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BOOKLET

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Title: Study of adsorption, retention and diffusion of pyrethroid pesticides such as permethrin in agricultural land and its ability to act as a filter

Authors: GODÍNEZ-GARCÍA, Andrés, DÍAZ-TECANHUEY, Pedro Jesús, GUIJOSA-GUADARRAMA, Santiago y HERNANDEZ-MORALES, María Guadalupe.

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ECORFAN-México, S.C.
143 – 50 Itzopan Street
La Florida, Ecatepec Municipality
Mexico State, 55120 Zipcode
Phone: +52 1 55 6159 2296
Skype: ecorfan-mexico.s.c.
E-mail: contacto@ecorfan.org
Facebook: ECORFAN-México S. C.
Twitter: @EcorfanC

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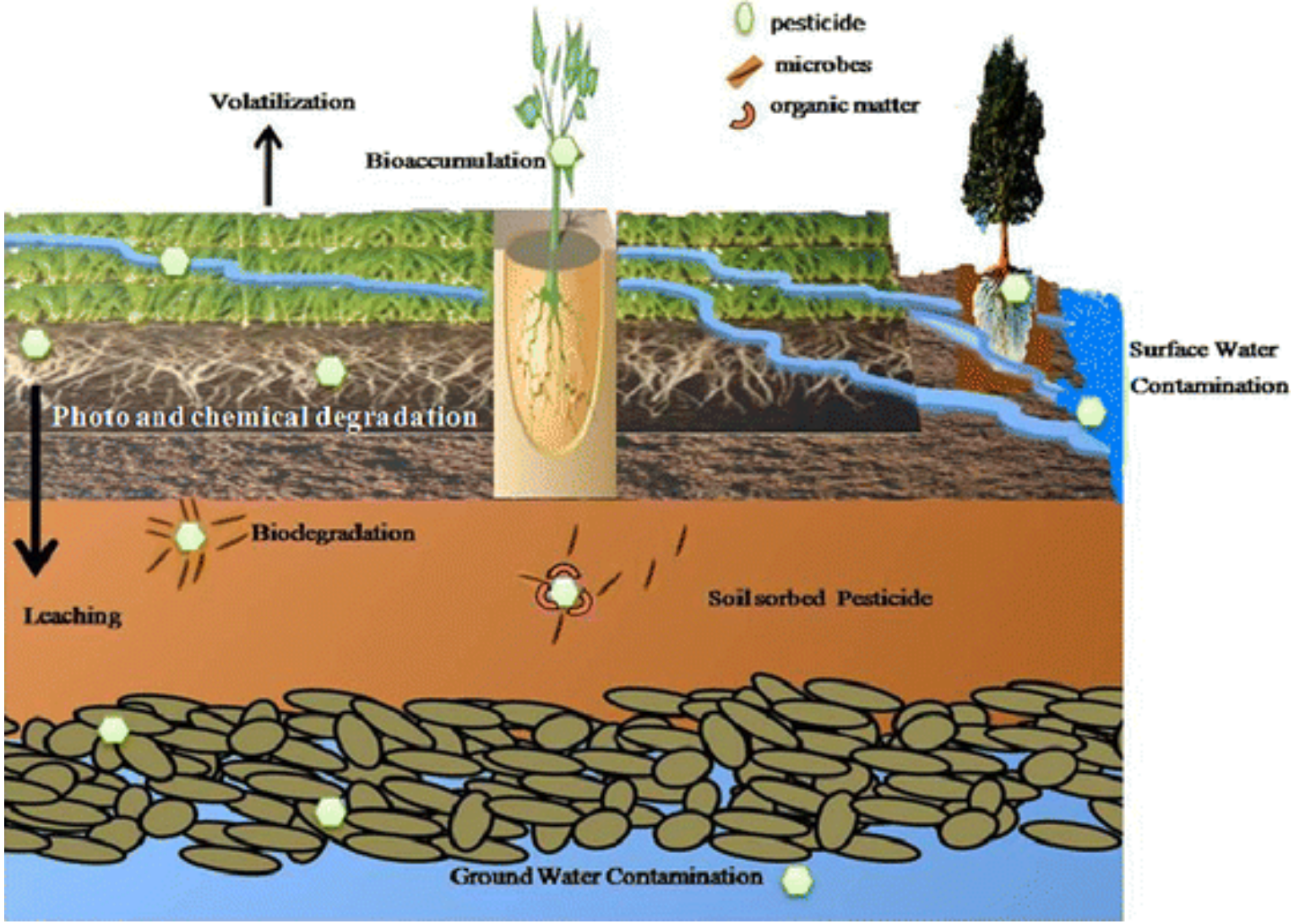
Introduction

In Mexico and in the world approximately 0.6 g pesticide/Kg crow production is used. (Zhang 2018)

Pesticides can produce ground water contamination.



