



Efficiency of several biomix to retain and degrade pesticides under Swiss pedo-climatic conditions

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Context: Switzerland

- Most surface waters are contaminated with pesticides
- Swiss agriculture ≈ 1300T/year (2007)
- Wastewaters are separated (stormwater and sewage)
- No federal legislation about management of
wastewaters contaminated with pesticides

Objectives

- Test different biomix for retention and degradation of pesticides
 - Pesticides commonly used in viticulture
 - Conditions close to agricultural practices

Experimental design:

	Clay	Silt	Sand	OM	pH
S1	21	43	36	3.6	7.8
S2	28	41	24	2.4	7.9

Biomix	Soil		Straw	Compost C1	Compost C2
	Type	%			
S1-70/30	S1	70	30	-	-
S2-65/35	S2	65	35	-	-
S2-50/50	S2	50	50	-	-
S2-25/50/25C1	S2	25	50	25	-
S2-25/50/25C2	S2	25	50	-	25





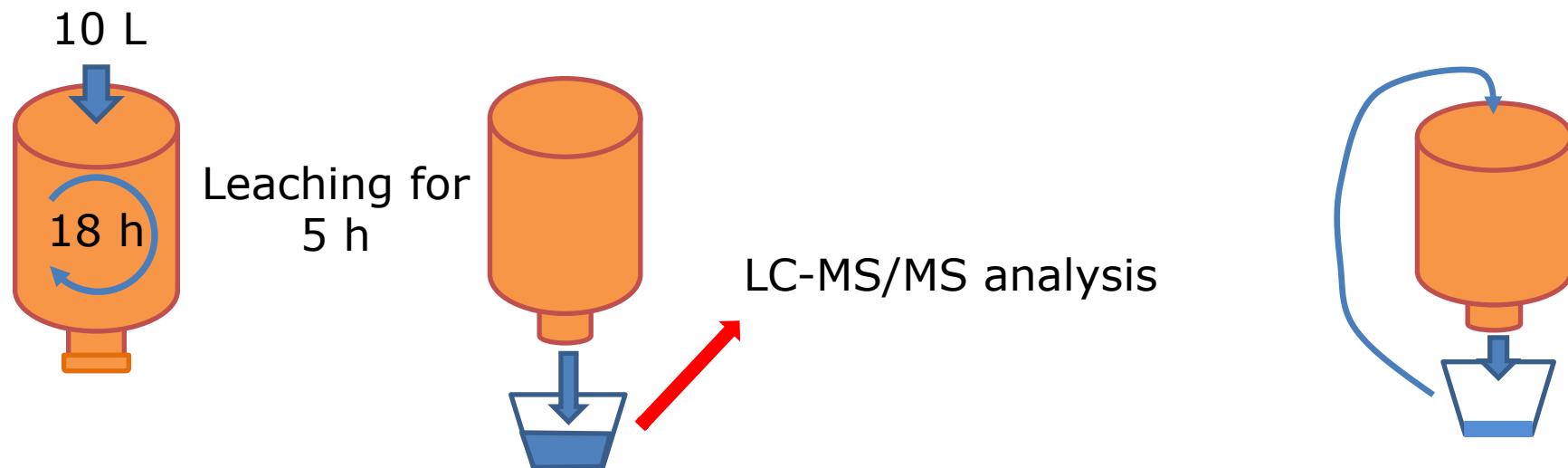
Experimental design :

3 consecutive treatments of biobeds with 10 L tap water and

2 Herbicides : Banex® (*diuron*), Alce® (*terbuthylazin*)

3 Fungicides : Switch® (*fludioxonil + cyprodinil*), Flint® (*trifloxystrobin*)

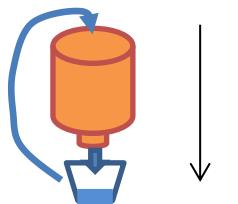
- 1) : 33 to 50 mg L⁻¹ each active substance
- 2) and 3) : 33 to 50 mg L⁻¹ fungicide active substance



Experimental design:

Last treatment (3):

