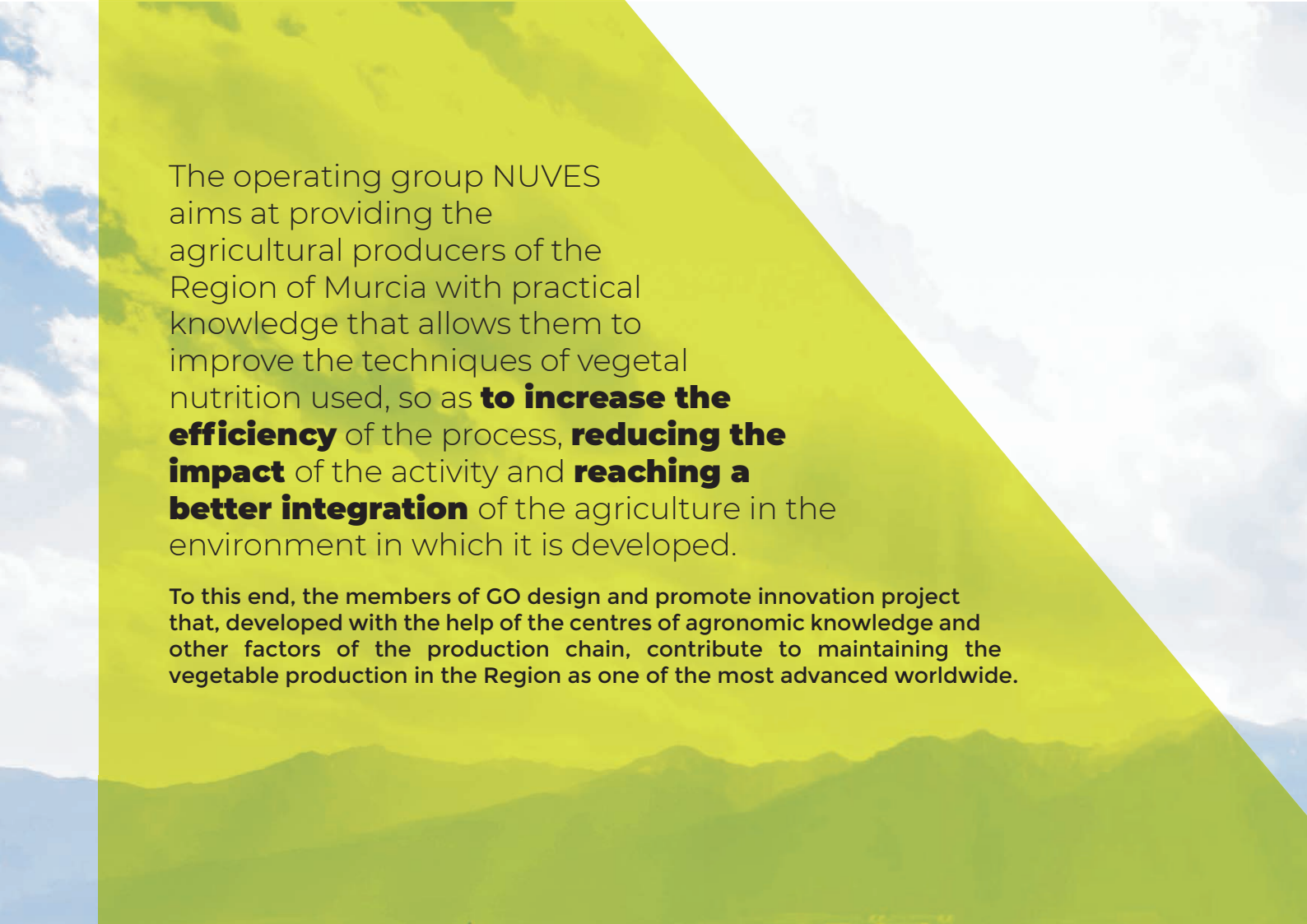



NITRIFICATION INHIBITORS IN HORTICULTURAL FERTIGATION



The operating group NUVES aims at providing the agricultural producers of the Region of Murcia with practical knowledge that allows them to improve the techniques of vegetal nutrition used, so as **to increase the efficiency** of the process, **reducing the impact** of the activity and **reaching a better integration** of the agriculture in the environment in which it is developed.

To this end, the members of GO design and promote innovation project that, developed with the help of the centres of agronomic knowledge and other factors of the production chain, contribute to maintaining the vegetable production in the Region as one of the most advanced worldwide.



