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GC-MS DETERMINATION OF CHLOROTRIAZINES IN AQUEOUS ENVIRONMENTAL SAMPLES.

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The extensive use of chlorotriazines as selective herbicides in agriculture and their relatively high persistence imply that these compounds are now present in the environment, contaminating surface and groundwater. In European countries, United States and Canada, the drinking water ordinance demands a limited concentration of 0.5 µg/l for the sum of all pesticides and 0.1 µg/l with respect to each compound, with the consequent need for sensitive and selective analytical methods. Gas chromatography-mass spectrometry (GC-MS) is the most reliable technique for this kind of analysis and was employed in the present study to evaluate the contamination of aqueous environmental samples by atrazine, simazine and ametryne.

Surface water samples (1 liter) were collected from the Espraido watershed (Ribeirão Preto, SP, Brazil) during the period from October 1995 to July 1996, at nine different points. Groundwater samples from sites near the river were collected during the same period.

The extraction procedure consisted of the addition of 100 ml of water sample, previously filtered through 0,22 µm membranes, to a separatory funnel. After the addition of 25 µl of the internal standard solution (caffeine, 5 µg/ml) and alkalization with 25 µl of 4 M NaOH aqueous solution, the samples were extracted with 15 ml ethyl acetate by shaking for 1 hour. Volumes of 5 ml of the organic phase were transferred to conic tubes and evaporated to dryness under a nitrogen flow, at the temperature of 35°C. The residues were dissolved in 25 µl acetone and 2 µl were chromatographed on a DB-5 column (J&W Scientific, 0,25 mm x 30 m, film of 0,25 µm) using a GC-MS QP5000 Shimadzu apparatus. Helium was used as carrier gas. The operation conditions were: injector temperature 240°C; oven temperature program - start at 60°C for 1 min, increase to 150°C at a rate of 20°C/min and then to 280°C at a rate of 10°C/min; detector temperature of 230°C in the ion source of the MS. Under the chromatographic conditions selected and by extracting 100 ml of water samples, the quantification limit was estimated to be 0.02 µg/l for each triazine herbicide.

The results showed traces of ametryne in surface water samples collected in December, whereas the ground water samples used for human consumption did not show contamination. The other herbicides were not detected in the samples analyzed under the condition employed.

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