September 2010



Leachate 3

Freezed - unfreezed

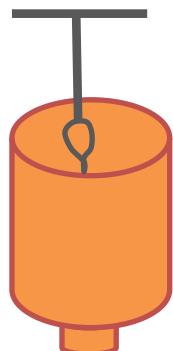
January 2011



Leachate 4

Biomix sampling

January 2011



T 4 months



MeOH extraction

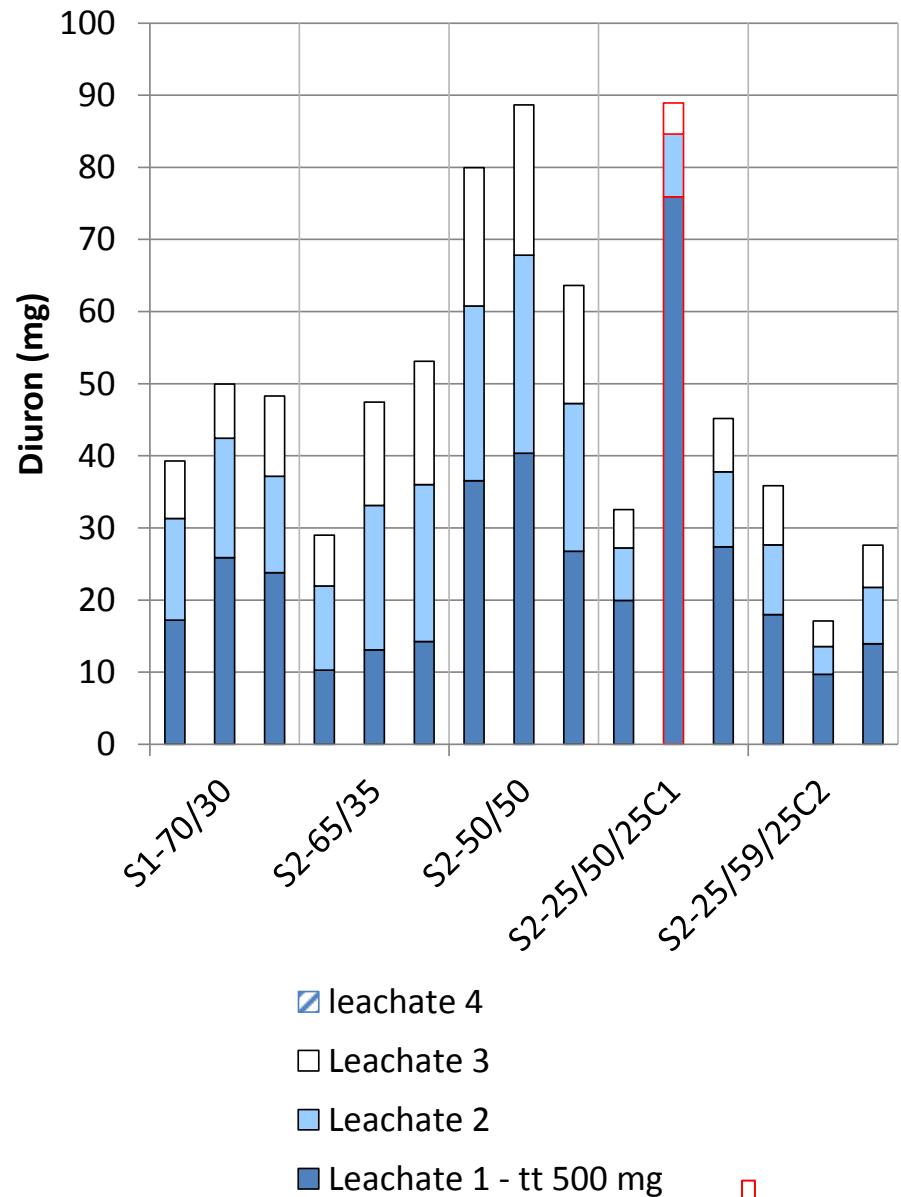
HPLC UV-DAD analysis



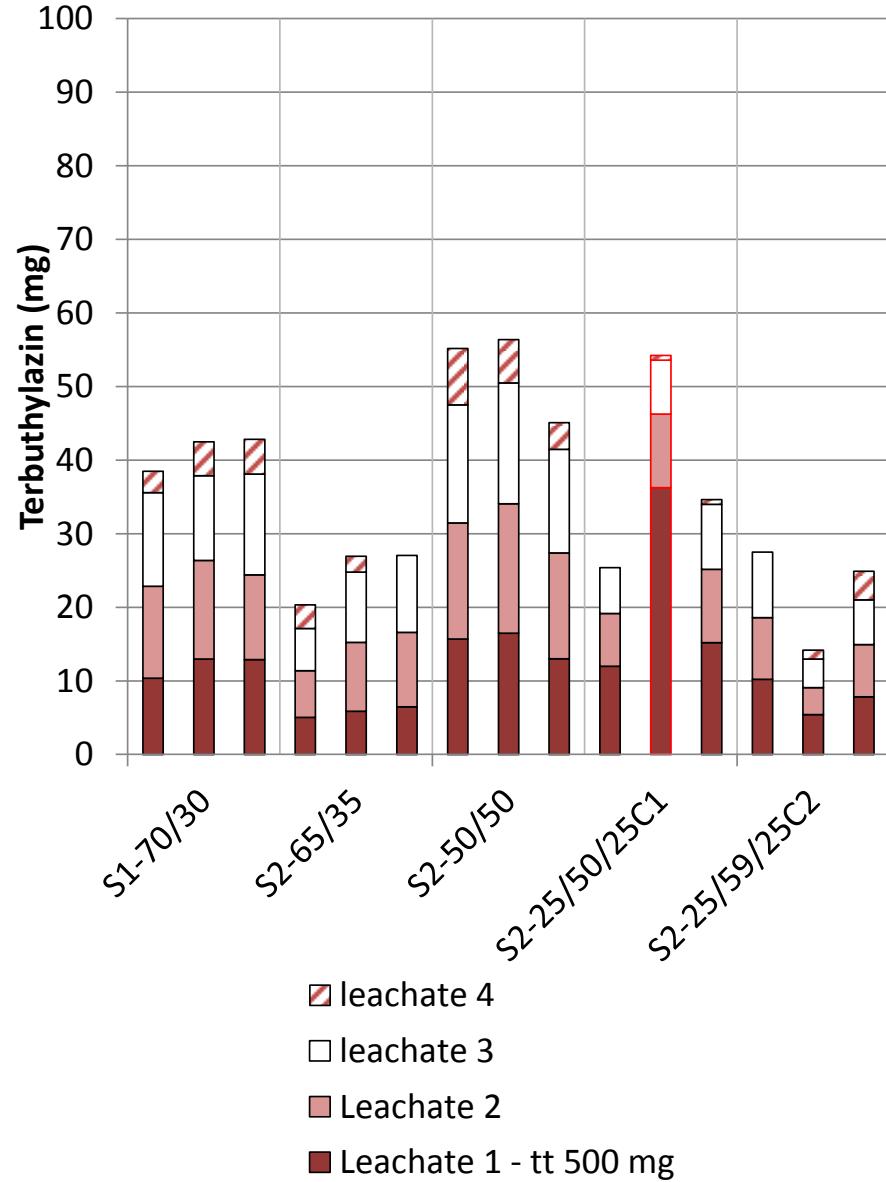
T 13 months

- Ambient temperature
- Watered (pF3) : march to july

Export of diuron

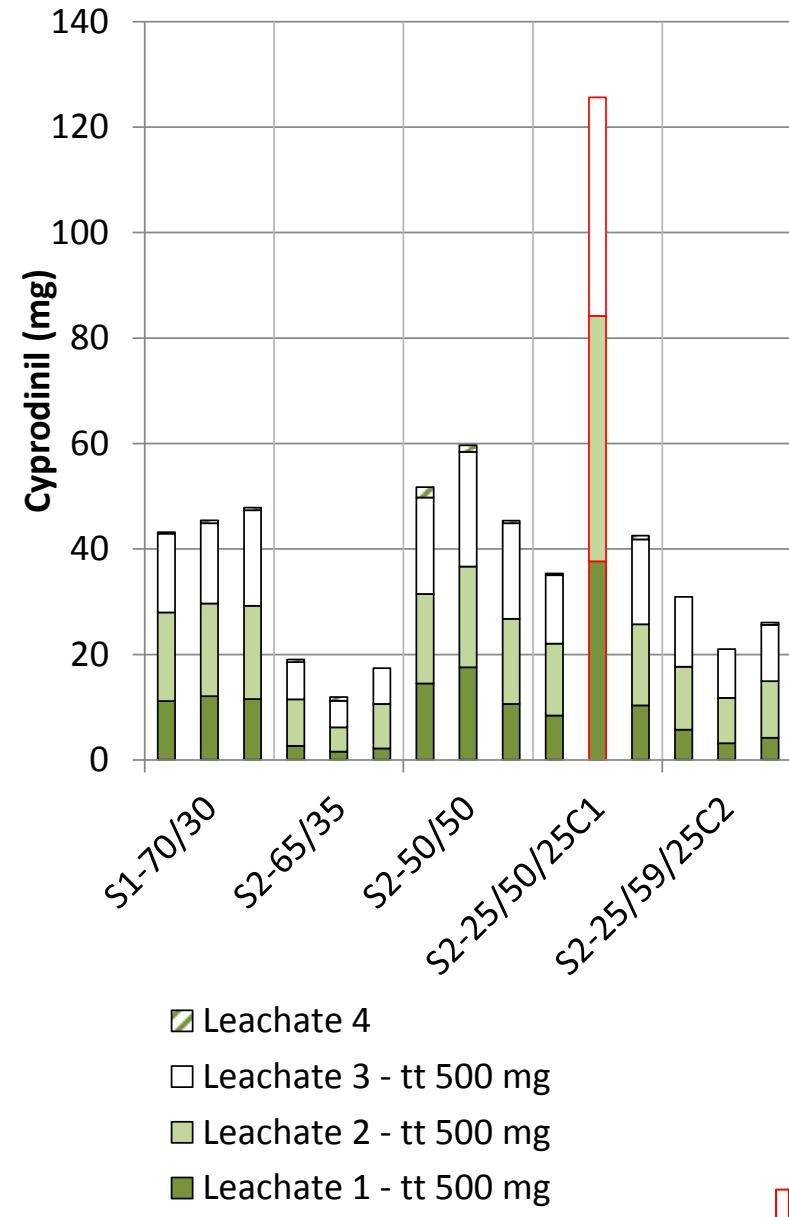


