

Bio-attract: a biological approach to alleviate plant biotic and abiotic stresses

Yaite Cuesta Arenas, Nuria Soler Calvo, Justine Jacquin, Ilsa Posthuma and Astrid de Boer



Background

Enzymes found in the soil play an important role in maintaining soil health. Healthy soil enables crops to recover from adverse conditions like pest and disease infestation, drought and extreme climate conditions.

Objective

Development of natural soil conditioners and seed coatings to promote soil suppressiveness and alleviate abiotic stress based on enzymatic formulations.

Preliminary results

In vitro effect of enzymatic formulates on the growth of relevant pathogenic and beneficial fungi

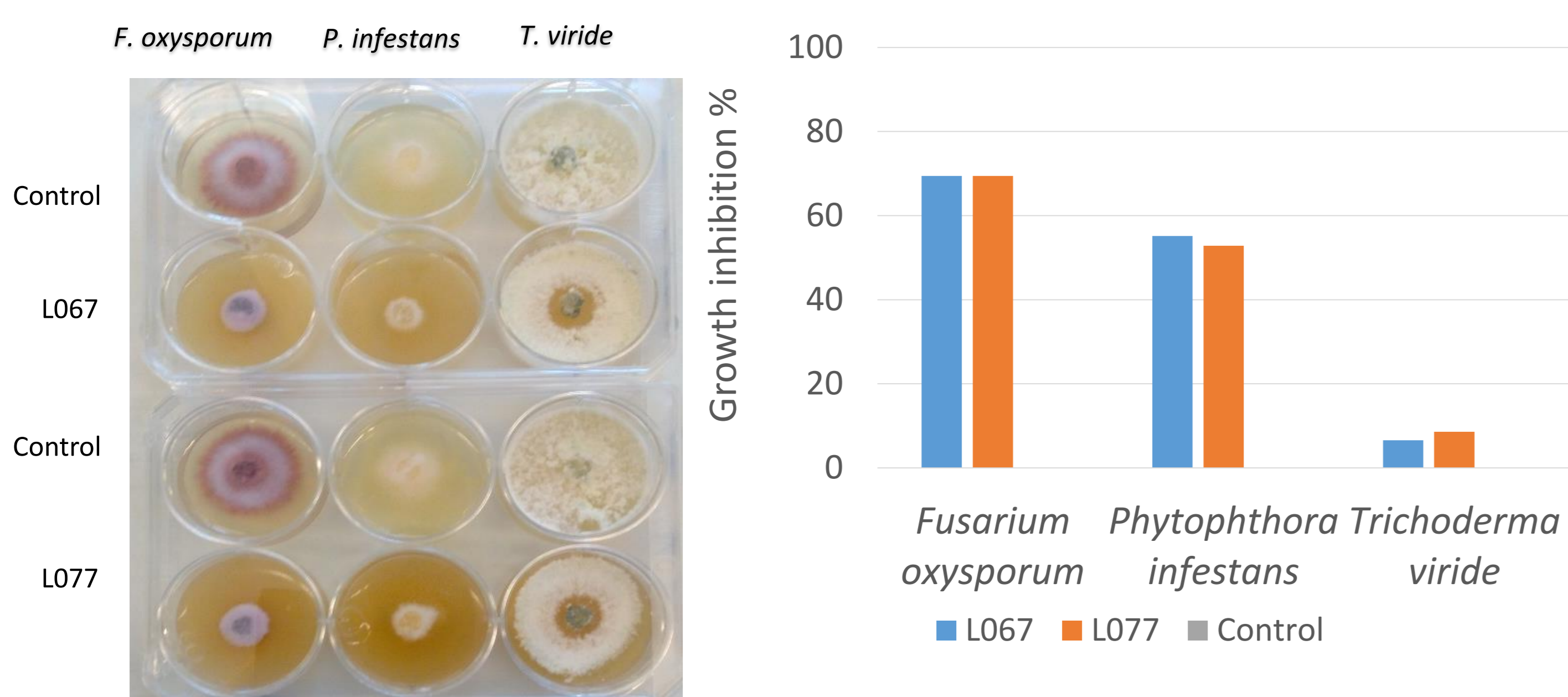


Figure 1. Growth of several fungi on Potato Dextrose Agar supplemented with formulates L067 and L077 after 5 days.

