

DELIVERY OF PLANT-GROWTH PROMOTING BACTERIA EMBEDDED IN A BIO-BASED MATERIAL DERIVED FROM FOOD WASTE BIOMASSES



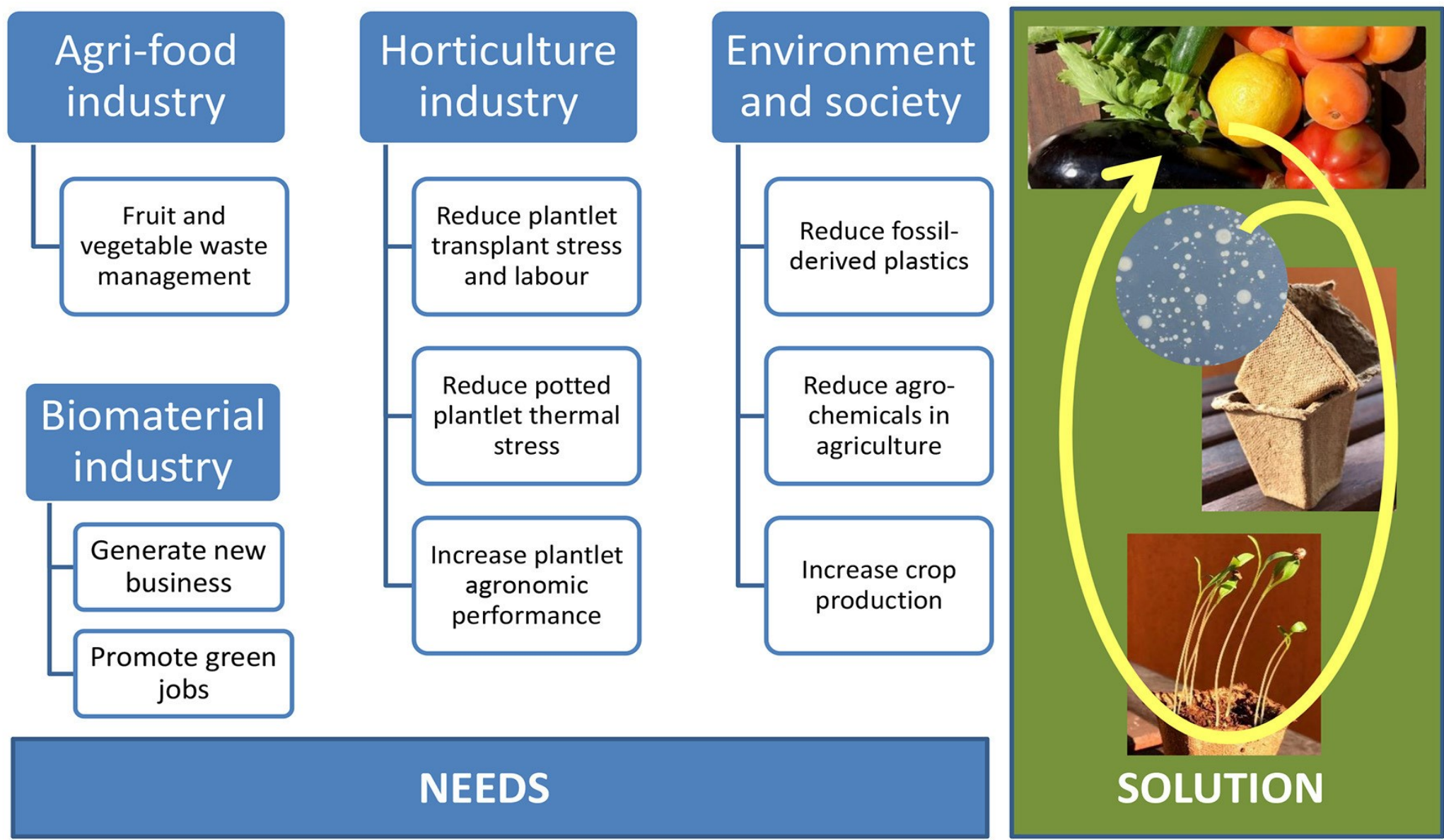
Lorenzo Vergani¹, Joa Patania¹, Francesca Mapelli¹, Giulia Franzoni², Masoud Ghaani¹, Antonio Ferrante², Stefano Farris², Sara Borin^{1*}