Export of terbutylazin

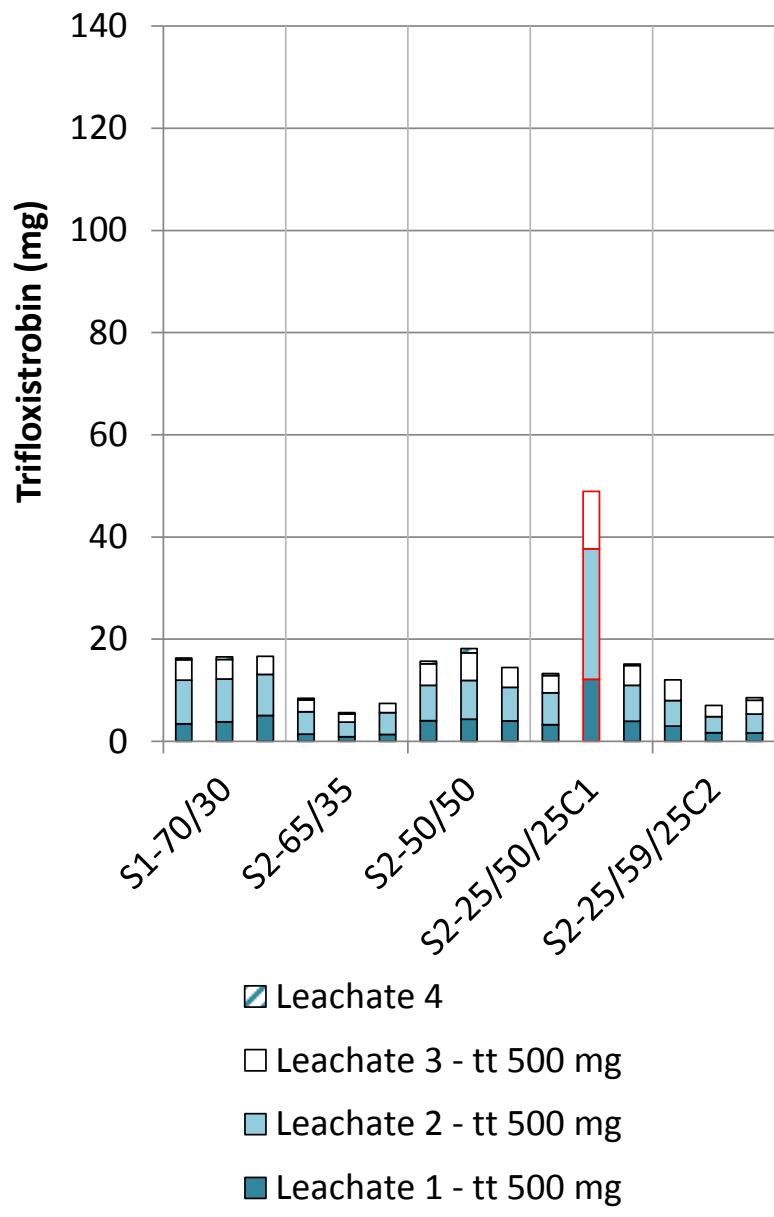


Biobed with immediate leaching

Export of cyprodinil

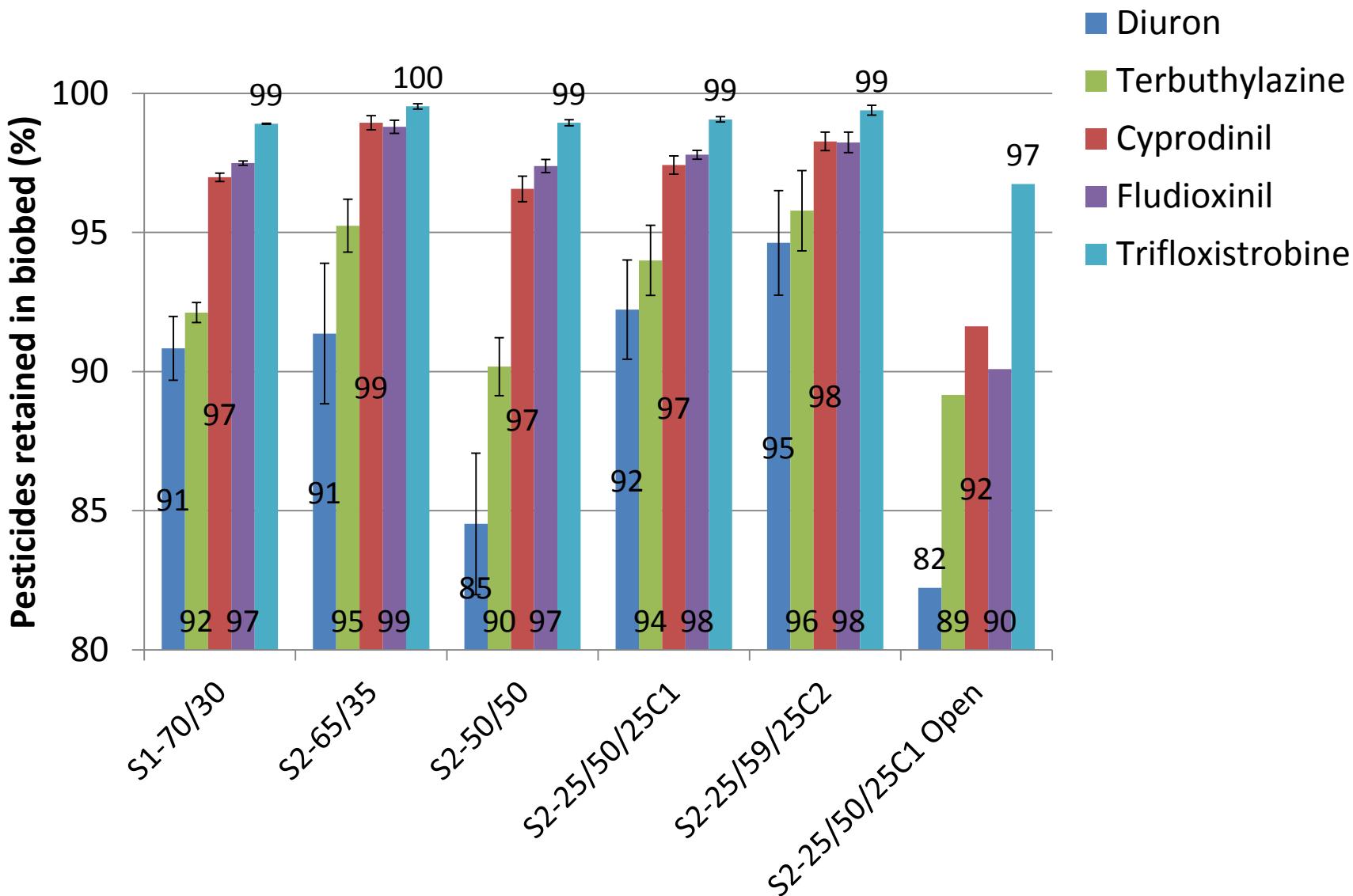


Export of trifloxystrobin