Some of the most productive agricultural regions of Mexico are El Bajio Gto. and Edo. Mex.

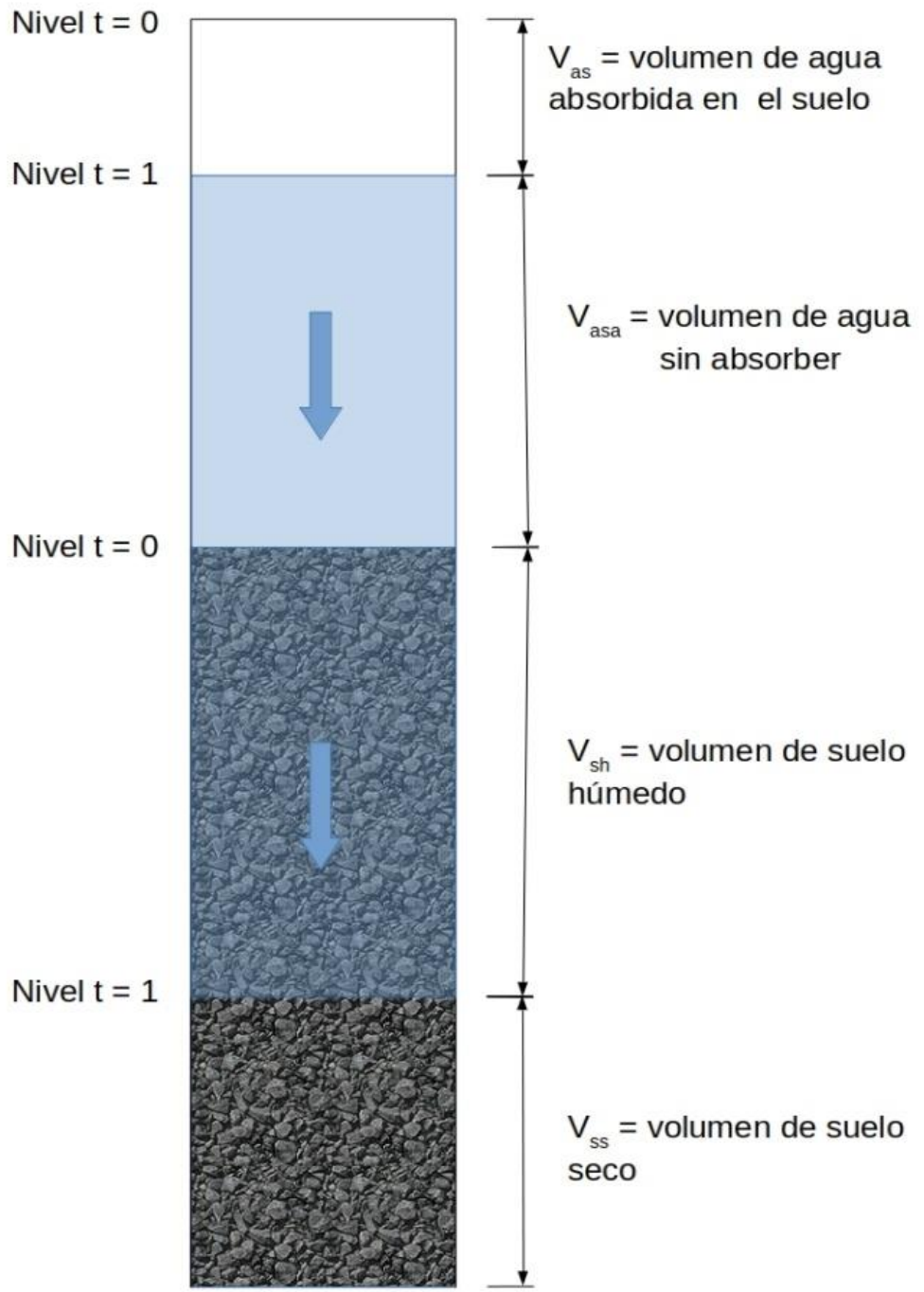
Vertisols and Phaeozem are the type of soil of these regions respectively.