The nitrification inhibitors project has provided an important practical knowledge to all farmers about the conditions in which its use provides benefits to the process of crops nutrition, allowing to increase the efficiency of the nitrogen fertilizers and obtain production equivalent in quantity and quality with a lower consumption of fertilizers.

The proper use of fertilizers with nitrification inhibitors helps to control the nitrogen losses due to deep percolation and **reduces the emissions of nitrous oxide**, while allowing plants to have a better ionic balance in the nutrients they absorb.

Although undoubtedly agriculture and plants, as living beings, are subject to innumerable uncontrollable conditions, **the use of this technique in combination with fertigation can help the people in charge of the production to reach a new level of technological development in our agriculture.**

FERTIGATION

The fertigation systems installed in horticultural crops allow to dose the nutrients according to the needs of the plant, locate the contributions in their root zone and all this almost immediately, thus facilitating ideal conditions for their development.

NITRIFICATION INHIBITORS

Nitrification inhibitors slow down the microbial oxidation of ammonium to nitrate, keeping both ions available to the plant for a longer time, reducing nitrate losses through leaching and improving the nutritional balance in the radicular system of the plants.

TRIALS

UPCT agri-food experimental station:

- Behaviour of two commercial inhibitors: DMPP and DCD
- Agronomic and physiological response of the crops: iceberg lettuce and broccoli.
- Incidence of inhibitors on the quantity and quality of the crops.
- Impact on the emission of greenhouse effect gases (CO_2 y N_2O).
- Programming fertigation strategies in other crops through different indicators of soil and plant hydric condition.

Commercial farms producing member of GO:

- Assessment of the use of inhibitors in crops in real production conditions.
- Effect of the use of inhibitors in reduced N nutrition techniques.
- Iceberg lettuce, broccoli, spinach, roman lettuce, celery, and watermelon.

CONCLUSIONS

The use of fertilizers with nitrification inhibitors has allowed to reduce the quantity of nitrate leached during episodes of high rainfall and inefficient irrigation.

The reduction in the leached fraction obtained has been greater using 3, 4-dimethylpyrazole (DMPP) than with dicyandiamide 1H-1, 2, 4-triazole (DCD) and with the fertilizers without inhibitors.

No differences have been obtained by the use of DMPP in quantity and quality of the crop.

The emission of greenhouse effect gases was reduced in the strategies with a lower contribution of N.

The use of soil sensors to control fertigation has made it possible to reduce the losses due to leaching and save water and fertilizers. These savings range from 8% for lettuce and 28% for broccoli.

The use of inhibitors in crops of lettuce (iceberg and roman) has allowed to reduce the contributions of N without affecting the harvest, increasing therefore the efficiency in the fertilizer and reducing the losses.

In celery, no production losses have been observed due to the use of inhibitors in strategies of restrictive fertilization in N.

The use of localized solid fertilizer with nitrification inhibitor has shown a very positive effect on the start of development in broccoli plantations.

In spinach, it has not been possible to alleviate the effects of a restrictive fertilization program in N through the use of nitrification inhibitors, thus compromising the commercial quality of the resulting product.

The use of nitrification inhibitors is not possible in ecological crops, as mineral fertilizers cannot be used.

INHIBITORS, NUVES PROJECT

The members of the Sustainable Vegetal Nutrition Operational Group Association (**Agromediterránea, Bonduelle, Grupo CFM, G's Spain, Intercrop Ibérica, Murciana de Vegetales**), under the coordination of the **Association of Producers-Exporters of Fruits and Vegetables of the Region of Murcia (PROEXPORT)**, promoted the project of improvement of fertigation through the use of inhibitors with the aim of applying properly the requirements related to nitrogen fertilization embodied in the **Law 3/2020 of recovery and protection of Mar Menor** improving this way the sustainability of the agricultural system integrated in the area.

The development of the works would not have been possible without an innovation centre such as the **Polytechnic University of Cartagena** which has made available for the project a complete team of scientists and the premises of the **Tomas Ferro Agri-food Experimental Station** for the development of the necessary trials before applying the results in real production conditions. In addition, the project had to have the collaboration of professionals of plant nutrition and innovation to be able to reach the goals: **ICL Iberia, Compo Expert, FMC Agricultural Solutions, Think Tank Innotech...**

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OPERATING GROUP OF
SUSTAINABLE
VEGETAL NUTRITION

PROJECT COORDINATION



Association of Producers-Exporters of Fruits and Vegetables of the Region of Murcia
56 associated companies. 1.2 millions T/year. 49,500 Ha of production

PARTICIPATING PARTNERS



INVESTIGATION CENTRE



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