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Residues of Clomazone, Quinclorac and Propanil in Soil, White Grain and Water in Rice Paddies in Uruguay

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Introduction

The increase in rice yield is generally associated to the progressively intensive use of pesticides for agriculture to generate and concrete the high potential of production that many present crops have. As an example, in 2004 Uruguay imported 67% more fertilizer and spent more than 90% in herbicides than in 2001. This increase in agricultural production must introduce an environmental dimension to

keep it as an sustainable activity. Part of the problem is the pesticide residues and its eventual development to a risk, because products used in rice have higher chance of contaminating water than products used in other crops. This require, to generate local Information on the level of residues existing in different crop systems used in the country

Objective

The objective was to determinate the existence of residues of Propanil, Clomazone and Quinclorac (the most used herbicides) in soil, water and grain in rice paddies, as well as in the Cebollatí river (with more than 10.000 ha. of rice planted in its basin)

Materials and Methods

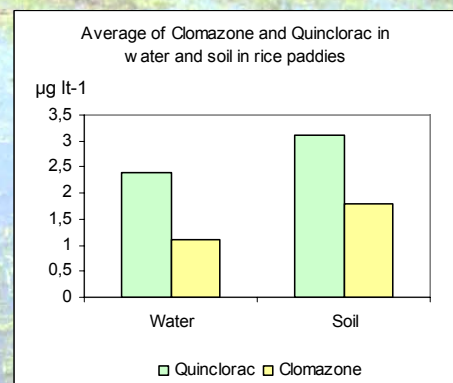
Three cropping systems were selected: No previous rice crop (one site), rice crop after four years of pasture (two sites) and single crop system: two years crop - one year fallow (4 sites). The samples were collected in three moments at the fields: before planting (water and soil), during the cycle of cultivation (water) and at harvest time (soil, water and white grain). The water samples were collected from the Cebollatí River from august to april. The laboratory method used was EPA 505.2. In order to determinate residues also in solid particles also, the water samples were not filtered.

Results

SOIL: No Propanil was found. There were residues of Clomazone in 43% of the samples and residues of Quinclorac in 24% at the first sampling, before the first application of any product. In the second sampling, after harvesting, 72% were positive in Clomazone and 67% positive for Quinclorac. The positive results on the first soil samples indicated persistence of residue of at least a year. Concentration range: 1.2 to 9.2 $\mu\text{g It}^{-1}$ for Clomazone and 0.2 to 3.9 $\mu\text{g It}^{-1}$ for Quinclorac. The largest amounts of residues were associated with the most intensive production systems.

WATER: Residues of the three herbicides were found (5%, 80% and 40% of Propanil, Clomazone and Quinclorac respectively). In average at the drainage zone of the field it was 54% more Quinclorac and 464% more Clomazone compared to the water coming in. Levels oscillate between 0.01 and 7.3 $\mu\text{g It}^{-1}$. Residues of Clomazone were found during all the monitoring period in the Cebollatí River. The levels went from 0.2 to 0.40 $\mu\text{g It}^{-1}$

WHITE GRAIN: No residue was found.



Conclusions

Although one year of monitoring does not guarantee definitive conclusions, some points have been identified to organize future courses of action for investigation. The most important problem would be the residues found in the use of Clomazone and Quinclorac, mostly Clomazone. The largest residue levels were associated to the most intensive systems of rice production

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