Methodology

Phenomena of transporting a suspension of pesticide in water through agricultural land.

$$\% \text{ Porosity} = \frac{V_{as}}{V_{sh}} * 100$$

$$\text{Flux} = \frac{volume \cdot density}{time \cdot area}$$



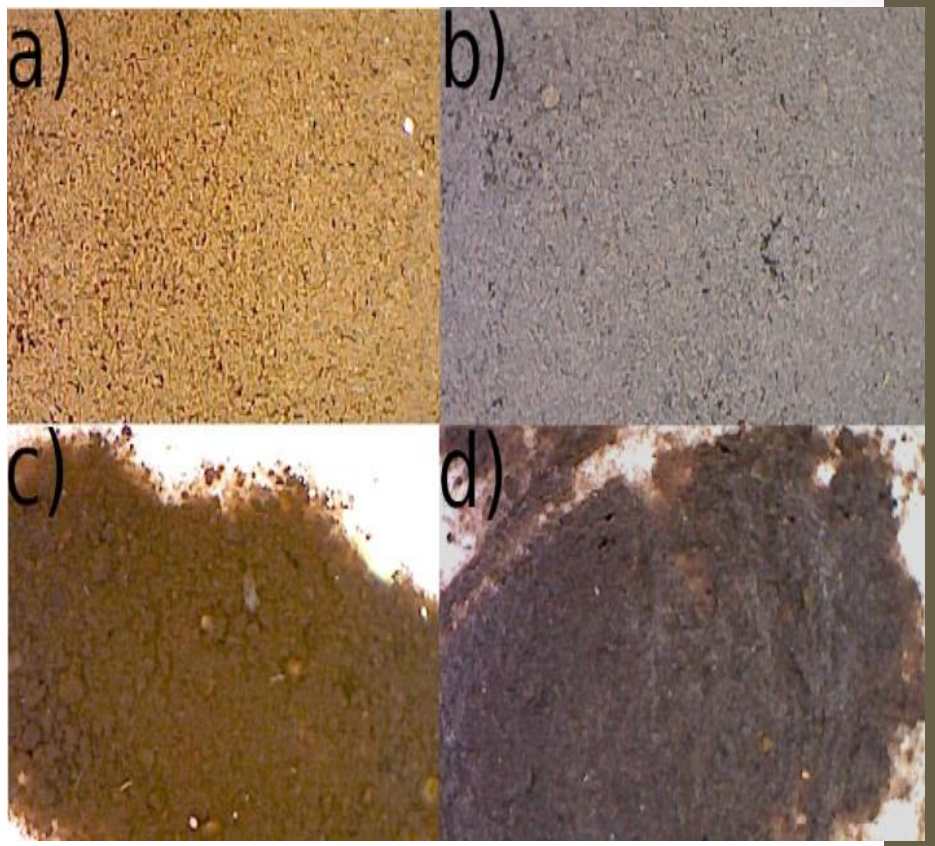
Physical characterization techniques

- Colour classification of soils according to Munsell system.
- Fourier-transform infrared spectroscopy of the soils.
- Mother solution UV-Vis spectra changes over the two different soils.

