Title: CHARACTERISATION OF MICROBIAL ENDOPHYTES, THEIR APPLICATION IN SYMBIOTIC AGRICULTURE AND THEIR USE FOR THE PRODUCTION OF FUNCTIONAL FOOD.

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Plants

RED MUSTARD (*Brassica juncea*)

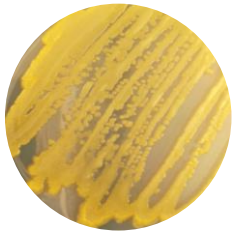
LETTUCE (*Lactuca sativa*)

BULL'S BLOOD (*Beta vulgaris*)

Beneficial bacteria

Streptomyces sp.

Pseudomonas sp.



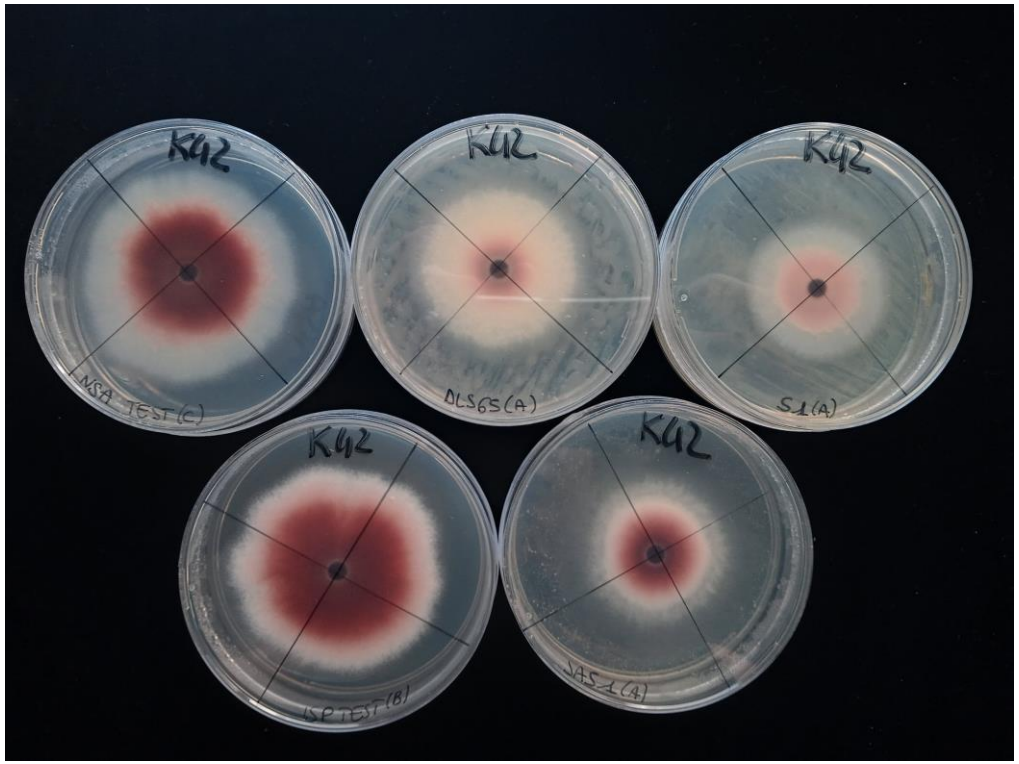
Pantoea sp.

