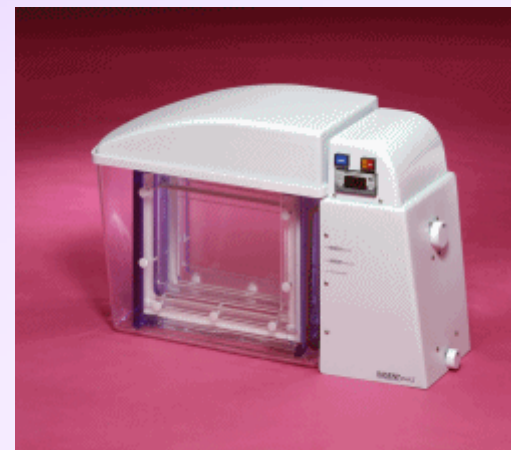
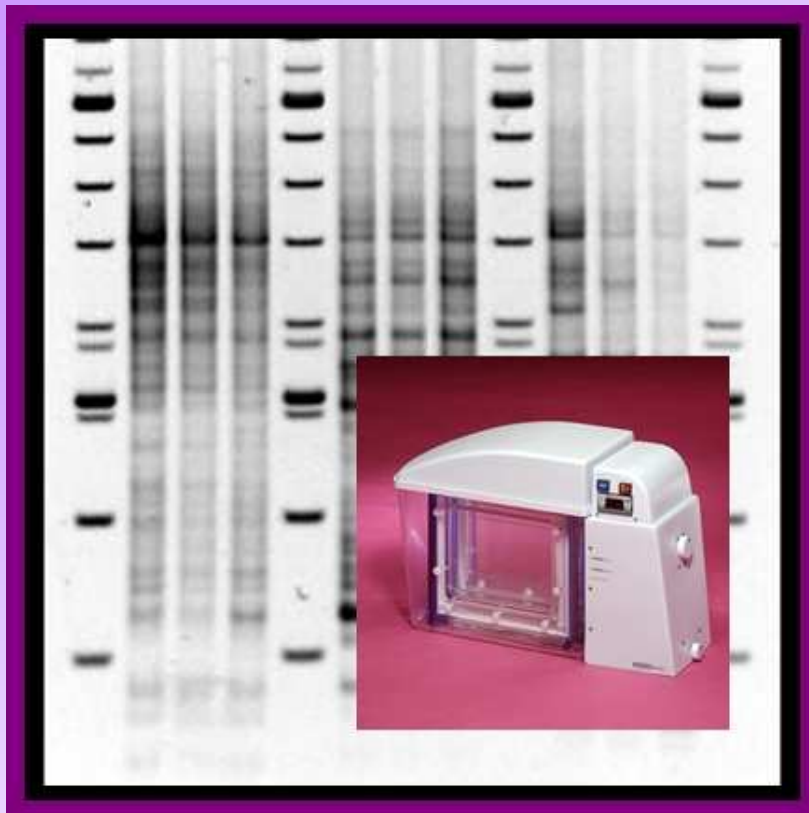


Trametes versicolor



Pycnoporus cinnabarinus

- ➔ Mobilize nutrients
- ➔ Degrade phytotoxic substances
- ➔ Enable plants to optimise their use of nutrients



OBJECTIVE



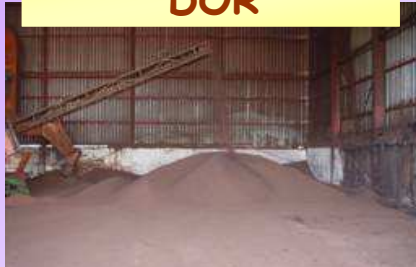
The aim of this study were to investigate the effect of DOR addition onto soil on both diversity and structure of the resident bacterial and to assess the impact of this waste, which either had undergone aqueous extraction or colonization with the white-rot fungus *Phlebia* sp. DABAC9 on enzymes soil and indigenous microbiota.