Results

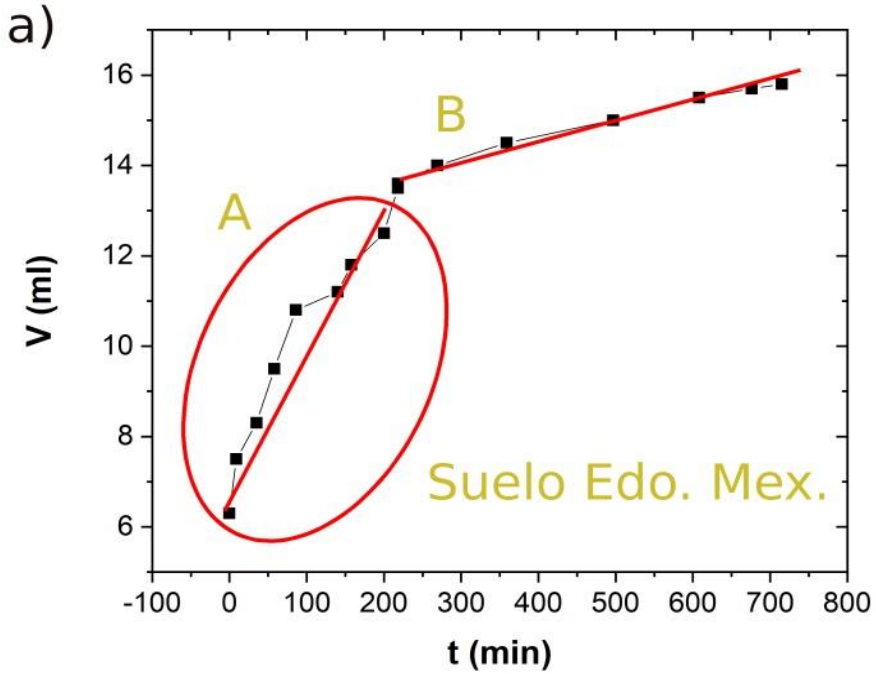
Types of soil analyzed and color classification according to the Munsell system

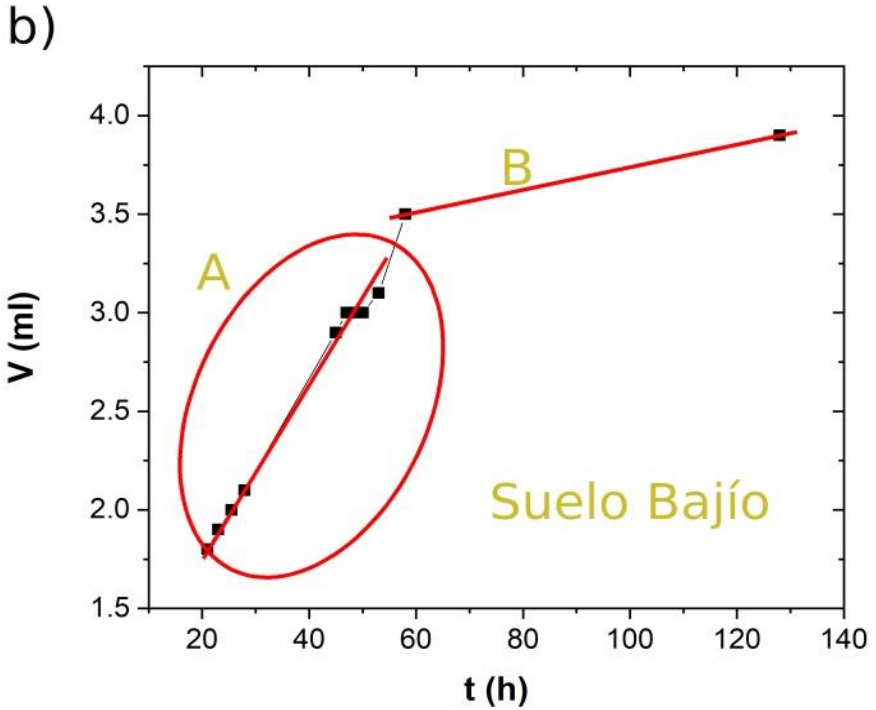
- a) Dry soil Edo. Mex. color: 10 YR 7/6,
- b) Dry soil El Bajío color: 7.5 R 7/1,
- c) Wet soil Edo. Mex. color: 10 YR 4/6,
- d) Wet Soil El Bajío color: 7.5 R 4/1.