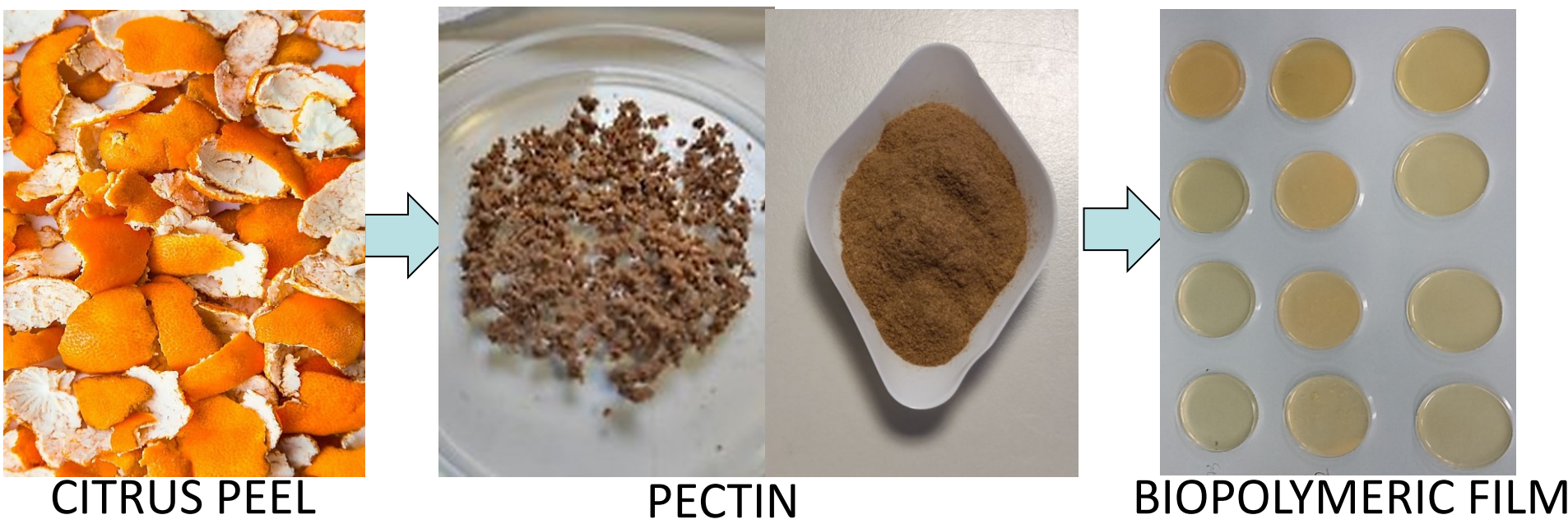
¹ DeFENS – Department of Food, Environmental and Nutritional Science, University of Milan (Italy)

² DiSAA – Agricultural and Environmental Sciences - Production, Landscape, Agroenergy, University of Milan (Italy)

INTRODUCTION AND AIM



Aim of the work: Study of the delivery of plant growth promoting (PGP) bacteria within a biopolymeric film obtained from food wastes, in a circular economy model