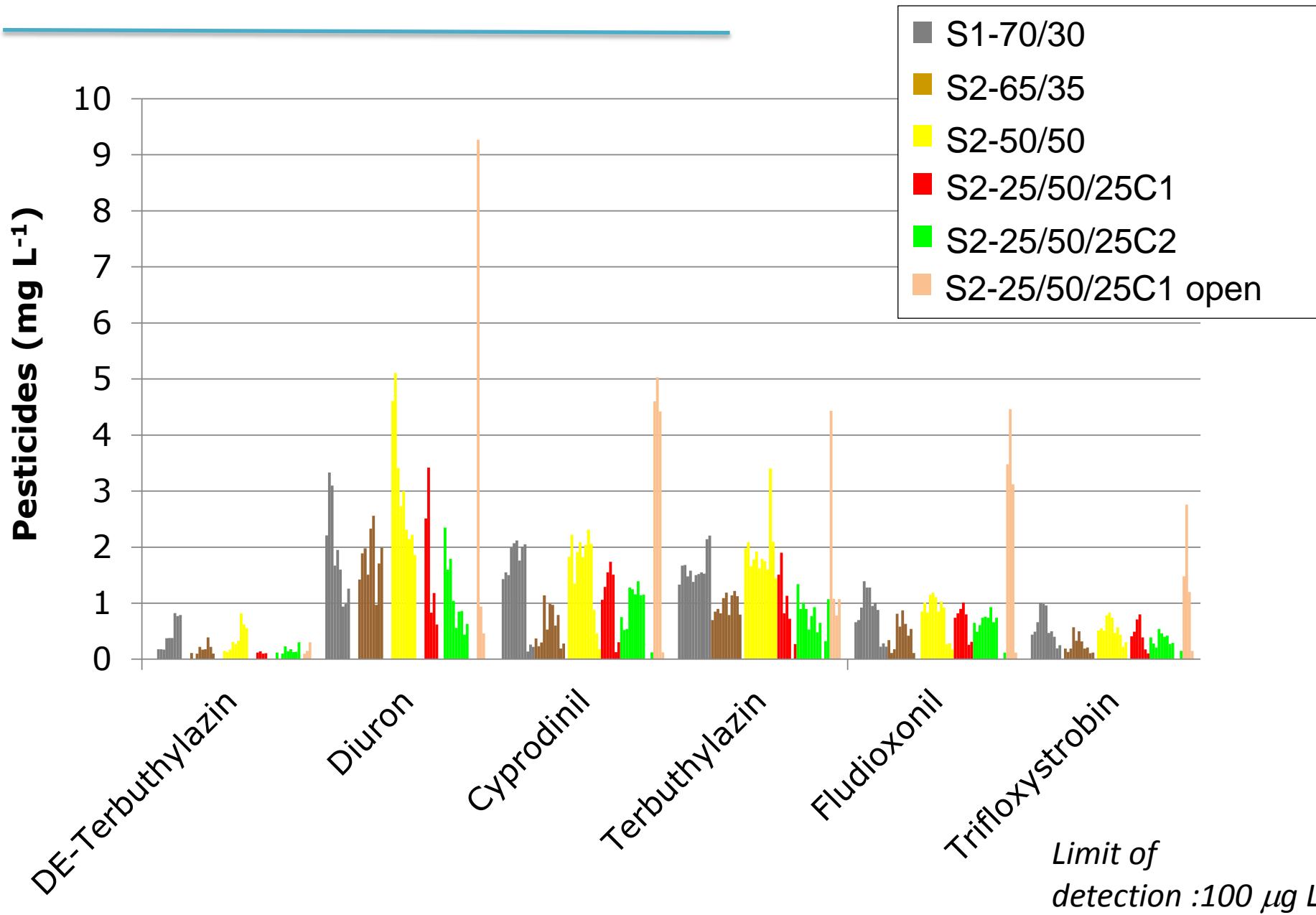


Biobed with immediate leaching

Results retention :



Results – Retention:





Biomix were sampled and removed in january 2011, 4 months after last treatment