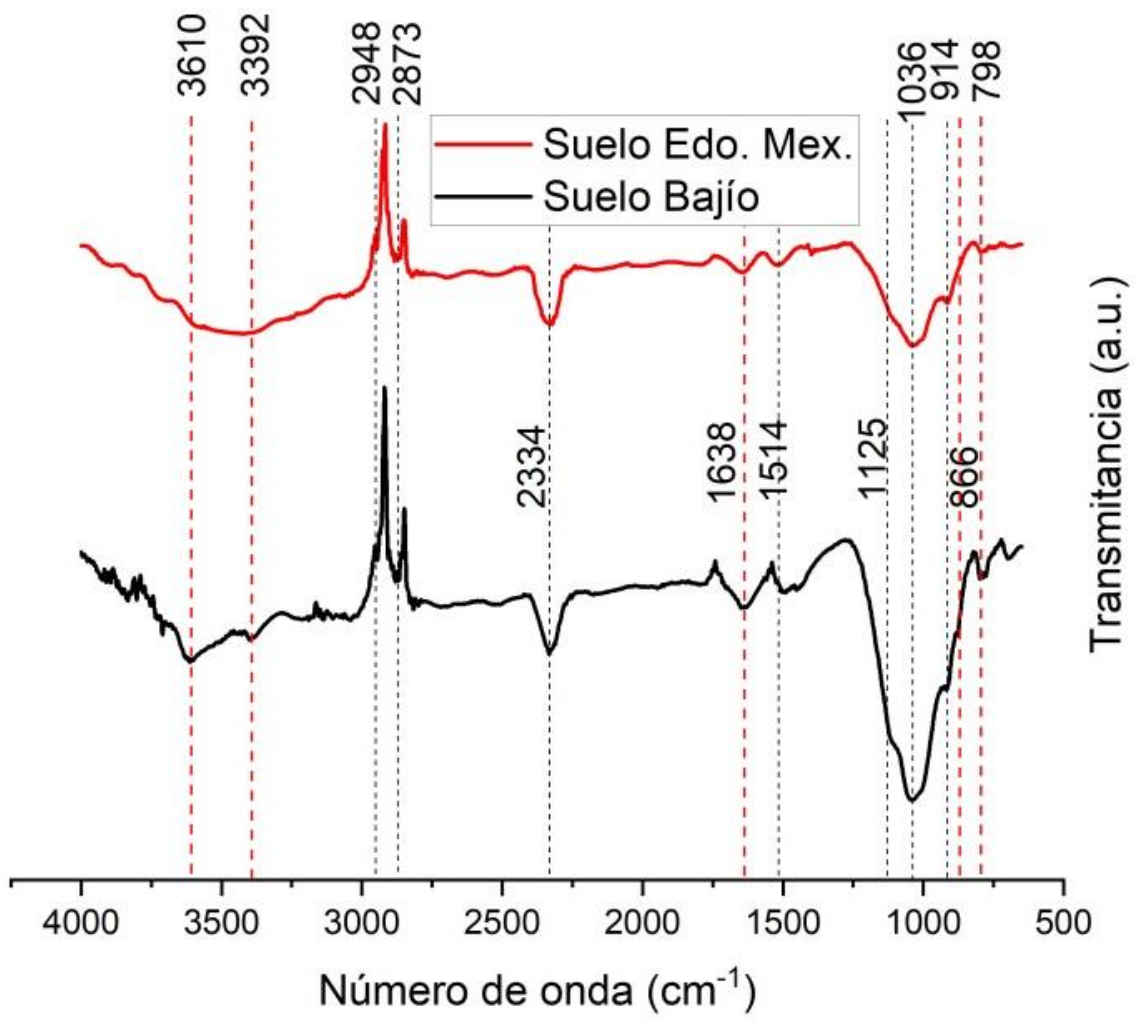
Porosity of the two soil samples and average mass flux of pesticide solution trough them.

Soil	Porosity	Mass flux region (A) [Kg/m^{2}h]	Mass flux region (B) [Kg/m^{2}h]
Edo. Mex.	37	18.8	25.5
Bajío	35	0.72	0.093

