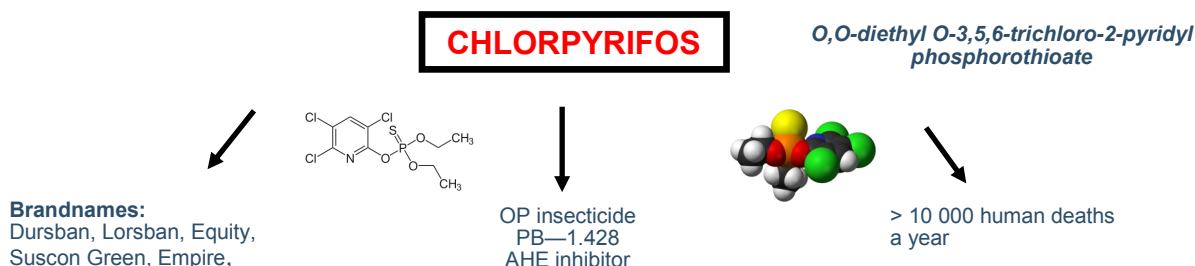


SCREENING AND IDENTIFICATION OF CHLORPYRIFOS IN GROUNDWATER SITUATED UNDER AGRICULTURAL AREA

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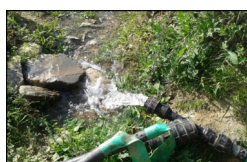
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METHODS AND MATERIALS

Sampling



Groundwater samples were collected according to the EPA protocol (2007) from the existing boreholes located on the agricultural fields.

Instrument analysis



GC-MS, Agilent 6890N, JAS UNIS injector, serial 7683B

Table 1. Temperature range

T (°C)	t (min)	Step (°C)
60	0	
150	2	25
200	0	3
280	10	20

In order to find the optimum performance of the injector a conventional injection was performed vs pulsed splitless injection using pressure 10–50 psi and the range of flow to split vent of 0.5 and 1.5 min.



+
66 g NaCl
0,5 µl TPP
20 ml DCM
10 ml DCM
10 ml DCM

LL extraction



Collect in a glass
Evaporated till
dryness



Collect in a vial
Evaporate till dryness and dissolve in
100 µl DCM

RESULTS AND DISCUSSION

Investigated area

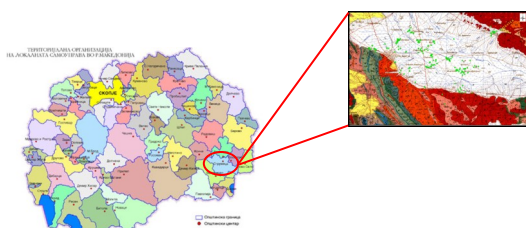


Figure 1. Geological map of the Strumica region

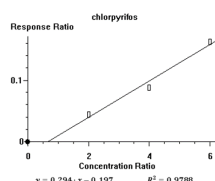


Figure 3. Calibration curve of chlorpyrifos obtained with spiking

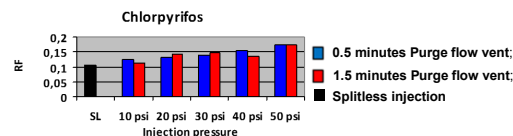


Figure 2. The response of chlorpyrifos on different injection conditions

Table 1. Method validation parameters for chlorpyrifos

t_R	RSD	R %	R^2	LOD µg/l	LOQ µg/l	t-S
21,066	6,34	130	0,98	0,33	3,3	0,0092

t_R – retention time; RSD – relative standard deviation; LOQ – limit of quantification; LOD – limit of detection; R – reproducibility; t-S – correction.

Table 2. Results obtained from the investigation of chlorpyrifos in groundwater of the Strumica region.

Coordinates	Locality	D (m)	03.07.2014	18.07.2014	16.04.2015
			C (µg/l)	C (µg/l)	C (µg/l)
41°25'432"	Sachevo	24	Not found	0,133 ± 0,00929	Not found
022°41'648"					

CONCLUSION

- LLE using DCM is acceptable for chlorpyrifos;
- Pulsed pressure of 50 psi increase the visibility of the peak;
- Chlorpyrifos was found in the groundwater of the investigated region in concentration of 0.133 ± 0.00929 µg/l.

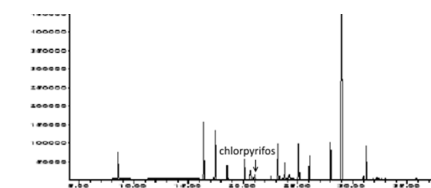


Figure 4. Chromatogram of chlorpyrifos in groundwater