

QUALITY CONTROL OF MICROBIALS

Silvia Volpato Tutor: Prof . Emilio Stefani

Università di Modena e Reggio Emilia, Dipartimento di Scienze della Vita
Industrial PhD. with CCS Aosta S.r.l. company



INTRODUCTION

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 healthiness. For this purpose, we evaluate the real composition, the antagonist activity and vitality and effectiveness over time of commercial fertilizer.



Overall goal:

Establish procedures and implement protocols for qualitative and quantitative control of the microorganisms present in different types of natural fertilizers products (liquid, solid and powder) to standardize quality control process

TARGET 2017

1. Characterization and identification of the microorganisms present in the MICOSAT F UNO .
2. Investigate the interactions between the microorganisms.
3. Find an ideal media composition for the trimming of microorganisms when applied.

EXPERIMENTAL APPROACH

Starting from the marketable product MICOSAT F UNO, a "quality protocol" has been developed taking into consideration the single microorganism and the whole consortium through:

1. A plate counting approach on different media to assess the vitality and to observe the relationship between these microorganisms.
2. A plate test to evaluate the effect of the different microorganisms among themselves.
3. 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.

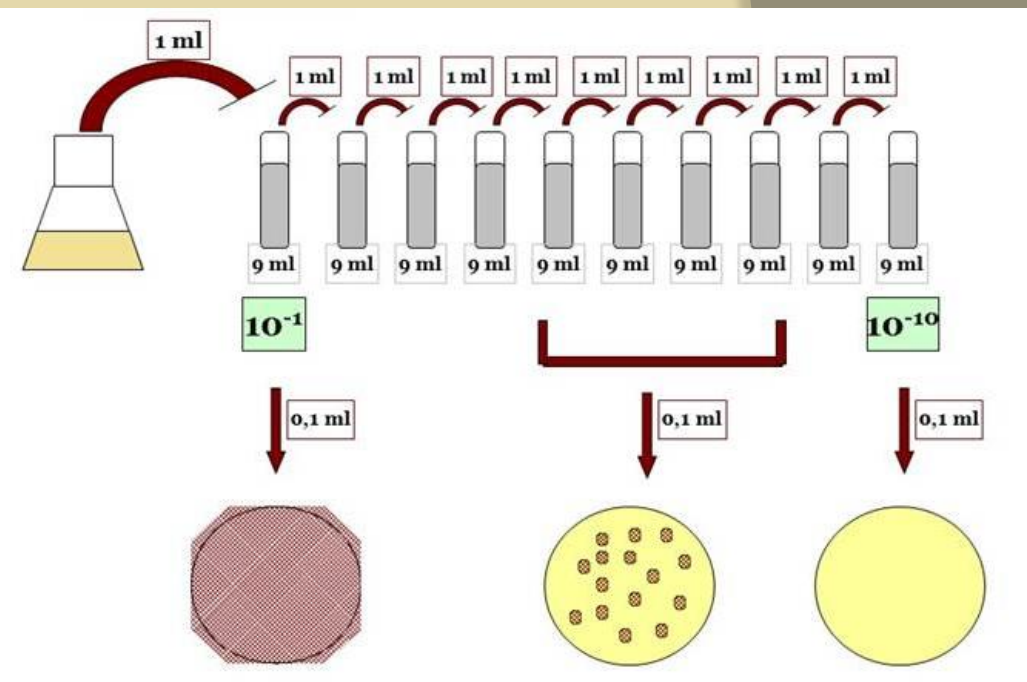


FIGURE 1: plate counting approach of serial-dilution

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.

	Myc	Control	Δ mycorrizati on
T1	61,83%	5,90%	55,93%
T2	55,73%	0,53%	55,20%
T3	39,57%	1,40%	38,17%

