Università di Modena e Reggio Emilia
Dipartimento di Scienze della Vita

with CCS Aosta S.r.l. Company

QUALITY CONTROL OF MICROBIALS

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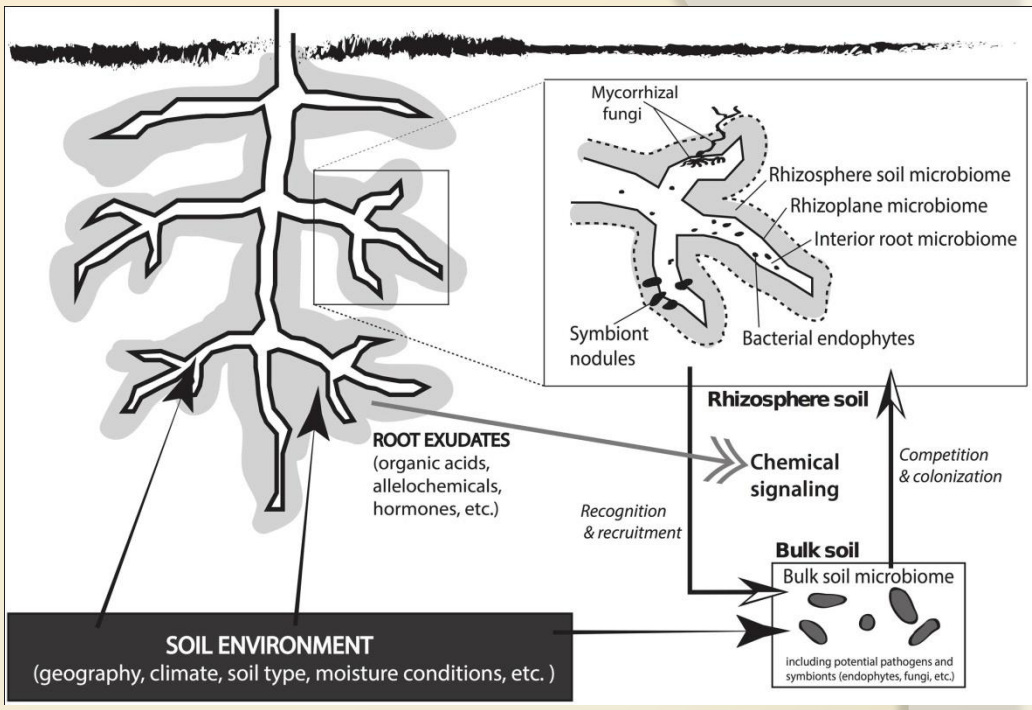
Industrial PhD in
AGRI-FOOD SCIENCES, TECHNOLOGIES AND BIOTECHNOLOGIES

XXXII CYCLE
II year

INTRODUCTION

Rizosphere



Symbiotic agriculture is a new cultivation process that involves the use of beneficial microorganisms such as fungi, bacteria and yeasts, for growth promotion, soil fertility and plant health.

Beneficial microbes are often used as inoculants

OVERALL GOAL

To obtain an efficient, effective and a sustainable microbial formulation which can be a valid alternative to chemical pesticides and, starting from the finished biostimulant product Micosat F UNO, made up of a microbiological consortium and **develop a "quality protocol"** considering both the individual microorganisms presents and the consortium as a whole.

Bacteria of the rhizosphere
Actinomyces
Saprophytic fungi
Yeasts
Mycorrhizae

QUALITY PROTOCOL

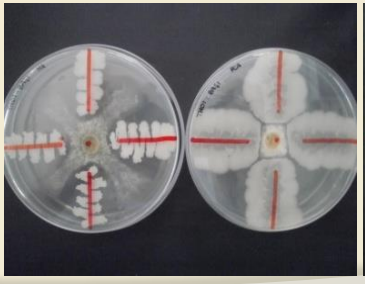
- Verification of the effectivness of microrganisms
- Verification of the compatibility of the microrganisms present in the microbial consortium
- Verification over time of the effectivness and vitality of microrganisms
- Effect of co-formulants on the vitality and effectivness of microrganisms
- Product formulation
- Shelf life of the finished product