Material and methods

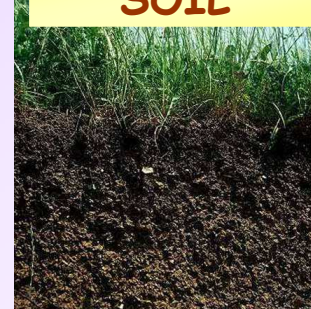


DOR



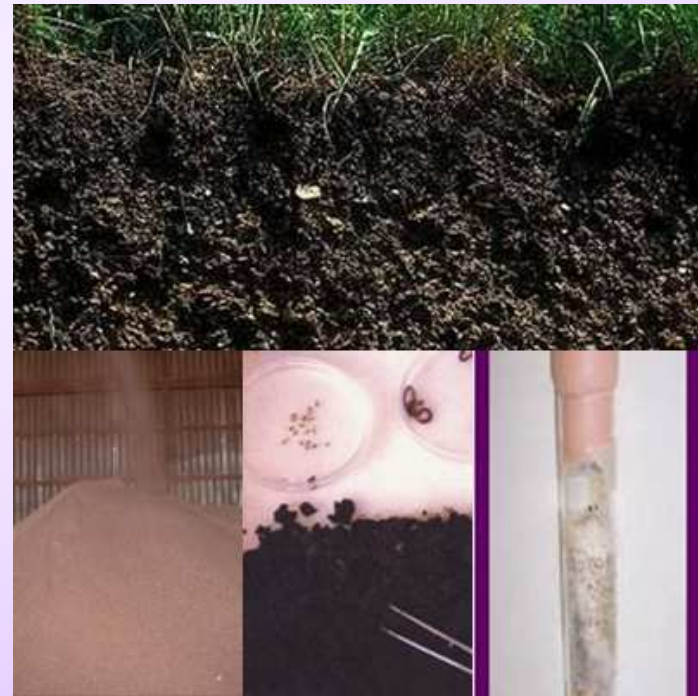
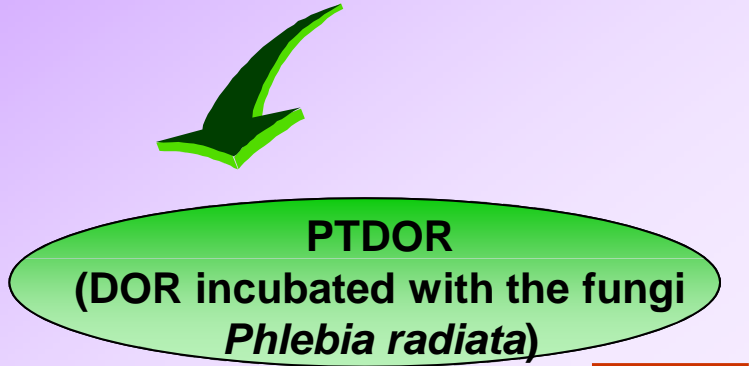
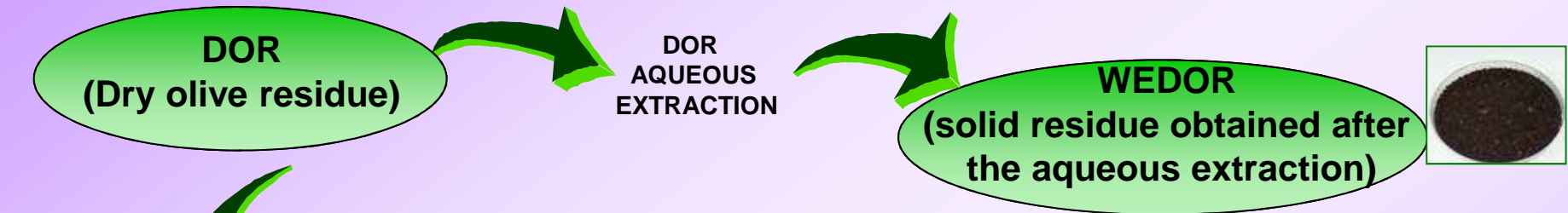
pH	5,33
TEC (g/kg)	226,6
Humic Acids (g/kg)	117,9
Fulvic Acids (g/kg)	21,3
N (g/kg)	18,72
K (g/kg)	30,54
Na (g/kg)	0,17
Mg (g/kg)	3,82
Ca (g/kg)	13,61
P (g/kg)	2,11
Fe (g/kg)	1,12
Cu (mg/kg)	68,97
Zn (mg/kg)	65,24
Mn (mg/kg)	46,51
Hemicellulose (g/100g DOR)	9,97
Cellulose (g/100g DOR)	17,09
Lignin (g/100g DOR)	24,36
Total phenols (g/kg)	26