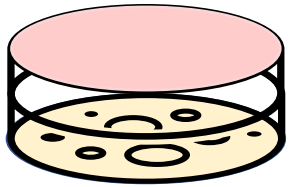
Fungal pathogen

Fusarium oxysporum f.sp. *lactucae*

Plant protection from fungal pathogens: VOCSs mediated

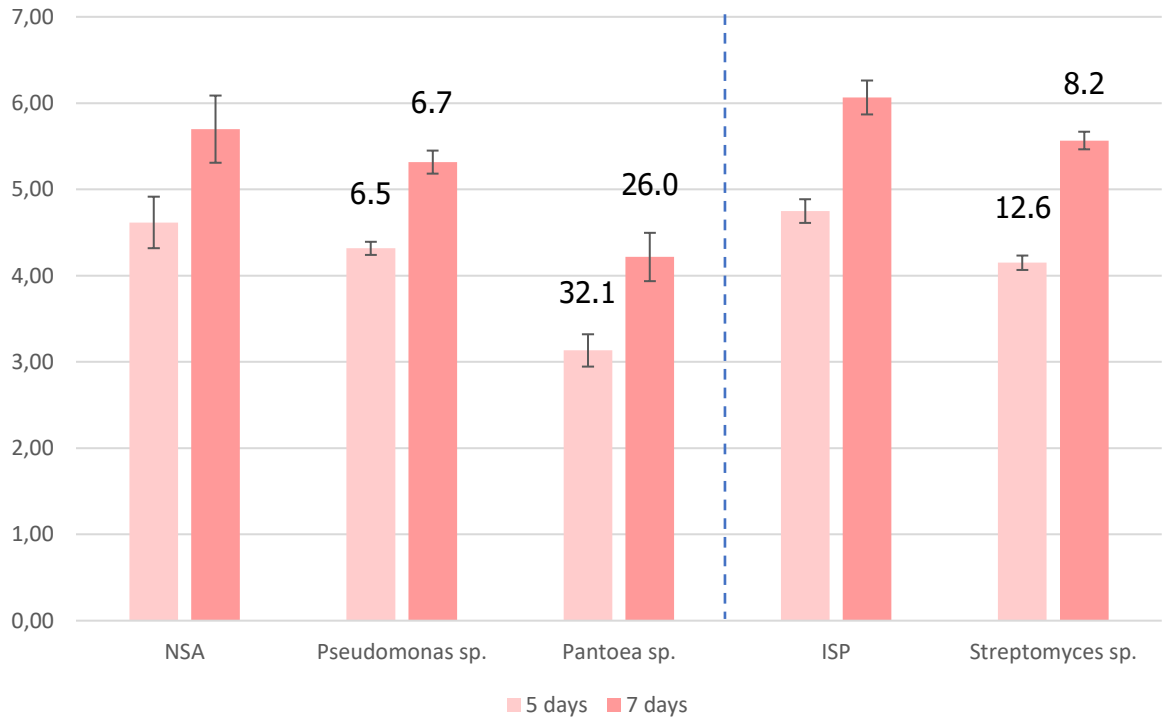
Fusarium oxysporum f.sp. *lactucae in vitro* inhibition





→ Fungi

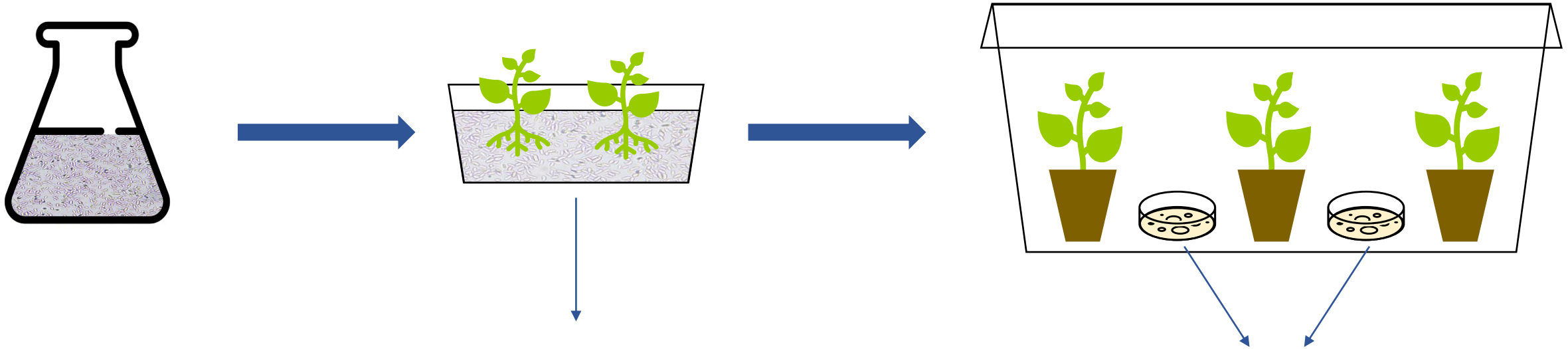
→ Bacteria



The nubers above the columns represent the inhibition percentage that is significant for all treatments (ANOVA, p-value < 0.05)