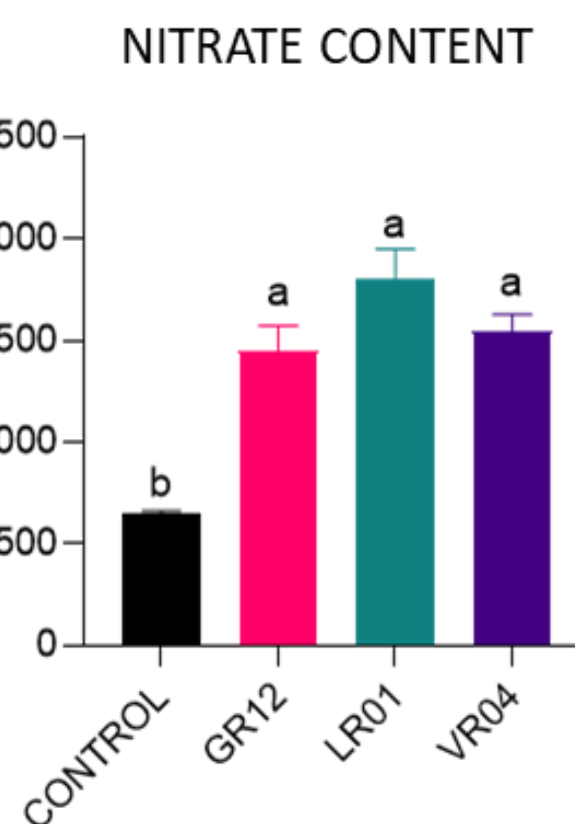
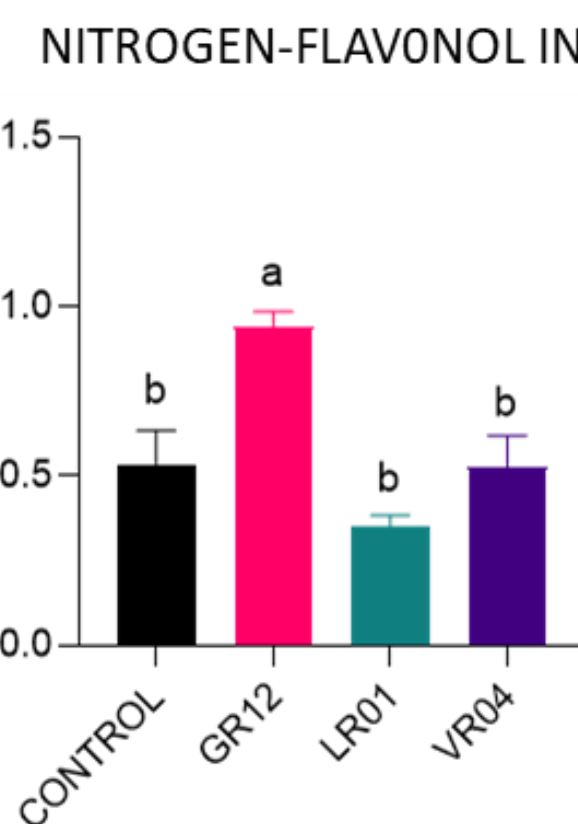
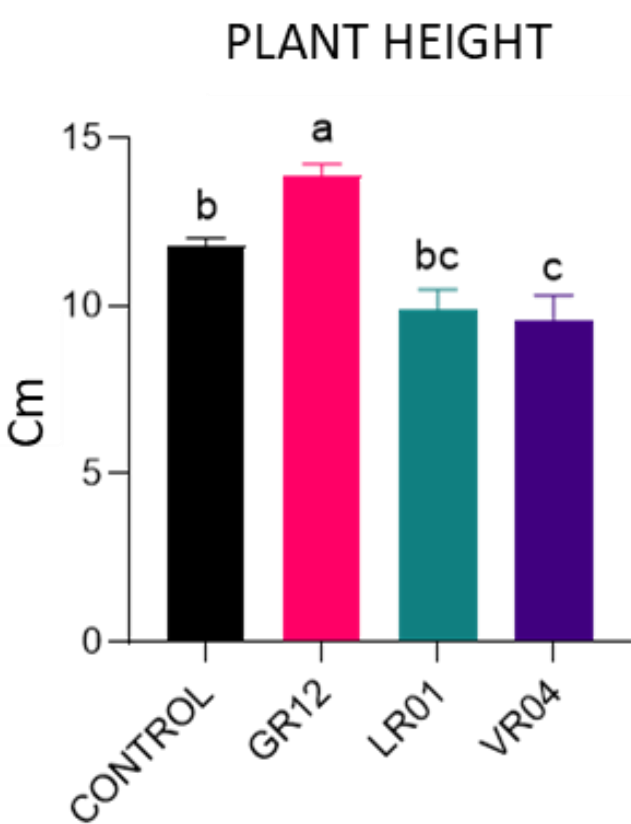
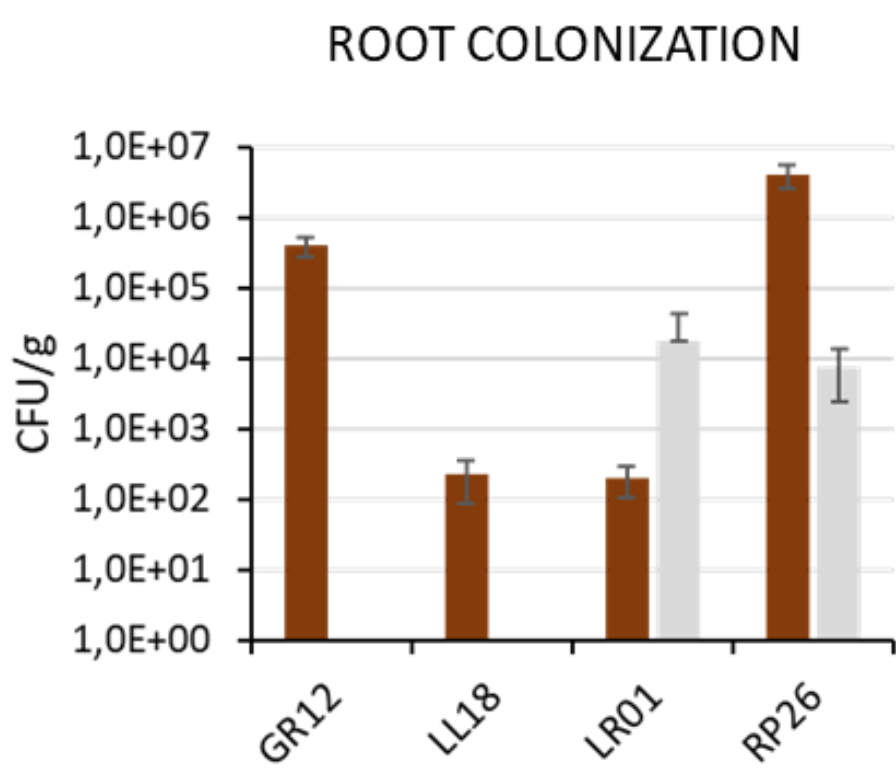
Final goal: Inclusion of living PGP bacteria in biodegradable carrier materials or nursery pots obtaining biostimulant agents with the potential to increase plantlet growth and decrease the fertilizer needs. (Mapelli et al. 2022)