SOIL



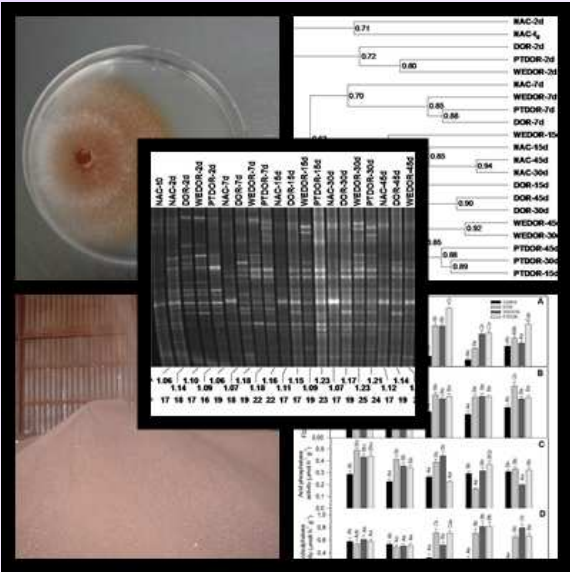
Sand: 65%
Silt: 23%
Clay: 13%
WHC 25,5%
pH 6,4
Total organic carbon: 1,5%
Total nitrogen: 0,15%
Available phosphorus: 16 mg/kg

Material and methods



DOR WEDOR PTDOR

Material and methods



DGGE of bacterial communities

- Fluorescein diacetate hydrolysis
- Aryl Sulphatase
- Acid Phosphatase
- Dehydrogenase

