"Gheorghe Asachi" Technical University of Iasi, Romania

DETERMINATION OF ^{15}N STABLE ISOTOPE NATURAL ABUNDANCES FOR ASSESSING THE USE OF SALINE RECLAIMED WATER IN GRAPEFRUIT

Cristina Romero-Trigueros[*], Pedro A. Nortes, Juan J. Alarcón, Emilio Nicolás

Departament of Irrigation, Centre of Edaphology and Applied Biology of the Segura (CEBAS-CSIC),
Espinardo University Campus, Murcia

Abstract

We reported the results of an isotopic study aimed at evaluating the medium to long-term effects of different water qualities and deficit irrigation strategies on the ecophysiology of grapefruit in a 7-year-old plantation in SE Spain. For a better understanding of the interaction between nitrogen and salts from reclaimed water, RW, an experiment using natural abundance (δ) of ^{15}N was conducted. This study showed that in grapefruit crop irrigated with RW leaf δ^{15}N value increased. We concluded that: (i) causal links exist between leaf δ^{15}N isotope and salt stress: positive correlation between values of this isotope and leaf salt content was showed; (ii) excess of nitrates provided by the reclaimed irrigation water were lost in the ecosystem through leaching, denitrification, etc., enriching the medium with δ^{15}N and increasing δ^{15}N values in plants. Therefore, the results of this study highlight the key role that salt content from RW can play in N uptake by plants and, hence, isotopic discrimination of leaf N. Consequently, it has been demonstrated the usefulness of isotopic discrimination measure to predict crop sustainability in the medium to long term when using water sources of different quality combined with deficit irrigation strategies.

Key words: enrichment of δ15N, gas exchange parameters, isotopic measurement, nitrogen use efficiency, saline reclaimed water

Received: May, 2014; Revised final: October, 2014; Accepted: October, 2014

---

[*] Author to whom all correspondence should be addressed: e-mail: cromero@cebas.csic.es