

INTRODUCTION

Waste disposal and pesticide pollution are two great environmental problems of great concern. Therefore to look for sustainable solutions to assure an environmental future is mandatory



Biotechnologies such as vermicomposting helps to stabilize organic wastes and allow their use as soil amendments.

We investigate the benefits of new agro-industrial vermicomposts as amendments in the control of pesticides residues leaching in soil to prevent water pollution



EXPERIMENTAL SET UP

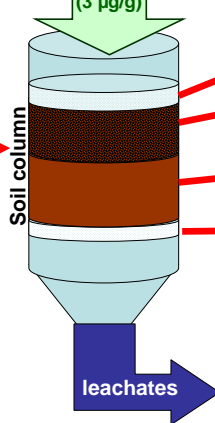
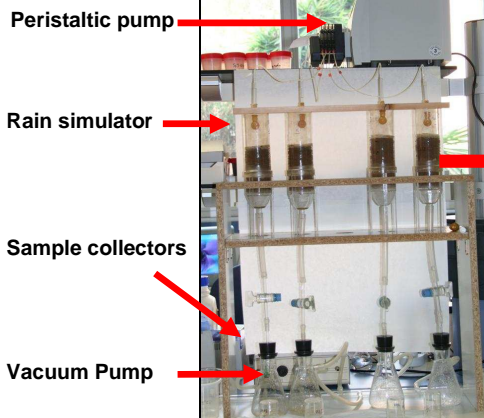
Experiments with packed Soil columns allow to understand pesticide leaching phenomenon avoiding problems of sampling heterogeneity and preferential flows.

Diuron and imidacloprid and their metabolites

DPMU: 3-(3,4-dichlorophenyl)-1-methylurea
 DPU: 1-(3,4-dichlorophenyl)-urea
 DCA: 3,4-dichloroaniline
 and CNA: 6-Chloronicotinic acid

Soil	pH	TOC g kg ⁻¹	Sand %	Silt %	Clay %	-	-	-
Chromic Cambisol (S ₁)	6.0	3.6	70	17	13	Sandy loam soil		
Chromic Vertisol (S ₂)	8.2	9.3	14	51	35	Silty clay loam soil		

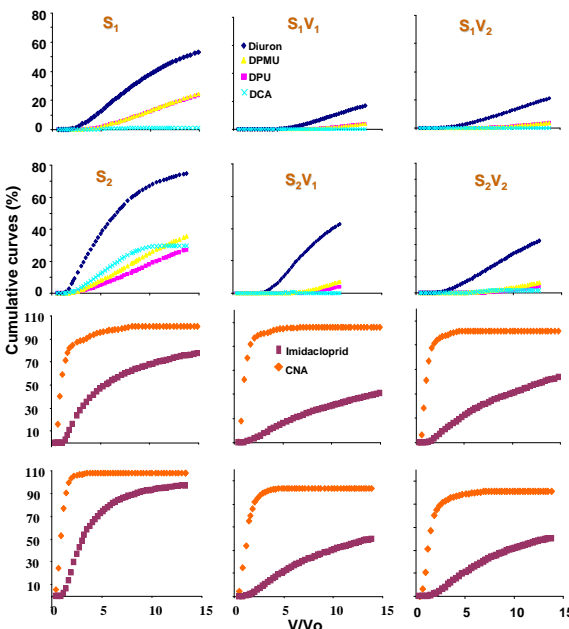
Vermicompost	pH	TOC g kg ⁻¹	TEC g kg ⁻¹	HA g kg ⁻¹	FA g kg ⁻¹	C/N	HR %	Lignin g kg ⁻¹
Spent Grape Marc (V ₁)	6.8	344	62	35	27.5	22	18	434
Biosolid vinasse (V ₂)	7.3	295	247	146	101	11	84	255



Acid washed Sand and glass wool
 Soil layer (2.5 cm) unamended (S₁ or S₂) or 5% amended with spent grape marc-vermicompost (V₁) or biosolid vinasse-vermicompost (V₂)
 Unamended Layer of the selected soils S₁ or S₂.
 Acid washed Sand and glass wool



RESULTS



Leaching in the silty clay loam soil (S₂) was more evident than in the sandy loam soil (S₁).

Vermicompost in the soil columns significantly reduced the leaching of all chemicals that were mainly retained in the upper layer.

Diuron leached to a greater extent (>40%) than DPMU and DPU.

The DCA metabolite was hardly determined in the leachates except in the unamended clay loam soil column (S₂).

Imidacloprid was almost entirely leached in the unamended soils (>75%). Its CNA metabolite was quickly leached in all soil columns.

The leaching of these chemicals was not enhanced by the increment in the dissolved organic carbon from the amended soils.