Impact of DOR treated with saprobe fungi on the enzymatic activities of soil

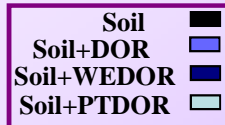
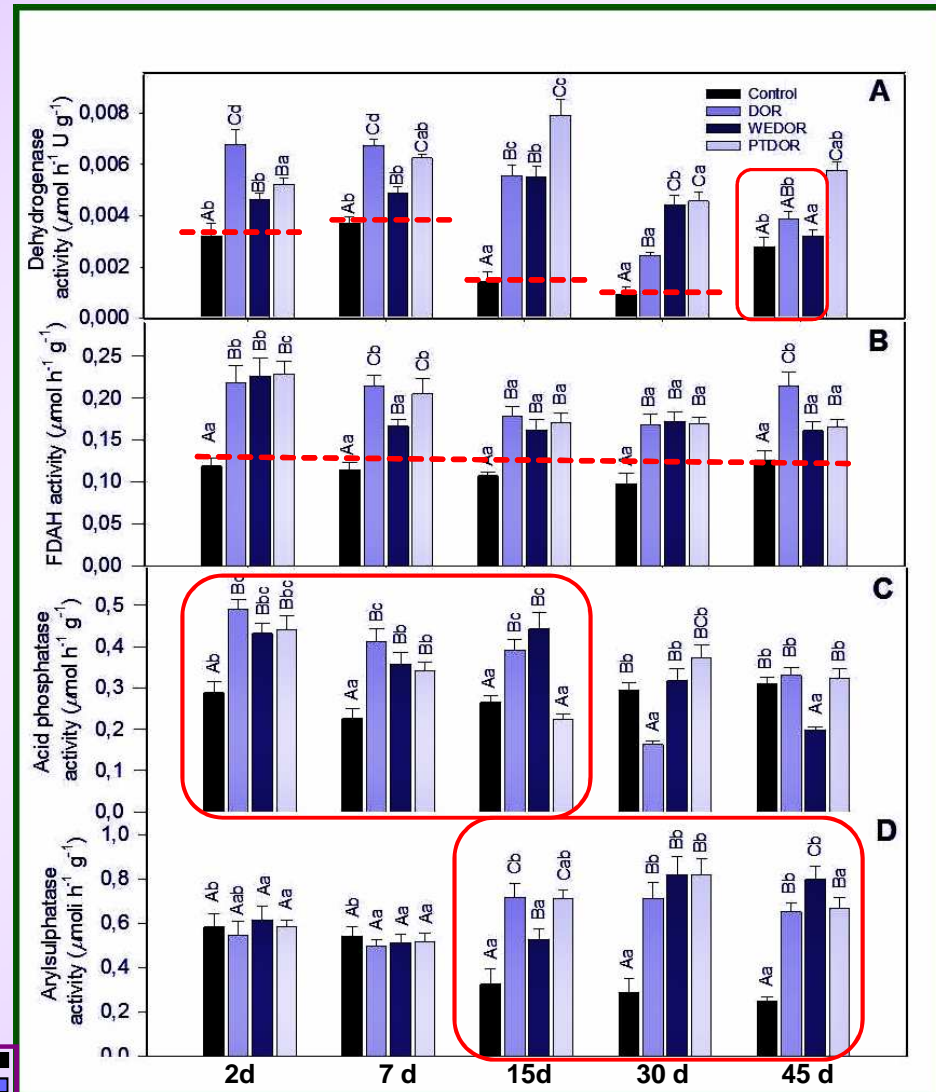