In vitro effect of microbial enzymes on nematode *Meloidogyne incognita*

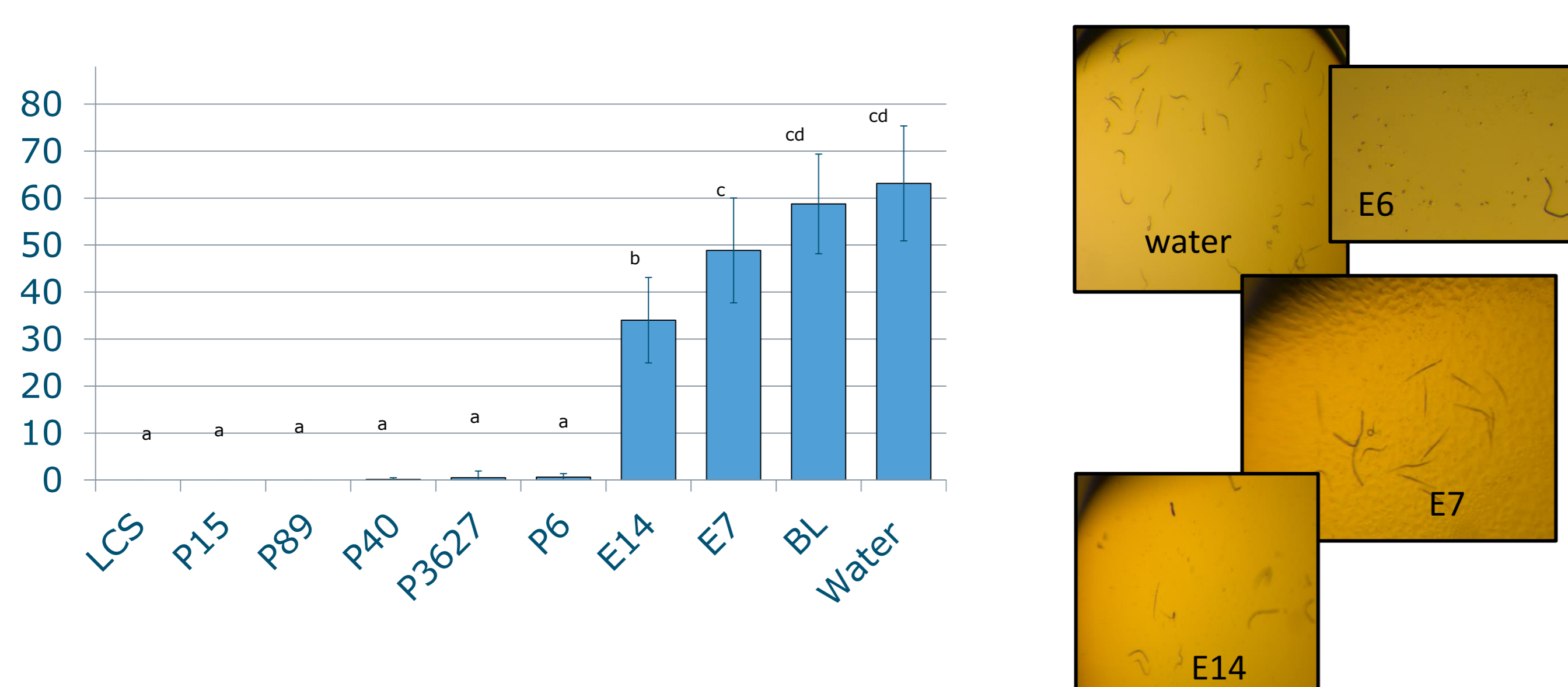


Figure 2. *M. incognita* survivals after 48 h.

