Faculté des Sciences
Université Mohammed V de Rabat

New low cost strategies of crop based on biodiversity and remote sensing to reduce the application of nitrogen fertilizers in the Mediterranean area

Pr. Souad El HAJJAJI
s.elhajjaji@um5r.ac.ma
Laboratoire de spectroscopie, Modélisation Moléculaire, Matériaux, Nanomatériaux, Eau et Environnement (LS3MN2E).

Type de Projet	International	Eau-environnement	**Domaine de Recherche**
Appel d'offre	PRIMA	Horticultural crops, nitrate pollution, biological inhibitors of nitrification,	**Mots Clés**

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Résumé

Fertilization is an essential practice to obtain the maximum production and quality of the crop harvest. However, the excessive use of nitrogenous fertilizers produces environmental problems related to the accumulation of nitrates in the soil and in the environment, mainly in lagoons, seas, oceans, etc., which trigger a series of problems that affect different society sectors. Mediterranean basin countries such as Spain, Italy, Morocco, and Tunisia have vulnerable areas in terms of the accumulation of nitrates in the environment, so there is a need to develop cultivation strategies that minimize the damage of nitrates in the environment by reducing the amount of nitrogen fertilizers applied on farms. Therefore, the objective of this project "TeleNitro" is to reduce nitrogen fertilizer in the crops by the design of a new cultivation strategy to reduce the contribution of nitrogenous fertilizers through the use of plants and/or botanical extracts with the capacity to slow down the transformation of ammonium into nitrate. Plants absorb and assimilate ammonium more effectively than nitrate, and in the environment ammonium pollutes less than nitrate.

To achieve this objective, the following specific objectives are proposed:

i) Knowing the spatial and temporal distribution of nitrate in agricultural systems (soil, plant, drainage solution), and the nutritional requirements of crops and their varieties; Calibrate and validate nitrate monitoring technology in agricultural systems;

ii) Selection of natural inhibitors of nitrification: plants and botanical extracts;

iii) Introduction and validation of the use of NI in the agronomic strategies of crops; Creation of a decision support system (DSS) that helps farmers to manage the fertilization of their crop plots in the most sustainable way possible;

iv) Conduct a life cycle study (LCA) and an economic study;

vii) Dissemination.

For this Project, a consortium has been formed made up of research centers from the countries mentioned above. These centers are CEBAS-CSIC (Spain), Miguel Hernandez University (Spain), National Research Council of Italy (Italy), Mohammed V University (Morocco) and Institut Supérieur des Sciences et de Technologie de l'énergie Gafsa (Tunisia). The researchers and their centers have all the knowledge and infrastructure necessary to carry out research tasks in the areas of knowledge required by the project: botany (biodiversity is applied when selecting NBI plants), chemistry (science sciences are introduced state-of-the-art omic analysis to characterize exudates and botanical extracts), plant physiology (the mechanisms by which NBI plants exude compounds with NI character are studied), microbiology (assays with microorganisms are used to test the inhibitory capacity of nitrification of NI compounds), remote sensing (satellite images are used to monitor the water and nutritional status of the crop), and all this in the agricultural environment to solve a serious environmental problem such as the accumulation of nitrates in soils and water sources , and, its effects on eutrophication.

Partenaires

- CEBAS-CSIC Spain, UMH Spain,
- National Research Council of Italy,
- Mohammed V University Morocco.
- ISSTEG – Tunisia,
- National Institute of Agricultural Research (INRA)