FIGURE 2: Mycorrhization index of 3 specific media for AM fungi production

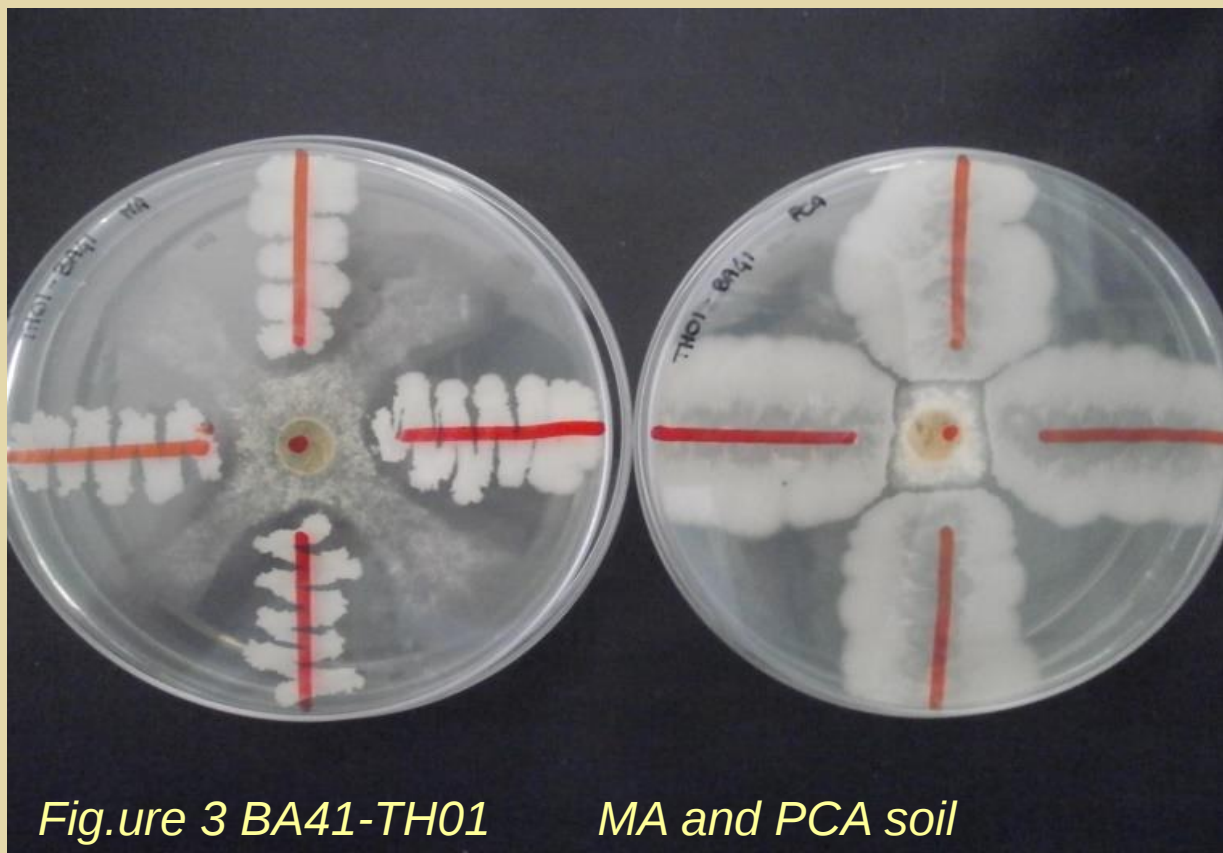


Fig.ure 3 BA41-TH01 MA and PCA soil

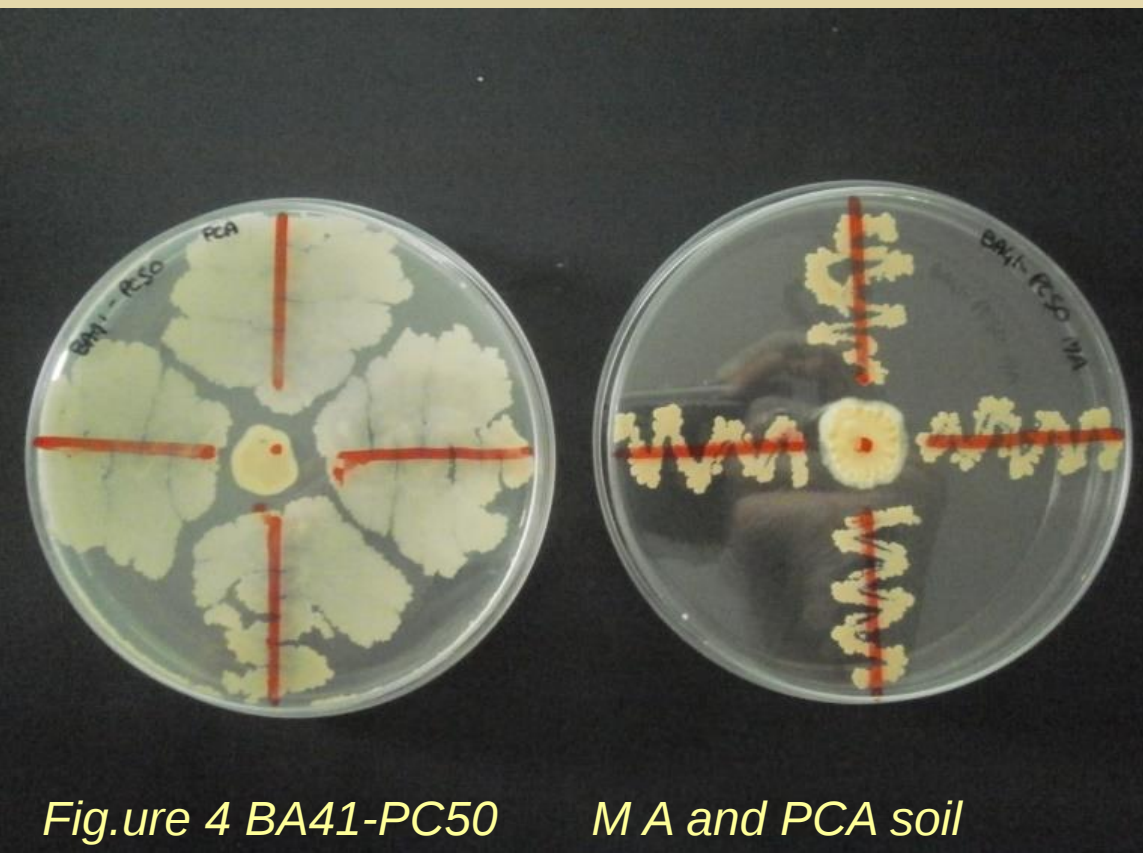


Fig.ure 4 BA41-PC50 M A and PCA soil

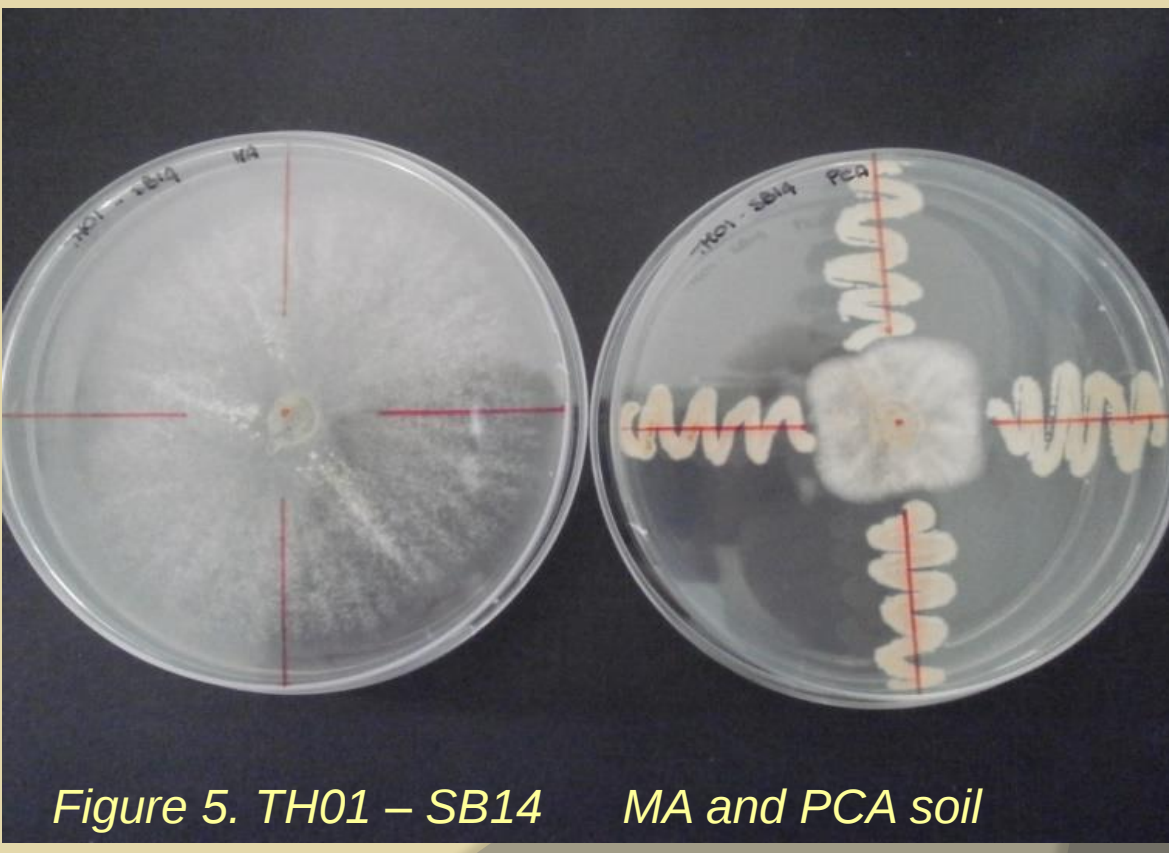


Figure 5. TH01 – SB14 MA and PCA soil

CONCLUSIONS

This study highlight the most promising microorganisms to be included in the consortium according to vitality and positive interaction in the *consortium* in order to improve the efficiency and specificity of these products.

FUTURE ACTIVITIES:

- Development and implementation of new methods to assess the mycorrhizal infection
- Evaluate the antimicrobial activity of individual strains with at least 3 different pathogens,
- Evaluate and implement new strategy for the viability of microorganisms over time.

Acknowledgments: Research financed by CCS Aosta Srl, Quart (AO).