

LEACHING OF ATRAZINE IN AMENDED SOIL WITH COW SLURRY APPLICATION

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Pesticide pollution of ground and surface water is of growing concern in the world. On the other hand, the application of animal manure amendments to agricultural soils is a common practice to improve soil fertility, although this practice may increase the potential of herbicides leaching due to high content of dissolved organic matter of manures. To rank herbicides in relation to their leaching potential, the ground-water ubiquity score (GUS), [1] has been used frequently ($\log t_{1/2} (4 - \log K_{oc})$), where $t_{1/2}$ is the herbicide half-life in soil and K_{oc} is the sorption coefficient normalized to soil organic carbon content. Herbicides with $GUS < 1.8$ are ranked as non-leachers, $GUS > 2.8$ represent leachers and those with GUS between 1.8 and 2.8 are considered transitional. The objective of this study was to evaluate the leaching potential of atrazine in amended soils with different rate of liquid cow manure application using K_{oc} values informed previously for us, [2] and atrazine dissipation study carried over under controlled conditions. The soil was amended with 0, 100,000, 200,000 and 300,000 L ha⁻¹ of liquid cow manure (LCM), (S-0, S-100, S-200, and S- 300, respectively), and then pre-incubated for 30 days, before atrazine application (field rate). They were stored at 20 °C in the dark and samples were taken during 30 days. The residual atrazine was determined for HPLC analysis and herbicide concentration fitted to a first order kinetic. The half-life of atrazine ranged between 15-17 days. The K_{oc} values obtained previously ranged between 9-11, it showed that LCM did not modified atrazine adsorption in S-100 and S-200, but when high rate of LCM was applied the adsorption was diminished (S-300) compared to soil (S-0). Gus index of atrazine in S-0, S-100, S-200 and S-300 was 3.5 3.7, 3.7 and 3.9, respectively, suggesting that atrazine is a herbicide with a high leaching potential ($GUS > 2.8$) and that this increases with LCM application. These results may be related with a large amount content of dissolved organic matter of LCM.

References:

- [1] Gustafson, D. 1989. Ground ubiquity score: A simple method for assessing pesticide leachability. *Environ. Toxicol. Chem.* 8: 339-357.
- [2] Briceño, G., Demanet, R., Mora, ML., Palma, G. 2008. *J. Environ. Qual.* Effect of liquid cow manure on andisol properties and atrazine adsorption 37:1519-1526.

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