

DEVELOPMENT OF STRATEGIES FOR THE USE OF RHIZOSPHERE MICROORGANISMS TO REDUCE THE INPUT OF FERTILIZERS AND TO CONTROL BIOTIC AND ABIOTIC ADVERSITIES: EXPERIENCE OF THE FERTLESS PROJECT

ALBERTINI M.*, NICOLI R.*, CORTICELLI C.*, BARRECA A.*, SALSI G.**,
DEMONTIS A.***, ROSTA R.***, MARABINI L.****, ZANARINI D.*****,
DALL'OLIO A.*****, DE FRANCESCHI S.*****, TONELLI M.*****,
FRANCESCHI S.*****, CHIARI G.*****, DEGOLA F.*****,
RICCI A.*****, GULLÌ M.*****

*) AgriTeS s.r.l., Via Marconi 4/2 – 40057 Granarolo dell'Emilia (BO)

**) Progeo S.C.A, Via Asseverati 1 - 42122 Reggio Emilia

***) Co.Na.Se, Via Selice 301/A – 48017 Conselice (RA)

****) Az. Agr. "Marabini Luigi", Via Stradelli Guelfi 1385 – 40024 Castel San Pietro Terme (BO)

*****) Soc. Agr. S.S. "Il Bosco di Zan", Via I. Lambertini 39 - 40068 San Lazzaro di Savena (BO)

*****) Società Agricola S.S. "Dall'Olio Pietro e Andrea", Via Madonnina 3671 – 40024 Castel San Pietro Terme (BO)

*****) Azienda Agricola "De Franceschi Stefano", Valsamoggia (BO)

*****) Coop. Agr. Soc. "Coltivare Fraternità", Via Valverde 10/B – 47923 Rimini (RN)

*****) SERBIOS s.r.l., Via Enrico Fermi 112 - 45021 Badia Polesine (RO)

*****) Department of Chemistry, Life Sciences and Environmental Sustainability, University of Parma, Parco Area delle Scienze 11/A - 43124 Parma (PR)

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In recent years, increasing attention to environmental protection and soil biodiversity has driven the need to identify new tools for a reduction of the use of technical means by agricultural producers within the agri-food chain. The use of natural biostimulants like Plant Growth Promoting Microorganisms (PGPM) constitutes a good opportunity, as they can help to reduce both the supply of fertilizers or pesticides and the release of

pollutants (protecting the quality of water and soil), and to improve crops' resilience to drought and thermal stress; as a result, the adaptation of cropping systems to the impact of climate change might be achieved, and safeguarding yields, quality, and profitability of harvest could be preserved if not implemented.

The FERTLESS Project, funded by Emilia Romagna Rural Developing Program (PSR 2014-2020), is aimed at defining a best practice model with low environmental impact applicable at the farm level, which includes the use and valorization of rhizosphere microorganisms for the cultivation of three crops (wheat, sorghum, and sunflower) that play a prominent role in the agricultural economy of Emilia Romagna Region; in fact, an agricultural system addressed to the reduction of pesticides and fertilizers is expected to obtain the recognition of an added value on the markets, operating an important function in terms of food safety and consumer awareness. As well, best practice models could create new market opportunities linked to the ever-increasing appreciation for agricultural products made with more environmentally friendly techniques, also solving the following concrete problems:

- a. development of low-impact strategies to reduce and/or replace synthetic fertilizers and pesticides, ensure greater safety of workers, and, indirectly, improve the consumer's health
- b. achievement of increased yields and improved quality of food and feed products
- c. economic as well as environmental savings due to the lower use of technical means and water resources.

The activities are focused on the validation of new biofertilizers to be applied as seed coating or microgranular products: their effects have been evaluated in terms of seed germination and other agronomical parameters, to assess the product's efficacy in ameliorating the plant resilience to specific abiotic stress; investigations have been performed in both laboratory conditions and in field trials, carried out in different farms.

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