This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under Marie-Sklodowska Curie grant agreement No 101034285

UNIVERSITY: University of Navarre (UNAV)

WIT AREA:

☐**Automotive, Mechatronics and Advance Manufacture**

☐**Health**

☒**Energy**

☐**IA**

WIT PROGRAMME´S RESEARCH LINE NAME: Valorization of natural resources and waste

DOCTORAL PROGRAMME: Doctoral program in natural and applied sciences https://en.unav.edu/web/doctoral-program-in-natural-and-applied-sciences

COMPLETE DESCRIPTION OF THE LINE

Agricultural intensification has entailed environmental pollution from the excessive use of highly soluble mineral fertilizers, and the scarcity of natural resources for their manufacture (i.e. phosphate rock). As an alternative, in the context of a circular economy approach this project proposes a methodology to produce granular (non-pelletized) compound fertilizers from the reutilization of mineral nutrients contained in organic wastes derived from plant and animal production activities. The novelty of this approach is that the wastes (agricultural wastes, both vegetal and animal origin) are transformed into a metal-organic-framework (MOF) resulting from the complexation reaction of the mineral nutrients contained in organic wastes with chelating macromolecules obtained from the chemical transformation of organic precursors present in organic wastes (such as lignin, cellulose, proteins or

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sugars). The final product is a solid composite, suitable for the manufacture of granular compound fertilizers protected from soil losses and released by the interaction with root exudates.

RESEARCH GROUP NAME: Biological and Agricultural Chemistry

COORDINATOR:

- Last and first name; link to the "Portal of scientific production": García-Mina, Jose María
- Department: ENVIRONMENTAL SCIENCES
- Email: jgmina@unav.es
- Telephone number: 948 42 56 00 EXT: 806295

MEMBERS OF THE LINE RESEARCH:

Jose María García-Mina

Marta Fuentes

Javier Erro

Angel Zamarreño

María Movila

María Garnica

Maite Olaetxea

David De Hita

Wit
Welcoming
International
Talent

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ANOTHER RESEARCH LINES OF THE GROUP: list of them

· Mineral nutrition of plants: basic and applied aspects. New fertilizers.

· Development of molecules capable of improving the growth of plants subjected to biotic and abiotic stresses.

· Soil organic matter. Physical-chemistry of Humus.

· Plant-microorganism-humus interactions.

· New chemical methods for environmental remediation in water and soil.

· New methods for the efficient recycling of nutrients in the context of a circular economy.

- Entities involved in research lines and contact person:

✓ Academic entities:

*Centro de edafología y biología aplicada del Segura (CSIC) (España): Diego Intrigliolo
*Universidad de Valencia (España): Alberto Bouzas
*Universidad Pública de Navarra (España): Idoia Ariz
*Universidad de Michigan. Departamento de ciencias vegetales, suelo, microorganismos (Estados Unidos): Jim Cole
*Universidad de Oviedo. Departamento de Ingeniería química y tecnología del medio ambiente (España): José Mario Fernández

✓ Industrial entities:

*Magnesitas Navarra S.A. (España): Maitane Guembe

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*Depuración de aguas del Mediterráneo S.L. (España): Sofía Grau
*Timac Agro España S.A. (España): Oscar Urrutia

- Joint supervision of doctoral thesis with international universities or non-academic institutions:

Laetitia Janin. Ciencias Biológicas 2012. "Effects of new biomolecules with humic- and seaweed- related origin and nitrogen root uptake and metabolism in Cannola". Universidad de Caen (Francia). (Director Philippe Laine, Co-director: JM Garcia-Mina)

- Brief group overview (max. 1000 characters)

The research group of Biological and Agricultural Chemistry (BACh) of the University of Navarre works on research lines dealing with high agronomic efficient nutrient supplies and organic biostimulants based on humus and microorganisms properties. At the same time, soil remediation and circular strategies are studied in depth.

Research is related to identifying plant strategies, nutrient-soil and plant-microbial interactions in order to obtain sustainable and efficient vegetal nutrition strategies. Research interests of the group: nutrients use efficiency; nutrients soil protection; plant-nutrients mobilization; soil remediation; water-soil decontamination; circular phertilizers; plant-humic and nutrients-humic interactions.

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- Link of the group to the "Portal of scientific production"

https://www.unav.edu/web/departamento-de-biologia-ambiental/investigacion/grupos-de-investigacion/grupo-quimica-y-biologia-agricola-bach

ACADEMIC REQUIREMENTS:

Chemistry, Biochemistry, Agronomy or Environmental Science

ADDITIONAL REQUIREMENTS:

The PhD candidate, with a background in chemical synthesis, is expected to be willing to engage in experimental development, with a curious spirit and positive interaction with the group. A background in life sciences is a plus. Basic knowledge of Spanish, English and/or French.