Formulates accelerate tomato seed germination

From nine tested formulates, three are able to speed-up seed germination in several tomato cultivars.

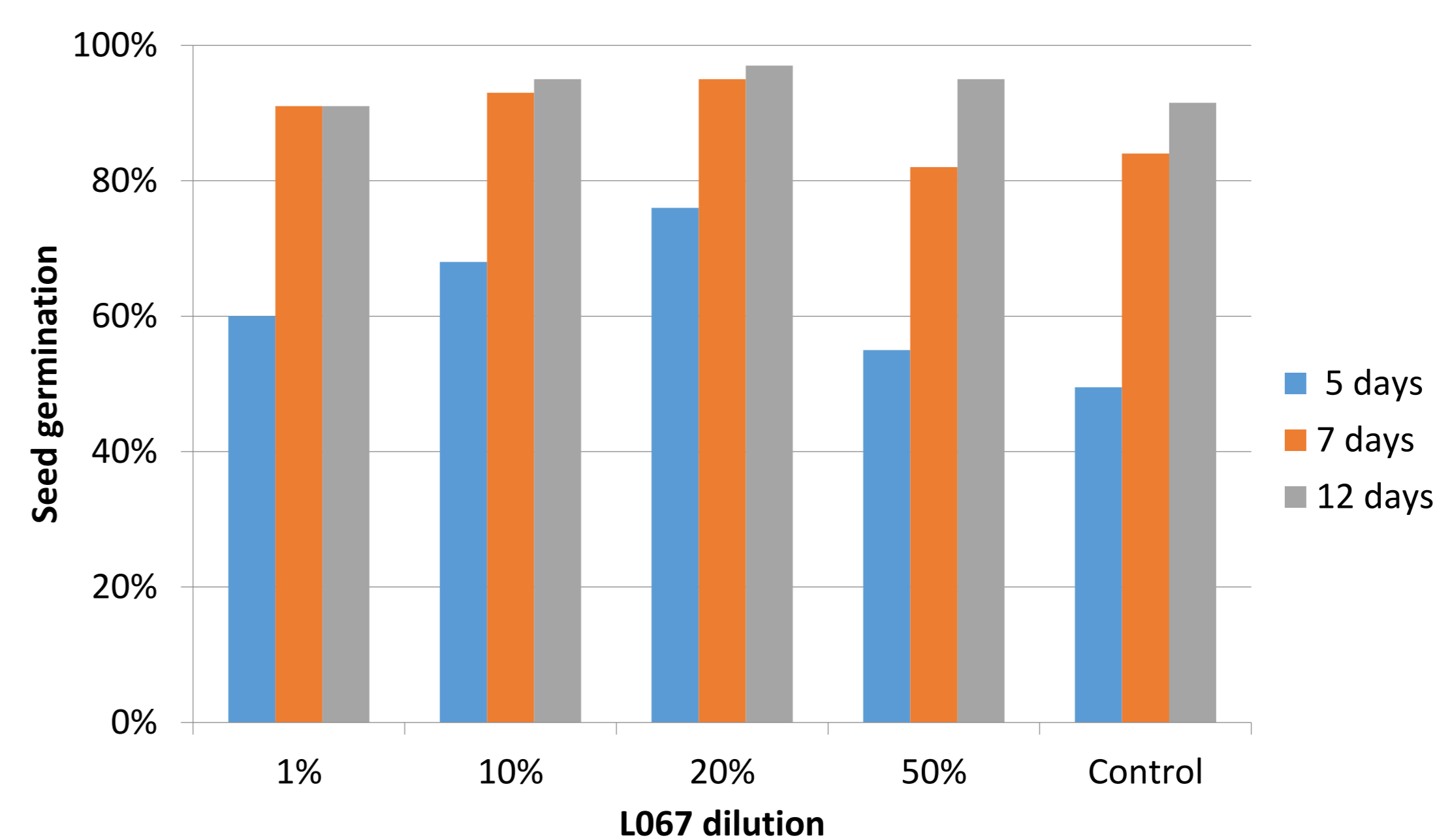


Figure 3. *Solanum lycopersicum* var. Morado tested with formulate L067.