Plant protection from fungal pathogens: VOCSs mediated

Fusarium oxysporum f.sp. *lactucae in planta* inibition



- Water
- *Fusarium oxysporum* f.sp. *Lactucae* $1*10^7$ conidia/mL

- Culture media
- *Streptomyces* sp.

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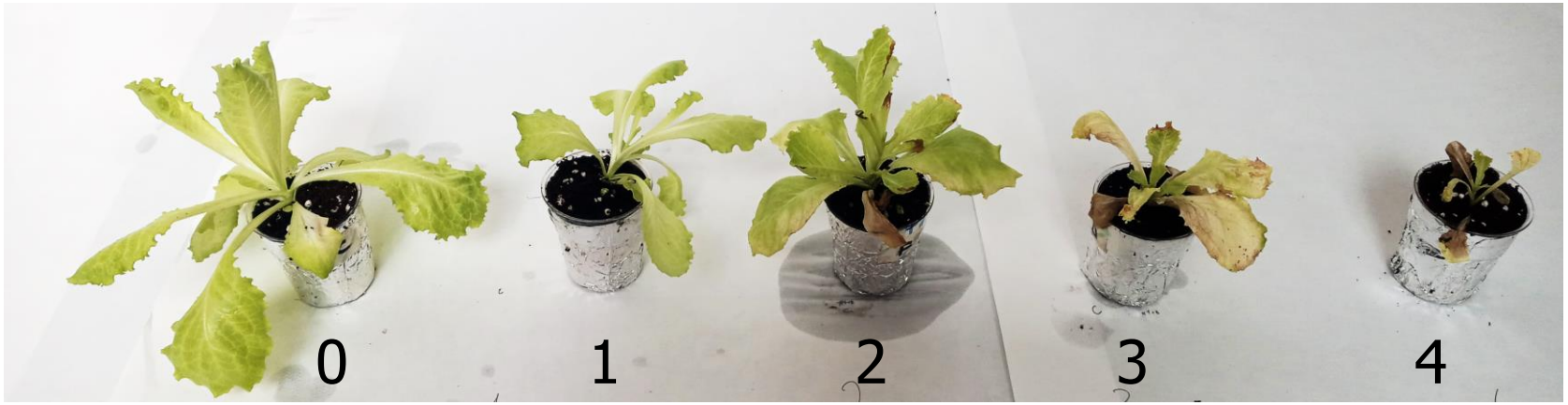
Water +
Test (W+T)