TARGET 2017

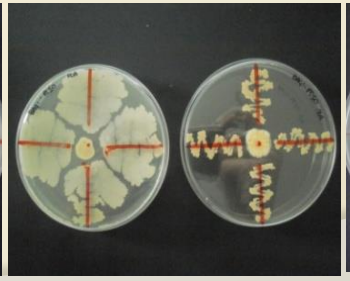
1. Characterization and identification of the microorganisms present in the MICOSAT F UNO through a plate counting approach on different media to assess the vitality.
2. Investigate the interactions between the microorganisms.
3. Find an ideal media composition for the trimming of microorganisms when applied through the development and implementation of 3 different soil compositions and Sorghum plants mycorrhized with *Glomus spp*. to increase the production of AM fungi content in the fertilizer.

RESULTS

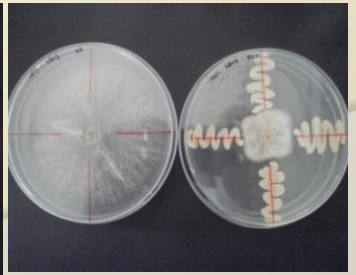
1. 1,24E+09 CFU gr-1 is the total amount of living microbial cells in the consortium MICOSAT F UNO. This suggest a possible interaction between the microorganisms.
2. Both BA41 and AR39 strains inhibit the growth of TH01 on both soil and also partially inhibit the growth of PC50. Some microorganisms have different effects based on the soil they grow on. For example, the SB14 has an inhibiting effect on PC50 and TH01 only on PCA ground.
3. The soil composition T1 showed the highest mycorrhization, so this new, softer substrate was also developed, because it is optimal for the production of AM fungi.



BA41-TH01



BA41-PC50



TH01 – SB14

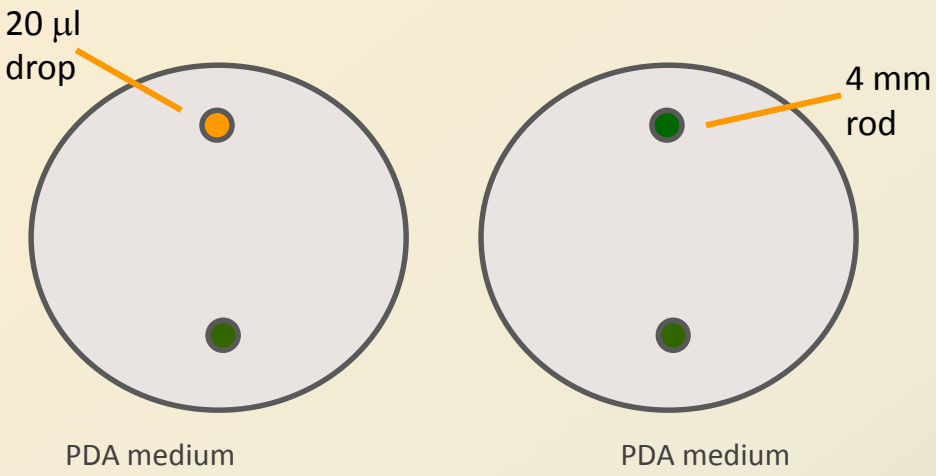
TARGET 2018

To evaluate the antimicrobial activity of microorganisms present in the Micosat F UNO product in relation to 6 different pathogenic strains of agrarian interest: 3 fungi and 3 bacteria.

EXPERIMENTAL APPROACH

Interactions in vitro with: *Sclerotium* (SP75), *Fusarium* (FP76), *Rhizoctonia* (RP77), *Xanthomonas pruni* (XP89), *Xanthomonas juglandis* (XJ88), *Pseudomonas siringae* (PS87)

1. **FUNGUS-BACTERIUM/ FUNGUS-FUNGUS**



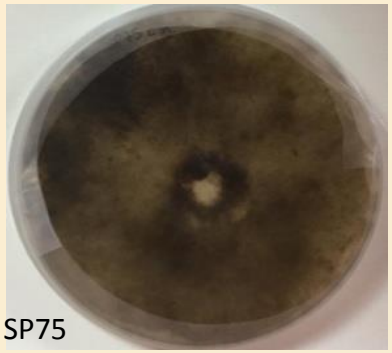
2. **BACTERIUM-BACTERIUM**

placed to grow in a small oven at 27°C.

