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Study of Chrysopogon Zizanioides ability to decontaminate irrigation water in Southwest Spain

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Conventional agriculture is characterized by the increasing use of agrochemicals to maintain and improve soil fertility. One of the main problems arising from this practise is the generation of leachates, which contain a high concentration of nitrate, nitrite, phosphate and other contaminating components, causing soil and water pollution. This is a common problem in irrigated areas such as Las Vegas Bajas del Guadiana (Extremadura, Spain).

Different techniques are being developed and used to control leachate generation, however, these practises happen to be very expensive. In this situation, the emergence of alternative technologies such as phytoremediation, based on the ability of some plants to absorb and accumulate high concentrations of pollutants such as heavy metals, organic compounds and radiactive components, is being explored to restore the degraded lands and it seems very feasible, economical and environment-friendly.

The Vetiver grass (Chrysopogon zizanioides) is a perennial grass originally from India, widely known for its ability to retain soil and prevent erosion. Recently, the new use of this grass for phytoremediation has stimulated research in this area. It produces up to two meter high plant with a strong dense and mainly vertical root system with emerging secondary roots which form a dense and strong network that grows horizontally and vertically to depths greater than 5 meters, useful in soil erosion control. It is vegetatively propagated and is non-invasive, resistant to pests and diseases and widely used worldwide for soil and moisture conservation and soil restoration.
This study, carried out in Badajoz, in the Southwest of the Iberian Peninsula, focuses in the use of Vetiver in the area. Its adaptation to climatic and soil conditions was tested for three years. Bunches of selected species were first grown in pots and later planted in experimental plots exposed to the weather conditions in the area.

When adaptation to edaphic and climatic conditions was confirmed, several tests were developed to analyze its characteristics and abilities as a phytoremediation species. These tests were developed in a greenhouse by controlling both the plant and its ability to decontaminate leachate from conventional agriculture irrigation. The analysis of water and leachates indicated
that the species is able to significantly decrease the concentration of some chemicals such as nitrates, nitrites and phosphates.