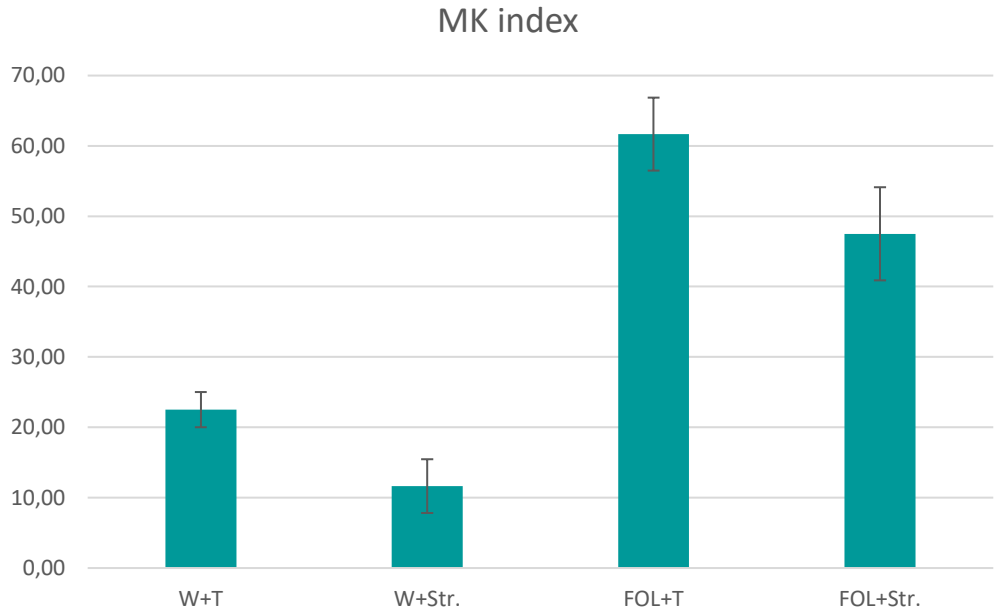
Water +
Streptomyces sp. (W+*Str.*)

Fusarium oxysporum f.sp. *lactucae*
+ Test (Fol+T)

Fusarium oxysporum f.sp. *Lactucae*
+ Streptomyces sp. (Fol+*Str.*)

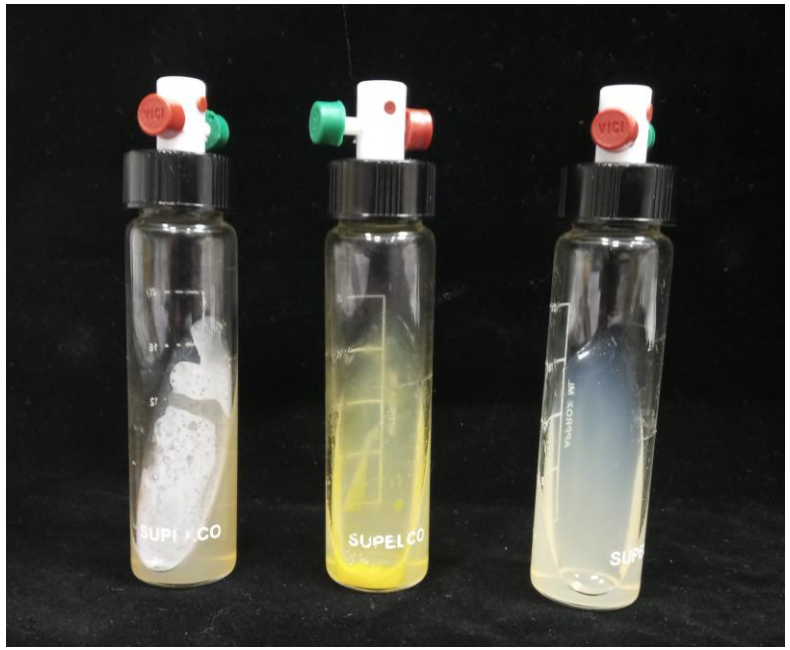
Plant protection from fungal pathogens: VOCSs mediated