Dehydrogenase

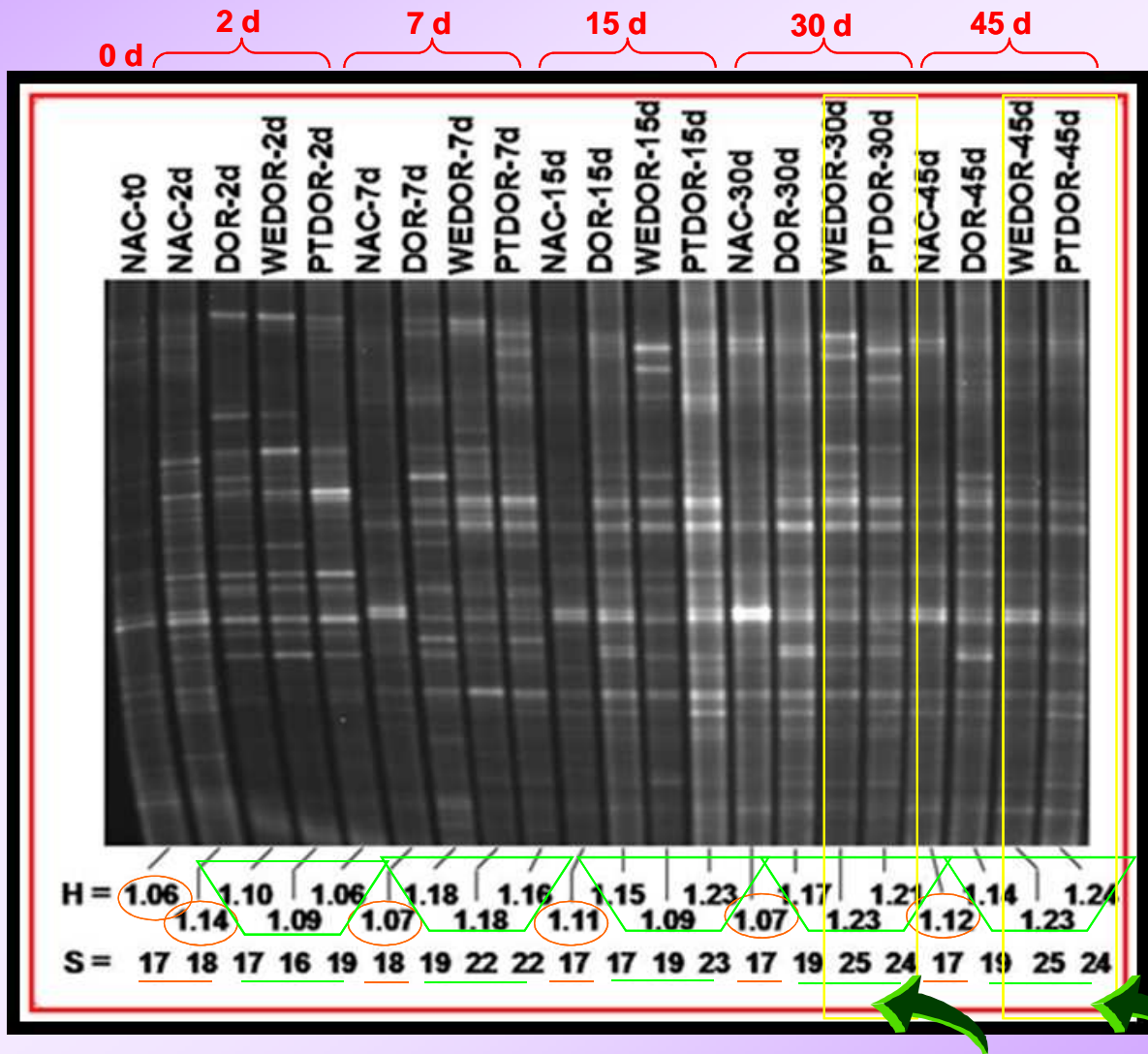
Fluorescein diacetate hydrolysis

Acid Phosphatase

Arylsulphatase

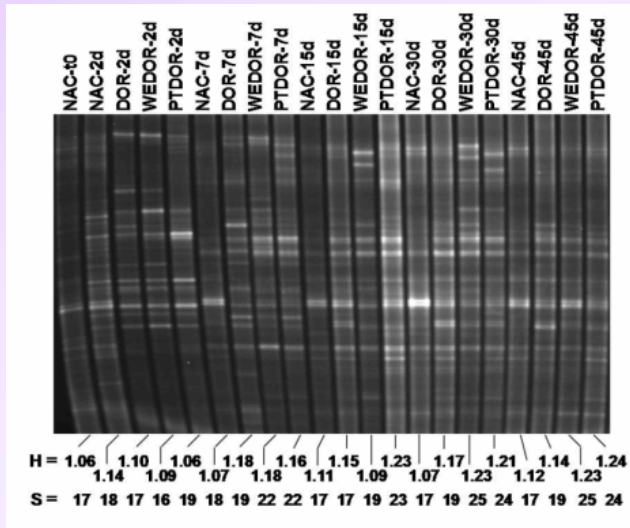
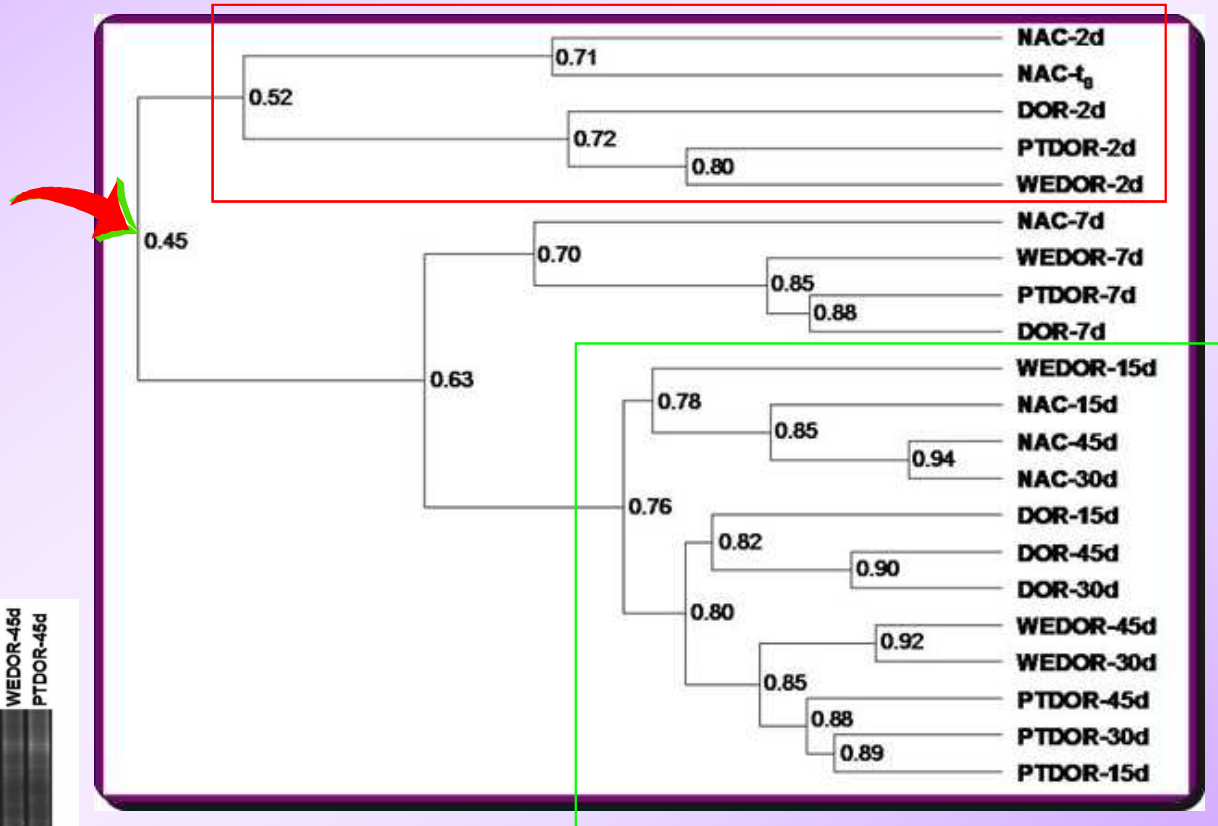


Effect of DOR on microbial community profile and diversity



- NAC: control soil
- Soil_DOR
- Soil_WEDOR
- Soil_PTDR

Effect of DOR on microbial community profile and diversity



Conclusions



The overall microbial activity was stimulated by the amendments as indicated by the higher activity levels of both dehydrogenase and fluorescein diacetate hydrolase.



The untreated DOR at the application level used is not a toxic to soil microorganisms.



The biodiversity of bacterial communities was unaffected or positively affected by the DOR amendments; the incubation time, however, had a dominant effect over treatment typology.



The DOR pre-treatments aimed at removing potentially toxic compounds may not be necessary.

APPLICATION OF DGGE



DGGE

Provide a rapid means of
investigating soil microbial
communities

Diversity of the microbial
communities in soils and
their response to different
agronomic purposes



Designing possible pre-
treatments of amendants
and subsequent application
strategies





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Prof. Investigación



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Inma García Romera
Investigador Científico



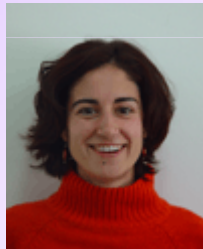
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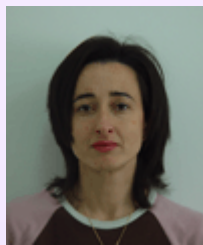
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