

RESIDUAL MOBILITY AND PERSISTENCE OF THE HERBICIDE DIURON FOLLOWING TWO-PHASE OLIVE MILL WASTE ADDITION TO SOIL

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INTRODUCTION

Two-phase olive mill waste (TPOMW) is a by-product of olive oil extraction, contains up to 90% organic matter, and may be used as soil amendment.

Diuron (3-(3,4-dichlorophenyl)-1,1-dimethylurea) is a commonly used herbicide in olive groves and its intensive use is frequently responsible for the contamination of surface and subsurface waters. The aim of this study was evaluate the

residual mobility and persistence of diuron following the addition of TPOMW to soils.



The total amounts of diuron extracted from unamended and TPOMW-amended plots are shown in Fig.1. At the beginning of the study, diuron retention had increased from 6% in the unamended soil to 11% and 17% for TPOMW1 and TPOMW2, respectively. The residence time of diuron was longer with increasing TPOMW rate. The TPOMW amendment decreased diuron's vertical movement. Thus, diuron residues were found down to 60 cm depths in the unamended plots, but to no more than 30 and 10 cm depths for TPOMW1 and TPOMW2, respectively, suggesting that no apparent leaching of diuron would occur in these soils.



MATERIALS AND METHODS

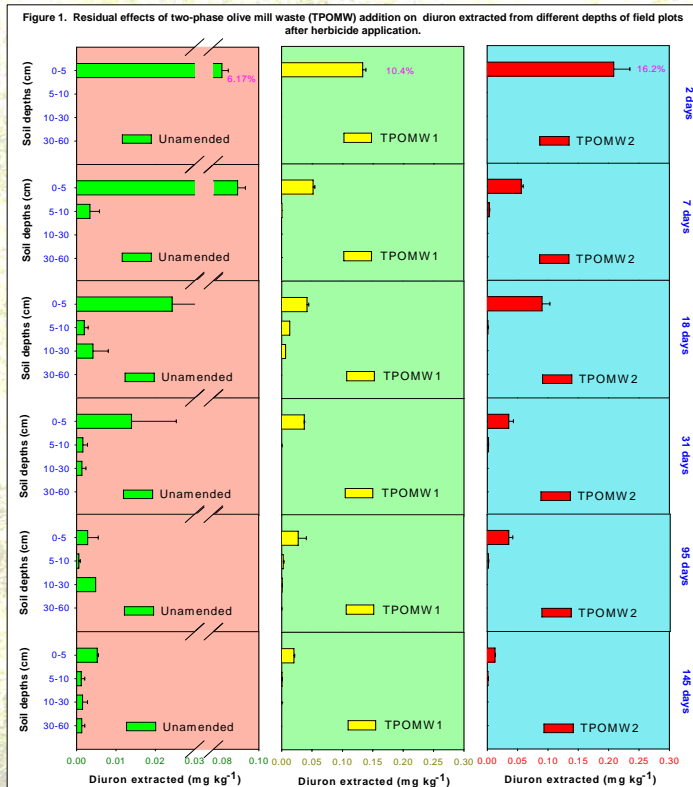
Field experiments were conducted on an olive grove soil amended for seven years with TPOMW. Treatments included an unamended control, and 30 (TPOMW1) and 60 (TPOMW2) Mg ha⁻¹ DW equivalent.

Table 1: Initial physicochemical characteristics of the soils and the organic amendment

Properties	Unamended	TPOMW1	TPOMW2	TPOMW
Organic carbon (g kg ⁻¹)	10.26	23.93	33.83	535
Soluble organic carbon (g kg ⁻¹)	0.122	0.152	0.189	36.5
pH (H ₂ O)	8.03	8.01	7.91	5.70
% Sand		60.61		
% Silt		19.72		
% Clay		19.67		

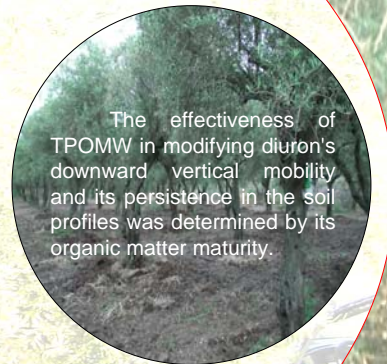


RESULTS AND DISCUSSION



OBJECTIVE

The objective of the present study was to evaluate the residual mobility and persistence of diuron following the addition of TPOMW to soils.



Acknowledgments

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Two-years after the last TPOMW-application diuron was applied at a rate of 3 kg ha⁻¹ to unamended and TPOMW-amended plots. At selected times after the application, four soil subsamples were taken randomly at different soil depths (0-5, 5-10, 10-30, and 30-60 cm). Samples were extracted with methanol at 1:2 soil solution ratio, and the extracts were centrifuged, filtered, and analyzed by HPLC.