Results

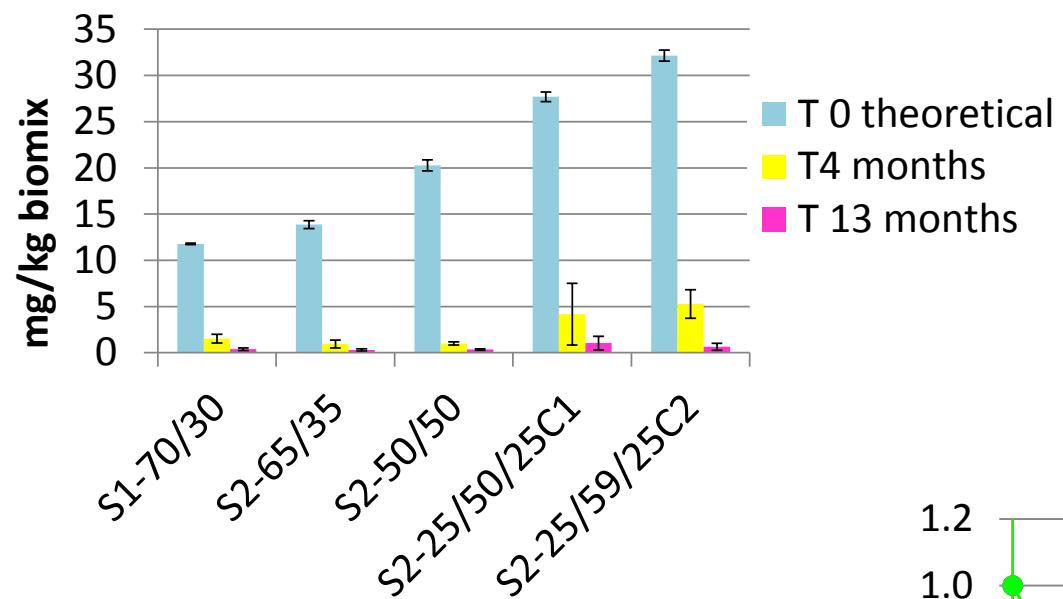
Biomix with high amount of soil showed reductive processes

S2-65/35

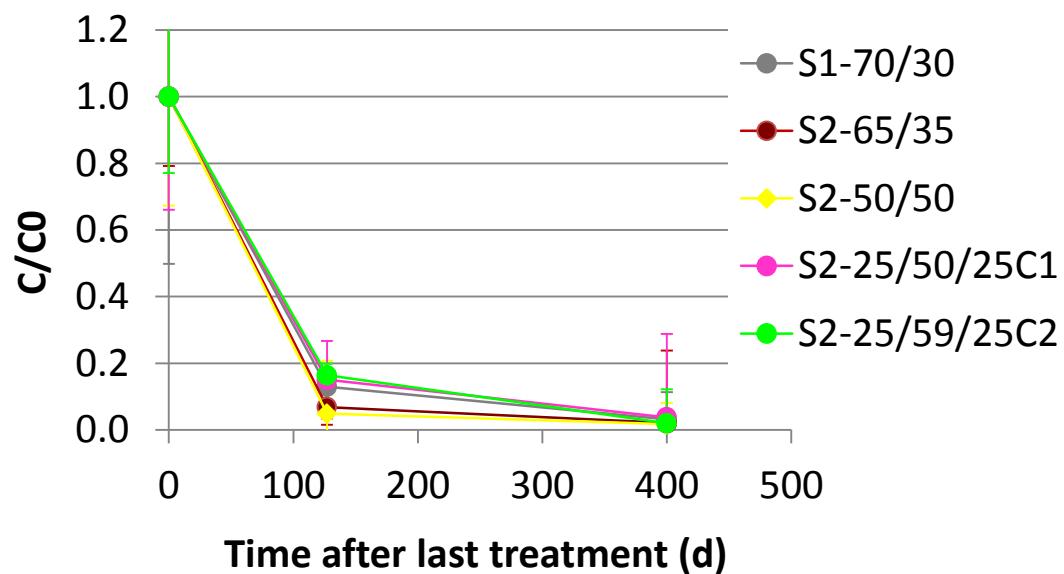


Results Degradation:

Diuron

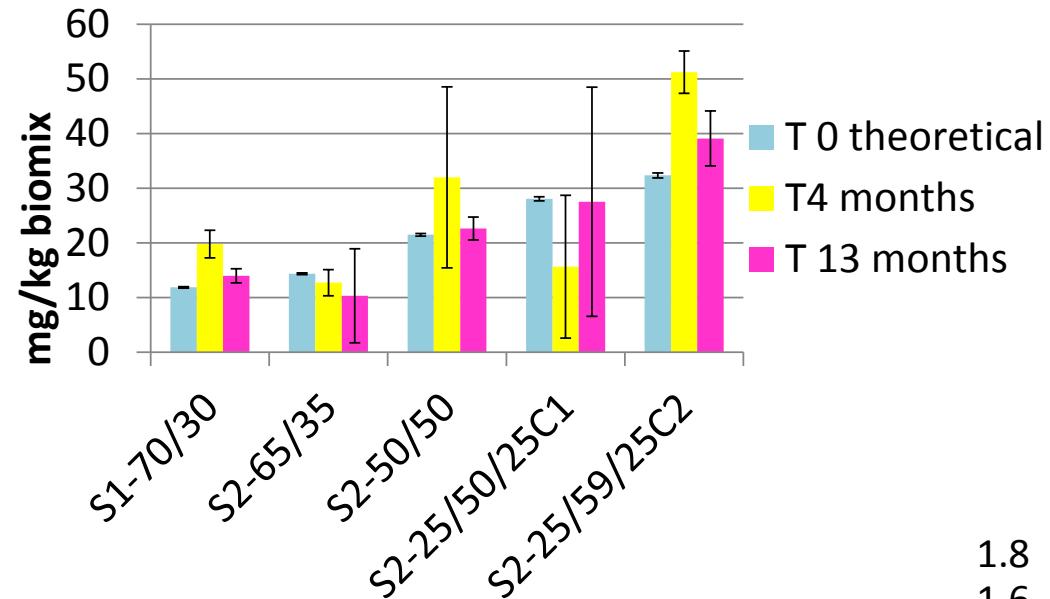


Diuron

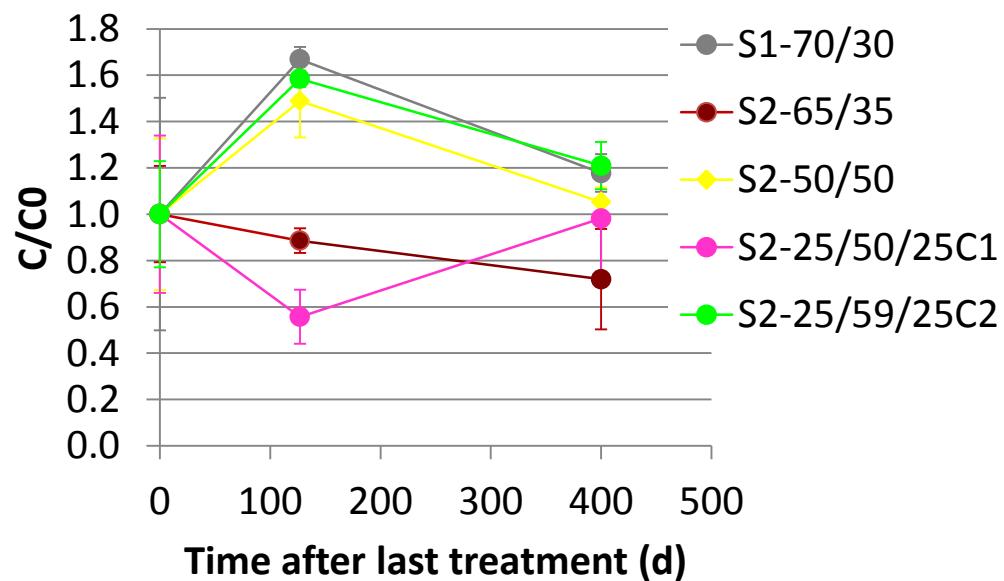


Results Degradation:

