MANAGEMENT EFFECTS ON GLYPHOSATE AND AMPA CONCENTRATIONS IN THE PM10 EMITTED BY SOILS OF THE CENTRAL SEMIARID REGION OF ARGENTINA

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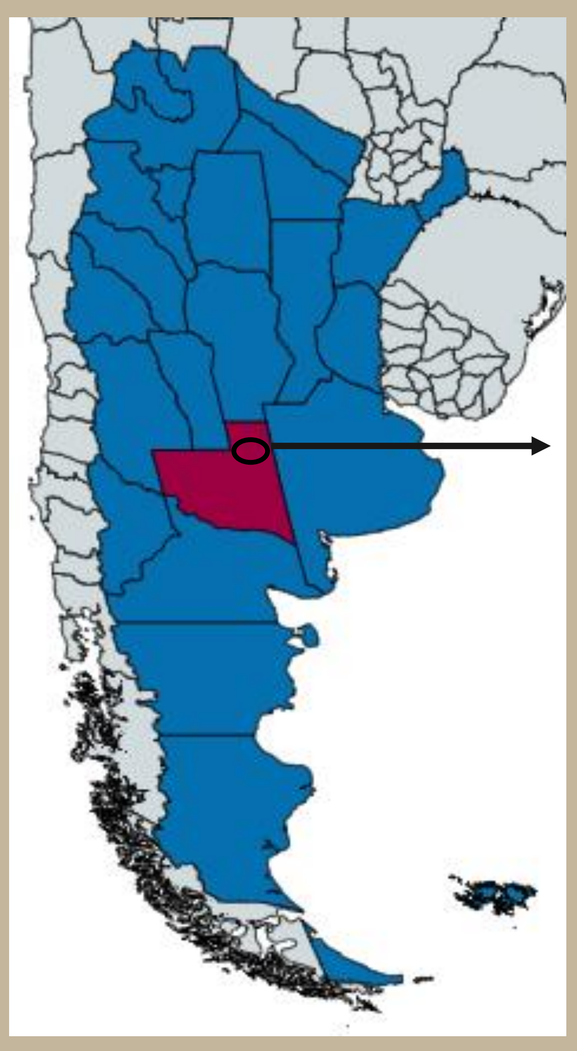
1 - INTRODUCTION

Particulate material less than 10 microns (PM10) is important because it is related to negative effects on human health. The soil is one of the most important sources of PM10 which can be emitted by wind erosion, tillage and traffic on unpaved roads. In agricultural soils different fertilizers and agrochemicals are used to produce food. Glyphosate is the main herbicide used in Argentina and in the world, being the dose and the number of applications per year variable in different management system. The objective of this study was to analyze the concentration of glyphosate (GLP) and its main metabolite, AMPA, in PM10 emitted by soils with different management and uses of the herbicide.

2 - MATERIALS AND METHODS

Surface samples were taken from the first 5 cm of 16 soils from the central pampa semiarid region (Fig. 1).



- **9 soils** with harvest crop (**HC**) mostly resistant to GLP, under direct sowing; with at least 3 applications of GLP per year.
- **5 soils** with forage crops (**FC**) mostly non-GLP resistant, under conventional tillage; one application of GLP per year.
- **2 soils** with permanent pasture (**PP**) that did not receive GLP and tillage during the last 30 years.

Figure 1: Location of the analyzed soils.

Using the Easy Dust Generator (EDG) coupled to an electrostatic precipitator (Fig. 2) PM10 from the soils samples were extracted. The glyphosate and AMPA content were determined in the soils and PM10.

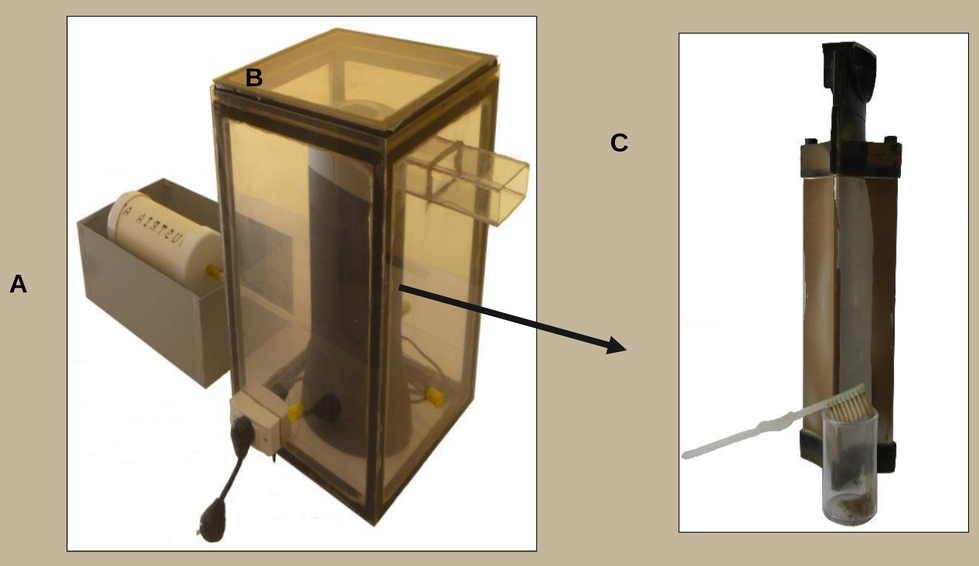


Figure 2: View of the EDG (A) coupled to an electrostatic precipitator (B) and PM10 collected (C).

3 - RESULTS AND DISCUSSION

Glyphosate and AMPA percentages of detection are shown in Table 1. Contents of glyphosate and AMPA in the soil and in PM10 were higher in HC than in FC and PP ($p<0,05$) (Fig. 4).

