

## EVIDENCES OF THE ALLELOPATHIC PHENOMENON

Macías F. A., Oliveros-Bastidas A., Castellano D., Marín D., Simonet A. M., Molinillo J. M. G.

*Grupo de Alelopatía, Departamento de Química Orgánica, Facultad de Ciencias,  
Universidad de Cádiz, C/. República Saharaui s/n, Apdo. 40, 11510- Puerto Real,  
Cádiz, Spain.*

### INTRODUCTION

Assurance of any allelopathy test could be increased by reflecting natural conditions performing bioassays *in situ* (1). An approach to these conditions is the bioassay in rotation. In this bioassay, the receptor plant is in contact with exudates from the donor plant. Here we present the study of the different variables that could affect the activity of compound present in rye exudates. We have also study the biodegradation and transformation of these compounds at natural concentration levels. The results obtained allowed us to propose the role of each product in the activity observed in these exudates.

### DESCRIPTION OF THE BIOASSAY

Different densities of rye seeds (12 kg/ha to 2 kg/ha) were sown on wool rock blocks and glass perlite with Hoagland's nutritive solution. The aerial parts of the seedlings were removed after two weeks from germination, maintaining the root inserted in the blocks. Then, the blocks were inverted and the receptor seeds (*Sinapis alba*) were sown in the exposed side.

After germination, samples from the nutrient solution were taken every 4 days, extracted and analysed using HPLC-DAD to obtain the concentration of each allelochemical in the different seed population densities. In order to assure which compound is the responsible of the activity, pure compounds were added at the concentration obtained in additional blocks.

The parameters used for determining the effect of the different compounds in the receptor plant were stem (SL) and root (LR) length and fresh weight (FW). *S. alba* seedlings were extracted and analysed to ensure the absorption of the allelochemicals.

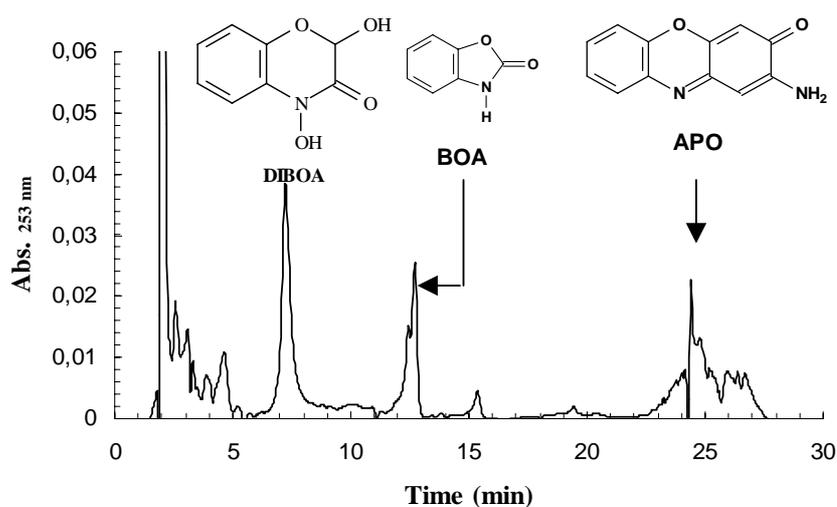


Figure 1. - HPLC profile of the receptor seedling.

HPLC analyses of the Receptor Seeds (Figure 1) showed that the plant adsorbed the released compound 2,4-dihydroxy-1,4-benzoxazin-3-one (DIBOA) and their decomposition products 2-benzoxazolinone (BOA) and 2-amino-3H-phenoxazin-3one (APO). After six days, a ratio 73:22:5 for APO/ DIBOA/BOA was observed in the nutrient solution. On the other hand, the ratio observed at that time in the seedlings was 49:31:21. The activity based on FW showed a decrease of 22% from the control, a 30% for SL and a 45% for LR

## REFERENCES

1.- Inderjit and Nilsen, Erik (2003) Bioassays and Field Studies for Allelopathy in Terrestrial Plants: Progress and Problems. *Crit. Rev. Plant Sci.* 18:673-693.