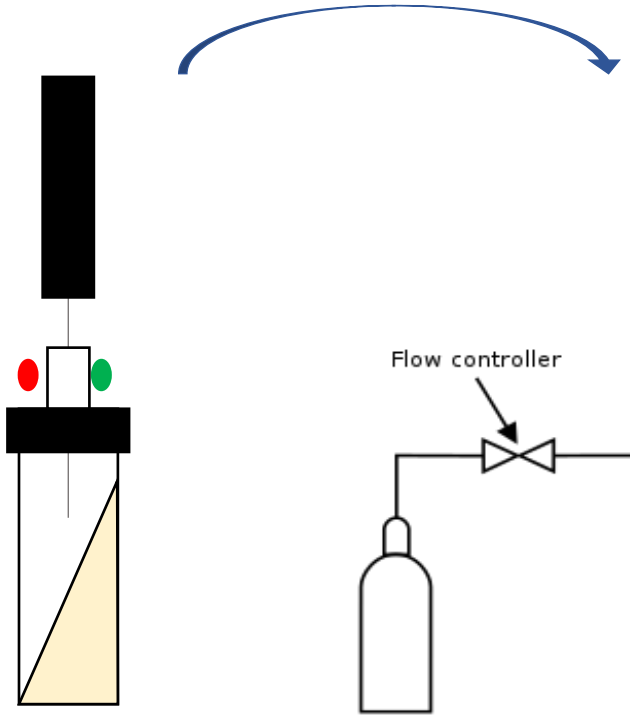




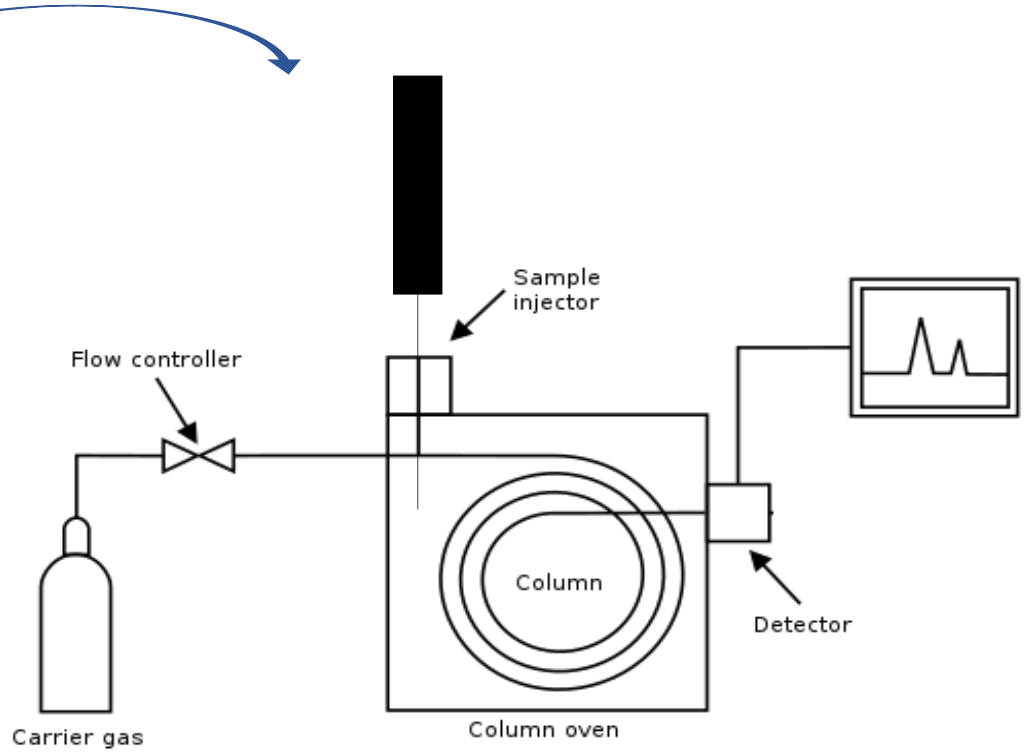
	W+T	W+*Str.*	FOL+T	FOL+*Str.*
W+T	-	-	-	-
W+*Str.*	**0,0147**	-	-	-
FOL+T	**0,0003**	**0,0002**	-	-
FOL+*Str.*	**0,0036**	**0,0012**	**0,0434**	-

GC-MS analysis of bacterial Volatile Organic Compounds (VOCs)





SPME fibre
RT
1 hour



To be continued…

Functional food: polyphenols content

TREATMENTS

- Water
- *Streptomyces* sp.
- *Pseudomonas* sp.
- *Pantoea* sp.

