



PARTNER PRESENTATION AND INTEREST IN HORIZON EUROPE PARTICIPATION

## COMPLEX ECOLOGICAL PRODUCT WITH FERTILIZING AND REHABILITATION OF SOIL EXHAUSTION PROPERTIES BASED ON NANOMATERIALS ,TAILORED for APPLICATION

### Challenges and objectives

In the 2030s, it is estimated that there will be 8.5 billion people, but poverty below subsistence levels is also growing alarmingly. To feed all these people, sustainable agriculture is needed. To achieve this goal we must have crops with higher yields, without pests and with the preservation of soil quality. Agriculture must change dramatically. 2030 Agenda for Sustainable Development- A Strategy in the 2nd sustainable development goal (SDG 2) sets out: explaining the ways to eradicate hunger, achieving food security and achieving sustainable agriculture must be carried out simultaneously by 2030. To this end, some goals must be pursued: soil protection and biodiversity conservation, without pesticides, high yields and disease reduction. A survey of the fertilizer market shows a continuous increase in hazardous fertilizers (nitrogen, phosphates, etc.) and pesticides. But organic fertilizers have also appeared shy. Hence the idea of this project: can a complex fertilizer be obtained that is efficient and does not harm the plant or the soil? This was the need of the project.

### Technical goals

The aim of the project is to demonstrate and verify a technology (TRL4 to TRL7) for obtaining an ecological fertilizer complex made of natural zeolites activated with oxide nanomaterials, cations and active principles extracted from plants to increase fertilizing properties, increase / diversify active principles from plants, decrease nematode infections of plants and the rehabilitation of depleted soils (the latter being tried for the first time). A prototype will be obtained that will validate the technology developed in real relevant operating conditions. The tests will be performed using 4 test vehicle plants. How were they chosen? An important activity of the project will be the evaluation of the critical threshold of ionic osmolality from which the cation concentrations can negatively affect the plant and can be harmful so we chose plants that have underground development, close to the surface on the surface and above the ground.

In addition to these analyzes that will allow us to analyze the toxicity, we will perform the analysis of biodiversity at the beginning and end of the culture. The final realization of an environmental balance will allow us to obtain the environmental accreditation (in the future - the analysis lasting about 3 years) to validate the prototype as an ecological product.

#### Expected impact

##### -The products potential market:

*Identified customers:* agricultural producers regardless of the type of product (large grain crop, vegetable growing or fodder for compound feed).

*Direct competition:* Currently in EU there are no companies that produce such fertilizer-improvers. In general, either soil improvers, fertilizers or biocidal substances are present in the market, each of these categories of substances being applied successively from the establishment of the crop until the production phase.

*Market size:* The study of the opportunity to apply nanomaterials in agriculture began a few decades ago and has materialized in several publications in the literature and in several patents, but there are very few products containing nanomaterials on the market.

##### -The scientific development and valorization

Scientific papers obtained from nanomaterials research ( increase the qualities as nutrients, antinematous fertilizers).

Toxicity analysis of the addition of nanomaterials in plant culture, analysis of biodiversity sustainability for rehabilitated soils

Patents for customized solutions,

Technology transfer, manufacturing licenses

#### Known partners:

- IMT Bucharest (RDI Institute)
- CP-MED (SME)
- ICIA-Cluj (Chemistry analytical Institute)
- USAMV (University)

# DEMETRA

### Contact details:

Senior researcher, Dr, **Ileana CERNICA**  
National RDI Institute for Microtechnologies,  
IMT Bucharest

Email: ileana.cernica@imt.ro

Telephone: +40 723 666 939

### Needed profiles:

- Plants research RDI institutes
- Small or Large agricultural exploitations on field
- Fertilizer producers
- Any type of institution interested in topic



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