	PP	FC	HC
GLP Soil	0%	80%	100%
AMPA Soil	66%	100%	100%
GLP PM10	83%	100%	100%
AMPA PM10	100%	100%	100%

Table 1: Percentage of detection of glyphosate and AMPA in soil and in PM10
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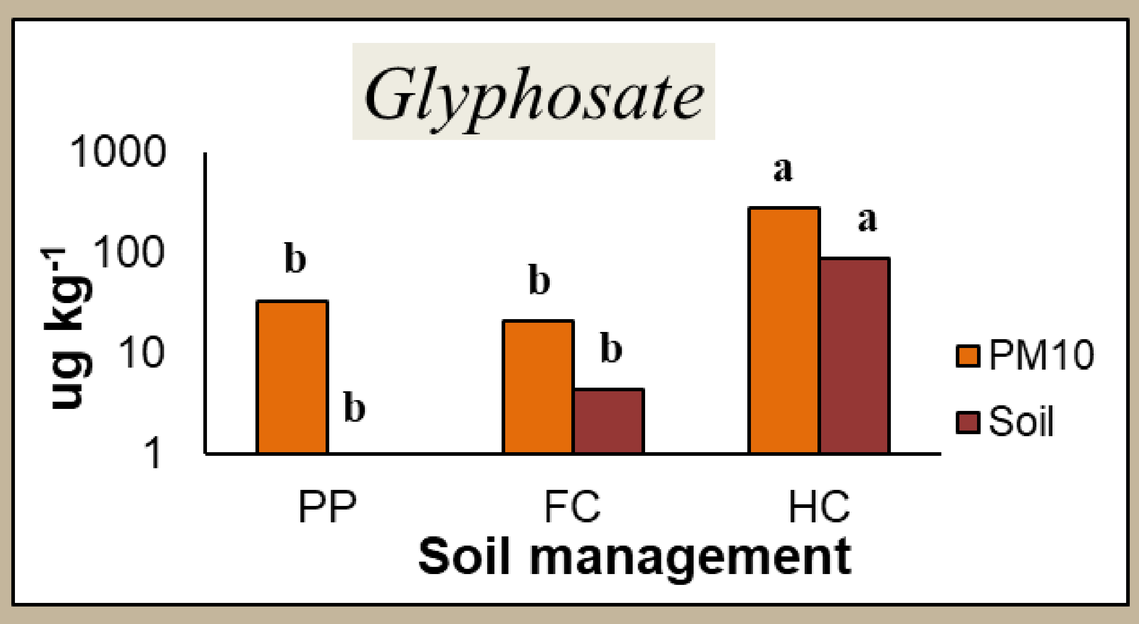

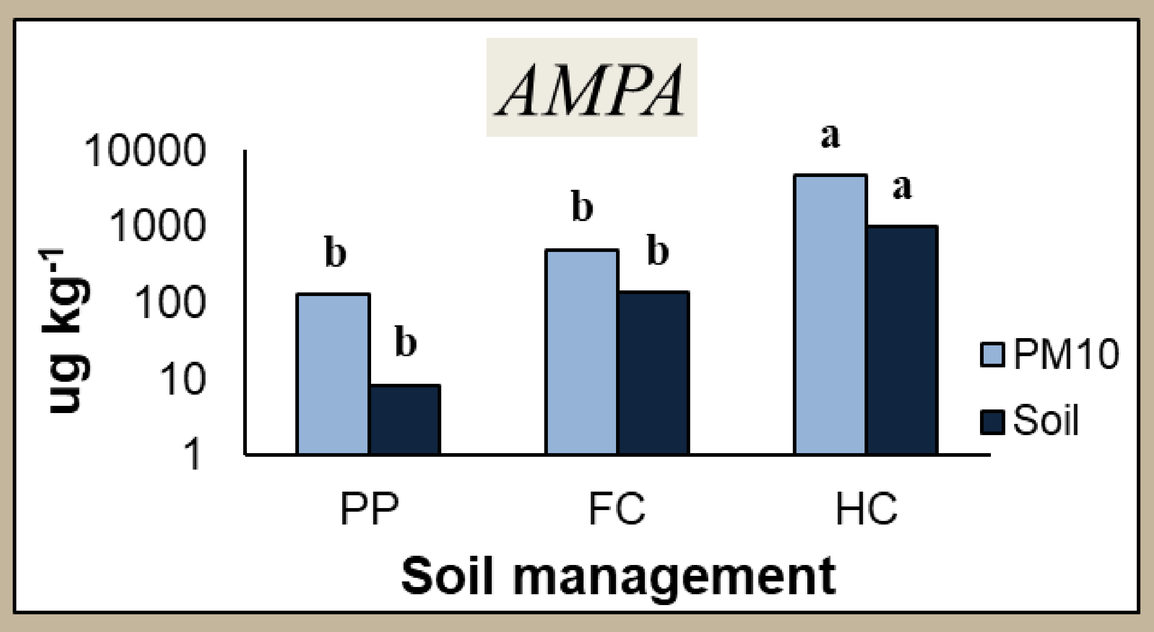

Figure 4: Glyphosate and AMPA contents in soil and in PM10. Differents letters mean significant differences ($p<0,05$).

4 - CONCLUSIONS

This study shows that the most frequent use of glyphosate increases its content and that of AMPA in the soil and PM10. It is confirmed that the contents of glyphosate and AMPA in PM10 are greater than in the soil under different management systems.
Our results suggest that is highly probably the existence of glyphosate and AMPA in the PM10 emitted from agricultural soils and that, in this way, glyphosate and AMPA be transported to not target areas. All those results should by confirmed under field condition.