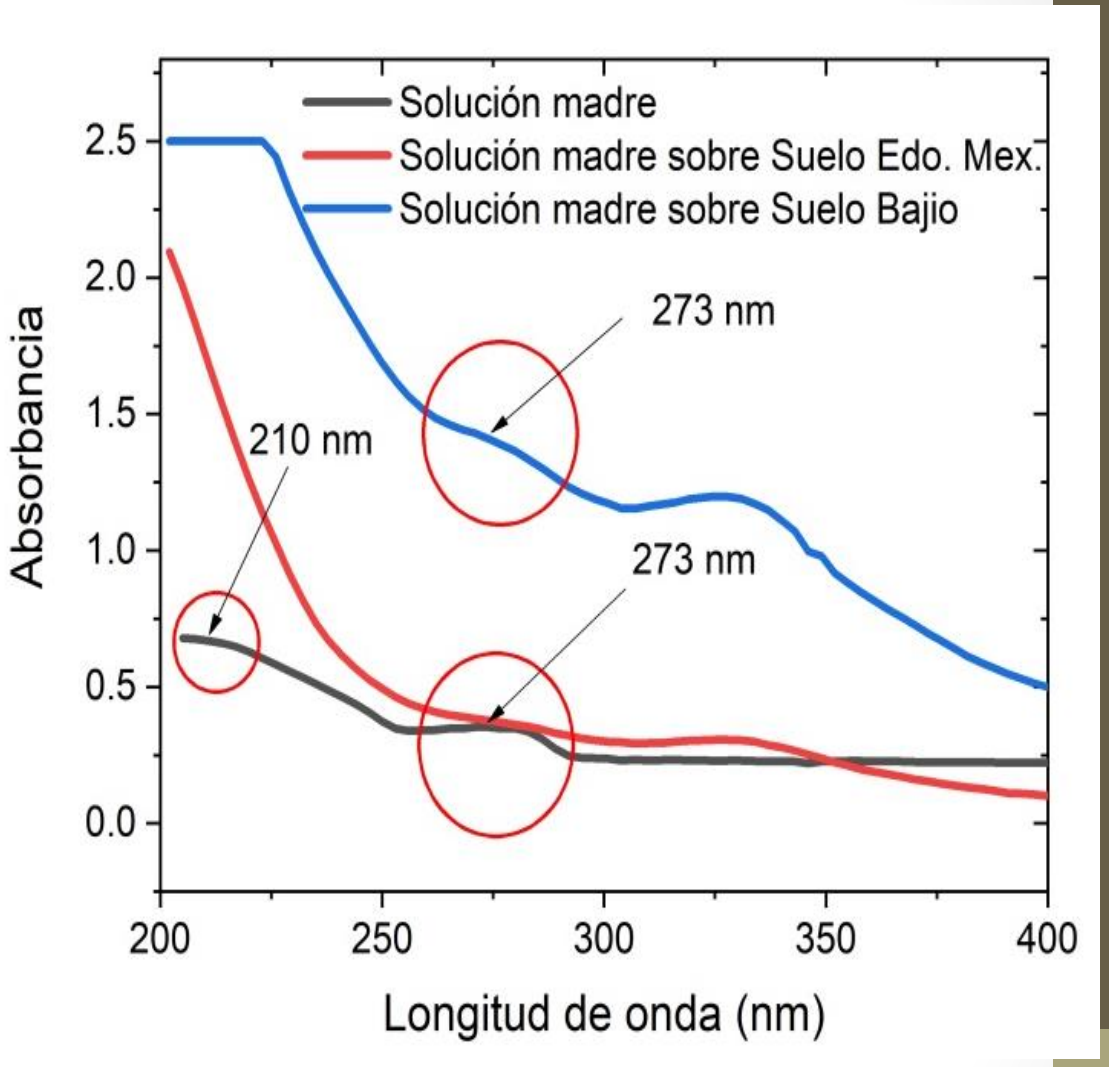




Infrared spectra for the soils from El Bajio and Edo. Mex.



UV-Vis spectroscopy performed on the remnant mother solution added on the soil of the Edo. Mex (red) and the remnant mother solution added on the soil of the Edo. Mex (blue).



Conclusions

Infrared spectra of the two type of soils were taken, which qualitatively found that El Bajio soil has a greater amount of Si-O functional groups and highly hydrophilic polysaccharides. These groups have an inverse effect on the speed with which pesticide solution penetrates toward ground water. In each soil it is observed that the pesticide being hydrophobic remains over the soil surface according to the UV-Vis spectra obtained. In the case of Edo. Mex. soil. By having a smaller amount of hydrophilic groups, it allows the passage of a greater amount of pesticides.

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