Microbial enzymes are able to reduce soil water repellence

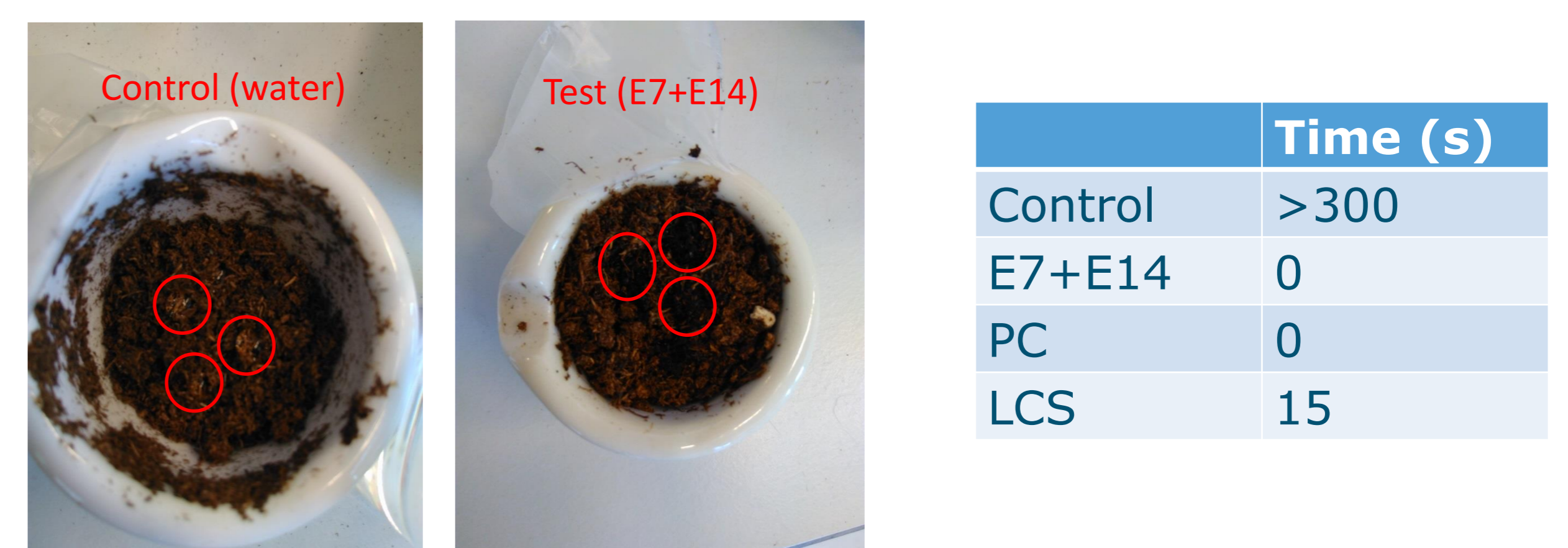


Figure 4. Water drop penetration time on potted soil, treated with enzymes for 2 days incubation followed by drying at 40°C for 24 h.

Conclusions

Enzymes among other ingredients in seed coating formulations and drenches help to condition the soil, liberate plant nutrients and improve seed germination. These new formulations are also able to promote natural soil suppressiveness by controlling diseases and attracting beneficial microorganisms.

This approach should be better than common practices, in which exogenous or exotic beneficial organisms are introduced. These organisms are often not adapted to local soil characteristics and must moreover compete with better adapted native micro-flora.

Acknowledgements

This project is financed by the EU programme Eurostars (E!10501 - BIO-ATTRACT), Topsector Tuinbouw en Uitgangsmaterialen (EU-2017-01) and partners: ChiralVision, Biológicas Canarias S.L. and Granada Coating.