TRENDS IN VERTICAL MOVEMENT OF HEXAZINONE HERBICIDE CONSIDERING TYPIC EUTRORTHOX SOIL OF ESPRAIADO'S STREAM CULTIVATED WITH SUGAR-CANE CROP - LOCAL AND DEFAULT DATA SCENARIOS

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Abstract: The present work used mathematical-modeling simulation techniques to evaluate the vertical movement of hexazinone herbicide, considering both half-life and organic-carbon coefficient (Koc) literature-*default* and local data from Espraiado's Stream **Typic Eutrorthox** soil, at Ribeirão Preto, São Paulo State – Brazil. This is one of the recharge zones of the Guarani Aquifer, which exposed to pesticides requires a close follow up to evaluate the water contamination risk, due to the natural vulnerability and water urban provisioning coming from the aquifer. Information about the evaluated soil, as well as, weather and sugar-cane crop was used as CMLS-94 [1] simulator inputs. The base scenario of simulation took into account a simulation period of 1.4 year, cane-cut date at August and hexazinone dose application of 0.40 $kg.ha^{-1}$, that is found at the local trade-mark product common in use. The 0.06 $kg.ha^{-1}$ value was used as a reference in order to identify simulation trends that can be confirmed by residue analysis using HPLC. It was observed that hexazinone had potential to remain close to the soil surface, mainly until 30 days after the application date, on both scenarios. Trends to be reached after 46 days at 13 cm of depth, with 70-82 % of initial dose, was also observed. This indicates the potential risk to superficial water contamination by run-off on this time. After that, the lixiviation trend increases. The followed depths and remaining quantities were obtained at the end of simulated period: a) *default*-data-scenario: depth - 1.89 m, and quantity- 0.12 kg ha^{-1}; b) local-data scenario: depth- 2.78 m and quantity- 0.18kg ha^{-1}. The main product movement was observed for the local-data scenario, mainly at the 63rd day after product application, although the quantities were remaining close each other on both scenarios. Despite the trends of hexazinone to be found at depth levels with varies from 0 to 3 m, the simulated soil is not present at Espraiado's stream catchments where these depths of water table could be found. Considering the fact, the potential risk of groundwater contamination by hexazinone on Espraiado's Stream **Typic Eutrorthox** soil do not exist. The depths reached don't compromise also the aquifer (reached at 40 m). It is important to mention that CMLS94 do not permit to evaluate the residual effect from successive pesticide applications; that is because this is not considered on the presented work.

Reference:

[1]NOFZIGER, D. L.; HORNSBY, A. G **CMLS-94: Chemical Movement in Layered Soils**. Oklahoma: University of Florida, 76 p. (Department of Agronomy – University of Florida) 1994.