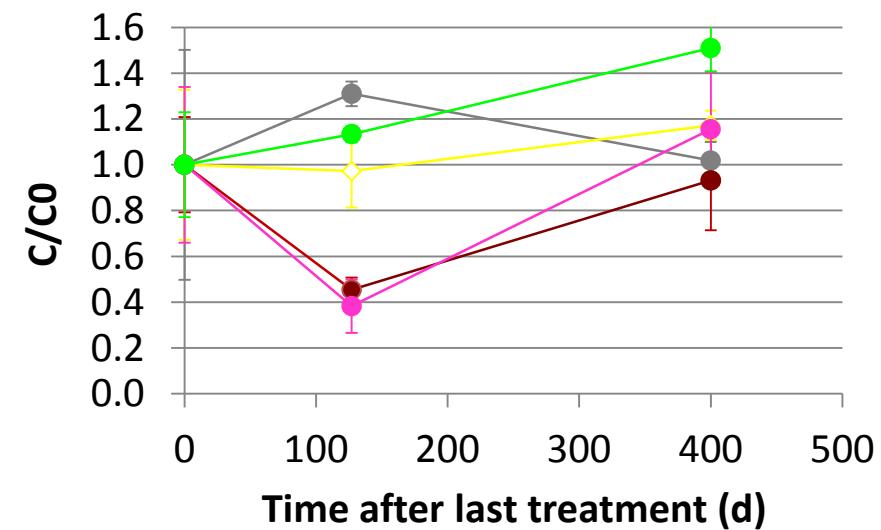
Terbutylazin



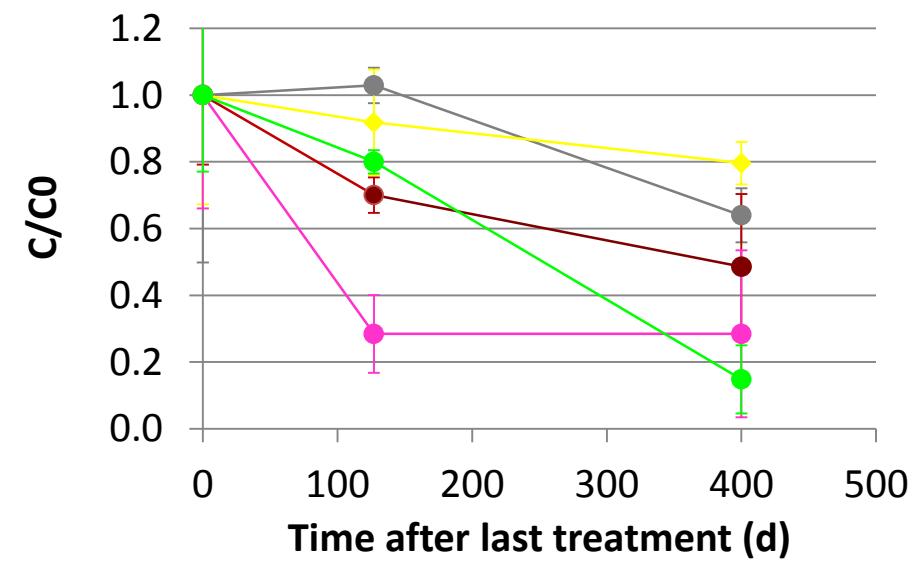
Terbutylazin



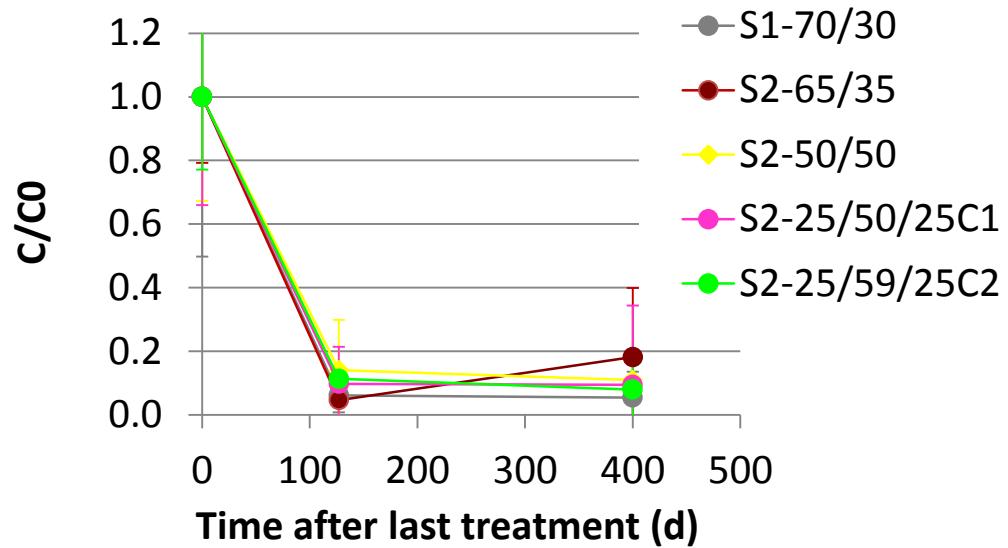
Fludixonil



Cyprodinil



Trifloxystrobin



Conclusions:

- Good efficiency for water clean-up : 90 – 99 %
 - Biomix with compost more efficient
 - Biomix with 65-70 % soil : problems of permeability
- «cleaned» water still contains pesticides - metabolites ?
 - spread in the field ?
 - legislation ?
- What about old biomix ?
 - spread in the field ?
 - legislation ?

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