

DETECTION OF PPT LEVELS OF ATRAZINE IN DRINKING WATER

MATRIX	Drinking Water
ANALYTES	Atrazine
LIMIT OF DETECTION	5 ppt
RANGE OF DETECTION	5 to 500 ppt
MATERIALS	<p>Atrazine RaPID Assay® Kit and Sample Diluent</p> <p><i>Reagents:</i> atrazine control (preparation described below), methanol and ethyl acetate (pesticide grade) and distilled or deionized water.</p> <p><i>Equipment:</i> vacuum filter device, vacuum manifold, BAKERBOND™ spe octadecyl (C₁₈) 500mg extraction column (cat. no.# 7020-03), 10 mL volumetric pipet, glass test tubes.</p>
COLUMN PREPARATION	Under vacuum, condition the column with 2 x 5 mL of methanol followed by 2 x 5 mL distilled or deionized water. Adjust vacuum to a flow rate of 5 mL/min for water (5 mm Hg). Do not allow the column to dry between methanol and water conditioning. Turn off the vacuum when about 1 mL of water remains above the column. Columns should be used only once.
EXTRACTION PROCEDURE	Measure 10 mL of the drinking water to be tested into a volumetric pipet. Turn on the vacuum and begin to apply the 10 mL sample directly to the column. Add another 5 mL of distilled water to the column as a rinse. Do not let the column run dry between sample and rinse. After the rinse has passed through, increase vacuum to 25 mm Hg for 10 minutes or longer to dry the column completely.
SOLVENT EXCHANGE	<p>Extract the atrazine from the column with 3 x 1 mL of ethyl acetate. Collect the extract in a glass test tube.</p> <p>Evaporate the ethyl acetate eluate to dryness under nitrogen. Redissolve the residue in exactly 1 mL of Atrazine Sample Diluent.</p>
ANALYSIS	Prepare a standard curve according to the directions in the Atrazine RaPID Assay package insert. Analyze the redissolved residue as the "sample". Calculate the atrazine concentration in the original drinking water sample by multiplying the assay result (in ppb) by 0.1.
PROCEDURAL NOTES	<p>Any water remaining in the column after extraction will be eluted with ethyl acetate. After evaporation of ethyl acetate, water remaining in the collection tube may contain traces of ethyl acetate which can interfere with the immunoassay. This water must be evaporated completely before proceeding.</p> <p>Sometimes a white residue is visible in the collection tube after evaporation. This is packing material from the column that will redissolve in the diluent and will not interfere in the assay.</p>

The source of the distilled or deionized water should be characterized as atrazine-free before this procedure is used. A 100 mL sample of the distilled water source should be run in the procedure shown above in place of the 10 mL sample. If the immunoassay result obtained after running this modified procedure is zero or in the "nd" (non-detectable) range of the assay, the water supply is determined to be atrazine-free.

Preparation of control samples of atrazine in water in the 100 ppt range is required in order to monitor the performance of this procedure over time. Use of standardized preparations of pure atrazine (usually dissolved in methanol), available from regulatory agencies and chemical standards suppliers, is recommended for this preparation. For example, a 1 ppm atrazine stock solution in methanol would be serially diluted 1:100 twice in atrazine free water to obtain a 100 ppt solution. The 100 ppt stock can then be aliquoted into clean glass vials with a 10 mL volumetric pipet, sealed with a teflon lined lid and frozen at -20°C for up to 6 months. At the time the procedure is to be run, a vial is thawed and applied directly to the column in the same with an average recovery of 106%. Recoveries of $\pm 20\%$ can be expected when the variability between individual C₁₈ columns is taken into account. The reproducibility of results between columns and between runs was excellent. The overall %CV at 94 ppt atrazine was 8.5% based on n = 48.

REFERENCES

Shepard, T.R. and Carr, J.D. 1992. C₁₈ Extraction of Atrazine from Small Sample Volumes. J. AOAC Inter. 75(3) 581-583.

Ohmicron Technical Bulletin by S.W. Jourdan (1992). " C₁₈ Extraction of Atrazine for Increased Sensitivity in the RaPID Assay".

Ohmicron Application Procedure. "Correction of Non-Specific Binding in RaPID Assays".

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