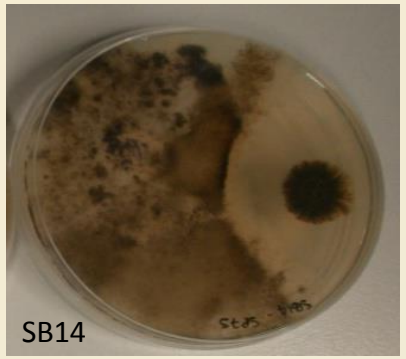
RESULTS

Antagonistic activity against three pathogenic fungi

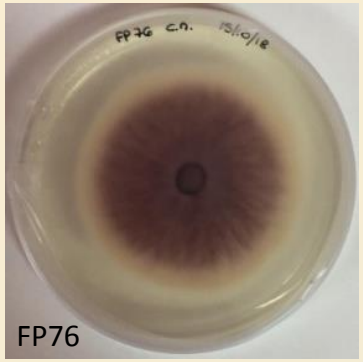
Sclerotium spp. (SP75)

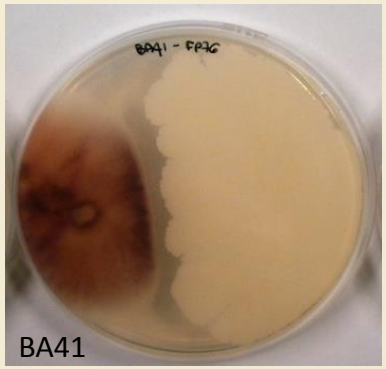

SP75

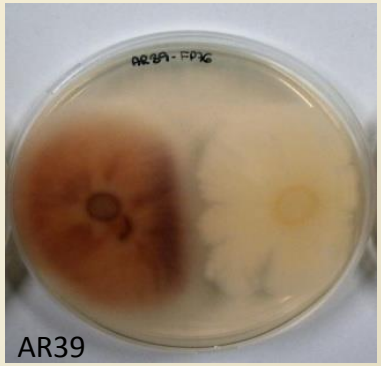

AR39


SB14

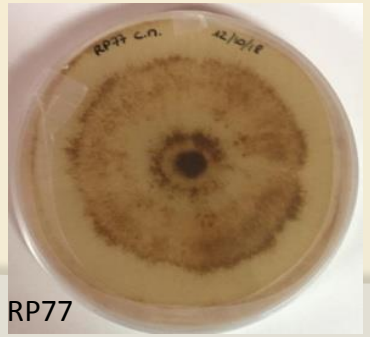
Fusarium spp. (FP76)

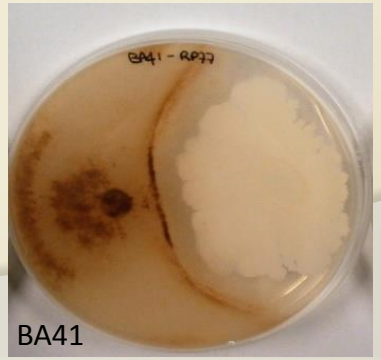

FP76


BA41


AR39

Rhizoctonia spp. (RP77)


RP77


BA41


TH01

CONCLUSIONS

The antagonistic activity of the single strains present in the Micosat F UNO microbial consortium has been verified against fungal pathogens.

The verification of the antagonistic activity against bacterial pathogens is still in progress.

The study of the single microorganisms and the interaction between the antagonist and pathogenic strains is extremely useful for the development of a targeted and certified microbial product.

FUTURE ACTIVITIES

- Evaluate which active molecules are produced by microorganisms of the commercial product.
- Evaluate the half-life and effectiveness of the commercial product over time

Thank you