

**DETECTION OF ATRAZINE, ALACHLOR, CYANAZINE AND METOLACHLOR IN CORN**

<b>MATRIX</b>	Grain corn
<b>ANALYTES</b>	Atrazine, Alachlor, Cyanazine, and Metolachlor
<b>RANGE OF DETECTION</b>	Atrazine: 20-1000 ppb Alachlor: 20-1000 ppb Cyanazine: 20-600 ppb Metolachlor: 20-1000 ppb
<b>MATERIALS</b>	<p>RaPID Assay Kit and Sample Diluent <i>Reagents:</i> methanol (pesticide grade), distilled or deionized water.</p> <p><i>Equipment:</i> laboratory grinding mill or coffee grinder, 20-mesh sieve, serological pipets, 10 x 13 mm glass test tubes, test tube rack, 125 mL polypropylene widemouthed bottles with polypropylene screw closures, freezer (~0°C).</p> <p><i>Apparatus:</i> laboratory blender or mixer (Method A), water bath shaker (Method B).</p>
<b>SAMPLE PREPARATION</b>	Grind the corn sample (>25 g) to a fine powder (i.e. to pass through a 20-mesh sieve).
<b>EXTRACTION PROCEDURE</b>	<p><i>Method A:</i> (Homogenization) Add 20 g of the powder to 80 mL of 4:1 methanol/water (4 parts methanol plus 1 part water) in a blender jar. Blend for two minutes at high speed. Transfer the homogenate to a polypropylene sample bottle. Cap the bottle tightly and place in freezer overnight (~ 12 hours).</p> <p><i>Method B:</i> (Heating) Add 20 g of the powder to 80 mL of 4:1 methanol/water (4 parts methanol plus 1 part water) in a polypropylene sample bottle. Hand tighten the cap and invert several times to mix. Loosen the cap slightly and position the sample upright in a shaker water bath at 65-70°C. Agitate the sample for 2 hours at 35 revolutions (oscillations) per minute. Remove the sample bottle from the water bath. Tighten the cap and allow the sample to sit at room temperature for one hour. Place sample in freezer overnight (ò 12 hours).</p>
<b>ANALYSIS</b>	<p>Remove the sample bottle from the freezer and invert the bottle several times to mix. Let the contents come to room temperature allowing the solids to settle. Dilute an aliquot of the supernatant 1:50 in a glass test tube with the appropriate Sample Diluent (provided in the RaPID Assay Kit) using serological pipets (e.g. 0.1 mL extract plus 4.9 mL diluent).</p> <p>Analyze the diluted extract as the "sample" according to the package insert for the RaPID Assay.</p>

## INTERPRETATION

Calculate the pesticide concentration in the grain by multiplying the assay result by the appropriate factors introduced by the procedure:

$$\text{assay result} \times \frac{\text{vol. methanol/water(mL)}}{\text{weight of grain(g)}} \times \frac{\text{vol. extract(mL)} + \text{vol. diluent(mL)}}{\text{vol. extract(mL)}}$$

For the procedures shown above:

$$\text{assay result (ppb)} \times \frac{80}{20} \times \frac{0.1 + 4.9}{0.1} =$$

$$\text{assay result (ppb)} \times 200 = \text{concentration of pesticide in grain (ppb)}$$

## PROCEDURAL NOTES

Chilling (~ 0°C) overnight is required to precipitate matrix interferences prior to immunoassay.

Sample diluents are optimized and specific for each assay.

## EXPECTED RESULTS

Due to the magnitude of the correction factor used, the accuracy of the final result will depend on the care taken in making dilutions.

When ground grain samples were fortified with 50 ppb to 500 ppb pesticide and extracted with methanol using the procedures shown above (Method A and Method B), average recoveries of fortified pesticide ranged from 80 to 120%.

Recovery of pesticide from grain corn will vary depending on the form of the residues (e.g. free, conjugated or bound metabolites) and the extraction method used.

## REFERENCES

Lawrence, L.J. and M.R. McLean. 1991. Toxological significance of bound residues in livestock and crops. In L. Somasundram and J.R. Coats (Ed.) Pesticide Transformation Products. American Chemical Society Symposium Series 459, Washington, D.C., pp. 242-253.

## TECHNICAL ASSISTANCE

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