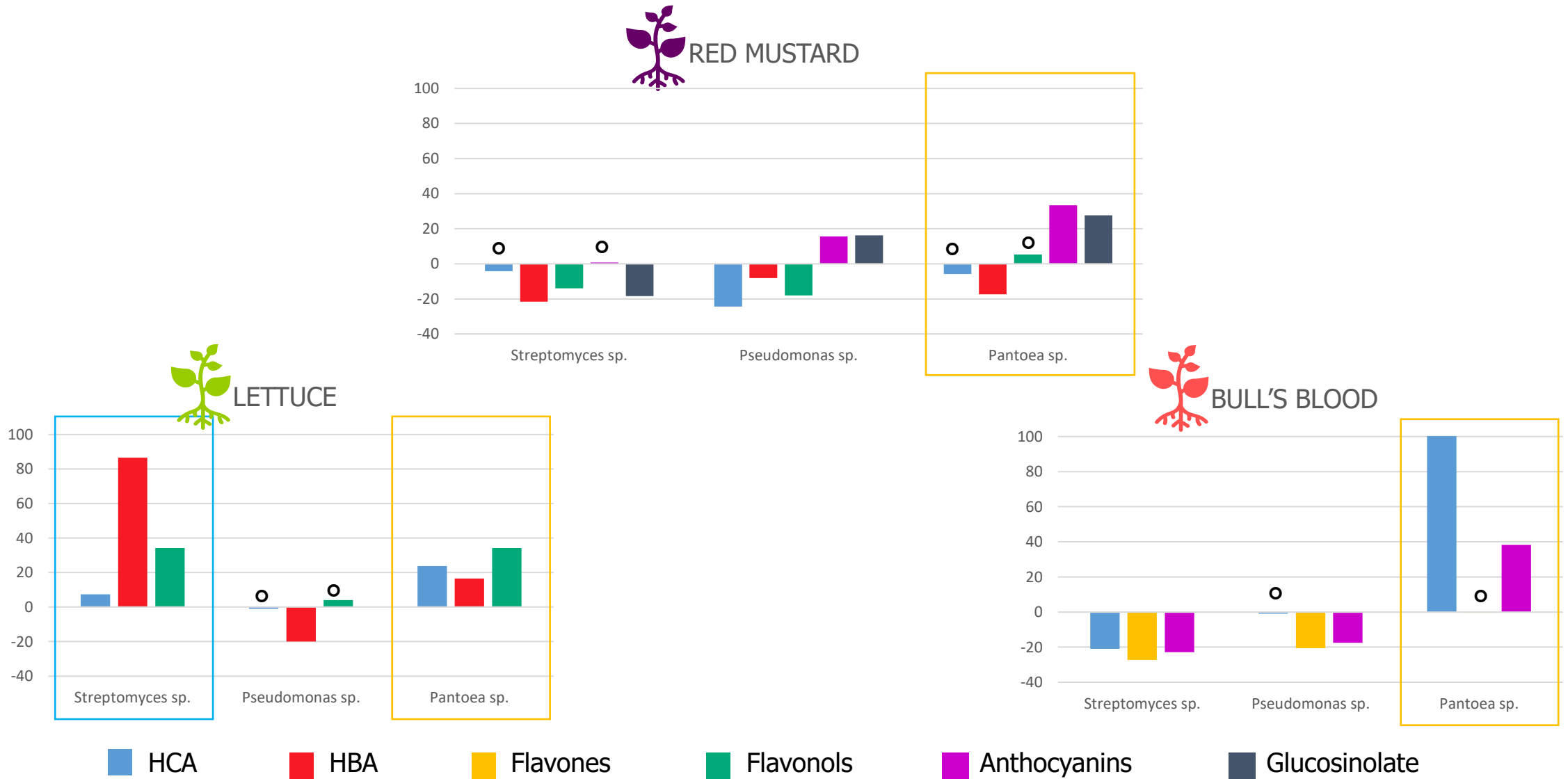
Soaked for 2 h

GROWTH CONDITIONS
5 weeks
26-22 C°
16-8 h

SAMPLING

- Ground with nitrogen
- Lyophilized

Percentage variation for each class of polyphenols



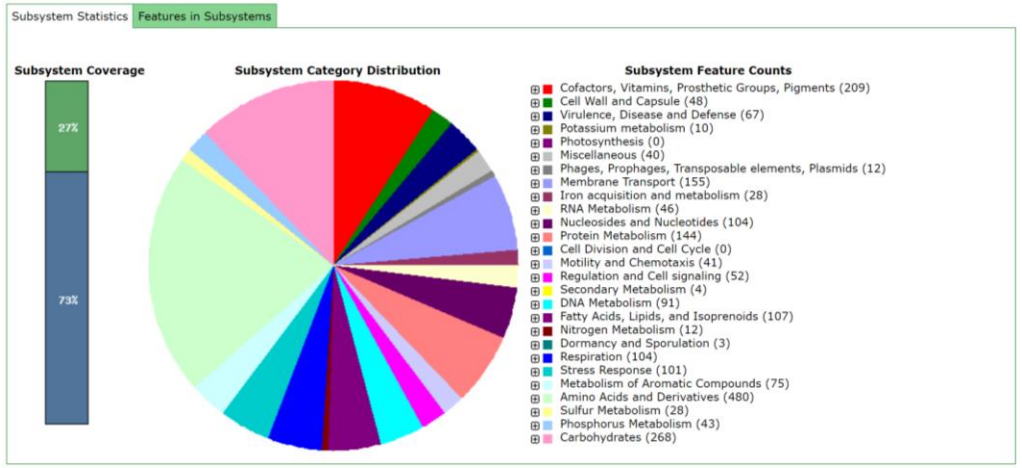
o= not significant, p-value > 0.05

In silico analysis: on bacteria

RAST Rapid Annotation using Subsystem Technology version 2.0

The NMPDR, SEED-based, prokaryotic genome annotation service.
For more information about The SEED please visit theSEED.org.