RESULTS

SELECTION OF BENEFICIAL BACTERIA

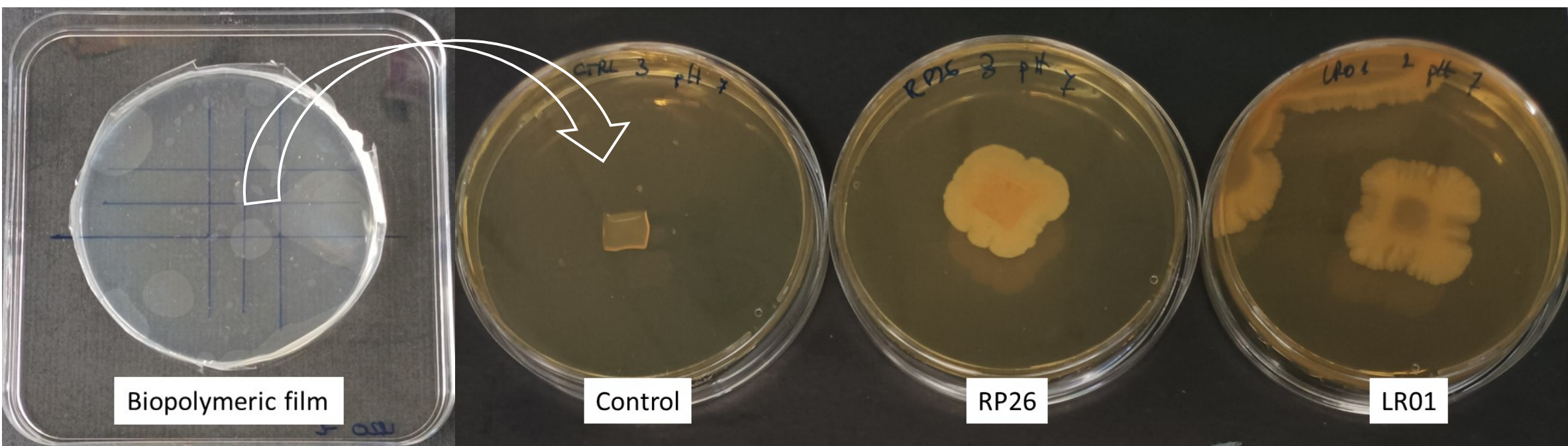
Strain	ID NCBI	Isolation source	PGP Test										Temperature (°C)					PEG (%)			NaCl (%)			pH		Enzymatic act.						
			PO4 solub.	Protease	Sideroph.	EPS	ACC deamin.	IAA	SCORE PGP	root length	root number	shoot length	vigor index	biocontrol	4	15	25	30	37	15	20	25	2	4	6	5	6	Amilase	Agarase	Alginate	Pectinase	
GR12	Rhizobium sp.	Grapevine roots							4																							
VR04	Kosakonia sp.	Lettuce leaves							4																	NA	NA					
LR01	Bacillus sp.	Lettuce roots							4																							
LL18	Pseudomonas sp.	Lettuce leaves							4																							
LR20	Bacillus sp.	Lettuce roots							3																	NA	NA					
RP26	Bacillus sp.	Resurrection plant	na	na	na		na		1	na	na	na	na	na																		

IN VIVO COLONIZATION AND PGP ACTIVITY OF *Lactuca sativa*



Strains GR12 and RP26 displayed high colonization capacity. GR12 increased plant height and the nitrogen-flavanol index. All the tested strains increased leaves' nitrate content

VIABILITY WITHIN A BIOPOLYMERIC FILM



Living bacterial cell suspensions were embedded in a liquid form of waste-derived pectin before solidification and drying. *Bacillus* spp. strains RP26 and LR01 were observed to grow from 1 cm² of the biopolymeric film deposited on tryptic soy agar (TSA) medium up to one month after the storage of the material.

PERSPECTIVES

- Assessment of the PGP activity of other selected bacterial strains on different model plants (lettuce, petunia)
- Development of new formulations of biopolymeric film to improve the viability of beneficial bacteria and study of its biodegradation in soil

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References

Mapelli et al. 2022. Food Waste-Derived Biomaterials Enriched by Biostimulant Agents for Sustainable Horticultural Practices: A Possible Circular Solution. *Frontiers in Sustainability*. doi: 10.3389/frsus.2022.928970