INFLUENCE OF DAIRY MANURE AMENDMENTS ON ATRAZINE AND DIMETHENAMID LEACHING

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Dimethenamid and atrazine herbicides are widely used for pre-emergence control of broad-leaved weeds in corn and several other crops. They have been frequently detected in ground water, near agricultural field, where they had been applied [1]. A field study was carried out during 2008 year and the aim of this work has been to evaluate the influence of dairy manure rate in dimethenamid and atrazine leaching. The field results will be compared with some ones obtained for us under controlled conditions [2]. The plot size was 3x5 m and the slurry was applied on September, a month before planting. The rates of slurry manure were 0, 100,000, 200,000 and 300,000 L ha-^{1}, corresponding to treatments S-0, S-100, S-200 and S-300, respectively. The application of herbicides was performed one day after sowing at the 1.5 kg ha-^{1} and 1.3 kg ha^{-1} rate of the commercial formulations (atranzine 90 GW and frontier EC). The trial was conducted in a randomized block design with three replications. Before the application of herbicide suction lysimeters were installed at a depth of 60 cm and these were sampled at regular intervals, associated with rain events, during 6 months. Water samples were frozen for later residue herbicide analysis by HPLC. After 40 days of the herbicides application 2.4, 1.3, 2.5 and 4.4 µg of atrazine were found for plot S-0, S-100, S-200 and S-300 respectively. These results can be correlated with the results obtained in our laboratory under controlled conditions, which indicate that atrazine is adsorbed less when 300,000 L ha^{-1} of liquid manure was applied, showing a high leaching potential compared to soil (GUS index of 3.5 and 3.9 respectively). For dimethenamid the values were 3.3, 2.1, 1.2 and 0.7 µg for plots S-0, S-100, S-200 and S-300 respectively. These results can be discussed based on a relative high adsorption of dimethenamid in soil (Koc 140). These results could be correlated with the degradation studies performed in our laboratory where we determined the half-life of dimethenamid for these treatments, calculating the rate of GUS, which resulted from 3.0-2.9, 2.8 and 2.6 for S-0, S -100, S-200 and S-300, respectively.

References:

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