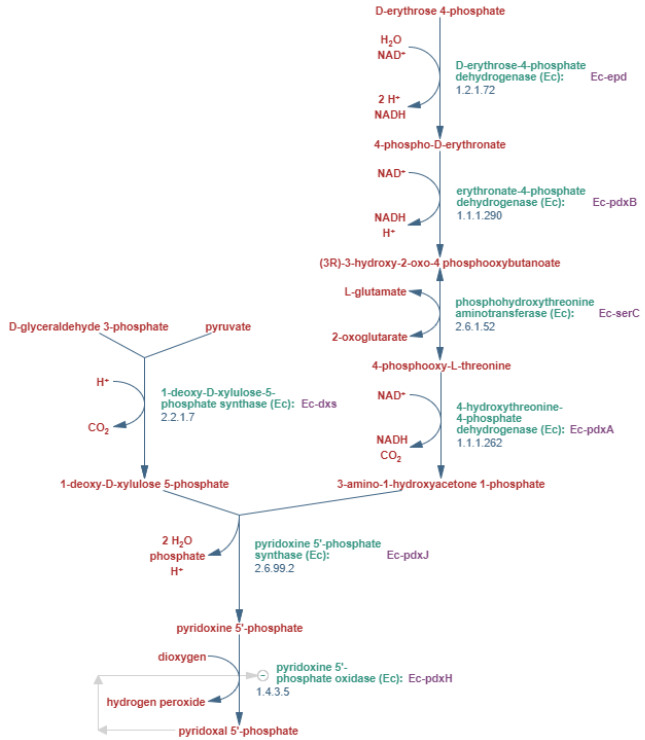
Bacterial genomes screening



METACYC

Analysis of metabolic pathways:

Riboflavin (B2)
Pyridoxine (B6)
Folate (B9)
Cobalamine (B12)



Functional food: Vitamins B content

UNIMORE strains
+
AIT strains

- **HPLC** → screening for production of Vitamins B2 B6 B9 B12
- **qPCR** → expression of involved genes

- **HPLC** → evaluation of Vitamins B2 B6 B9 B12 content
- **qPCR** → expression of involved bacterial genes
- **Fluorescent microscopy** → plant colonization