Application Note 88

Capillary GC Analyses of Triazine Pesticides in Dry Pet Food

Based on federal and state regulations for identifying and quantifying low levels of pesticides in food and environmental samples, we selected three capillary columns to screen for triazine pesticides. A nonpolar and two low/intermediate polar phases were chosen to evaluate differences in component elution order and retention times. Low level screening analyses were performed effectively by using split/splitless injection and a thermal specific detector (TSD). Each column separated the triazines in less than 30 minutes. Example chromatograms are shown.

Key Words:
• triazines • atrazine • simazine • pet food

Federal and state regulations require that pesticides in food and environmental samples be identified and quantified at low levels. Based on these regulations, we selected three capillary GC columns to screen for pesticides at low levels. We chose a nonpolar phase, PTE™-5, and two low/intermediate polarity phases, SPB™-608 and SPB-1701, to illustrate the differences in component elution order and retention times for triazine pesticides.

Triazine pesticides (Table 1) were spiked into, then extracted from, dry pet food purchased at a local grocery store.

Table 1. Triazine Pesticide Standards Mixture (1000µg/mL each component in methanol)

Atrazine
Prometon
Prometryn
Simazine
Simetryn
Terbutryn

Extracts were prepared by weighing out 50 grams of the food, manually crushing it, and adding 100mL of acetonitrile (1). *The untreated extracts contained no pesticides.*

Samples of the spiked and unspiked extracts were injected onto each capillary column under the conditions listed in Figure A.

Figure A shows chromatograms of the extracted pesticides from each column. The low/intermediate polarity SPB-608 and SPB-1701 columns selectively eluted the analytes, based on dipole-dipole and hydrogen bonding interactions between the solute and the stationary phase. Each column at least partially separated all of the analytes (prometon and simazine were incompletely separated by the SPB-1701 column). The nonpolar PTE-5 column eluted the analytes by boiling point. One pair of analytes (simazine and atrazine) coeluted from the nonpolar column. Analysis time for each column was approximately 28 minutes.

Table 2 lists the recovery values for the triazine pesticides, determined using the SPB-608 column. Recovery of the spiked analytes ranged from 104% to 117%. Limits of detection for the standards ranged from 0.1ppm to 10.0 ppm.

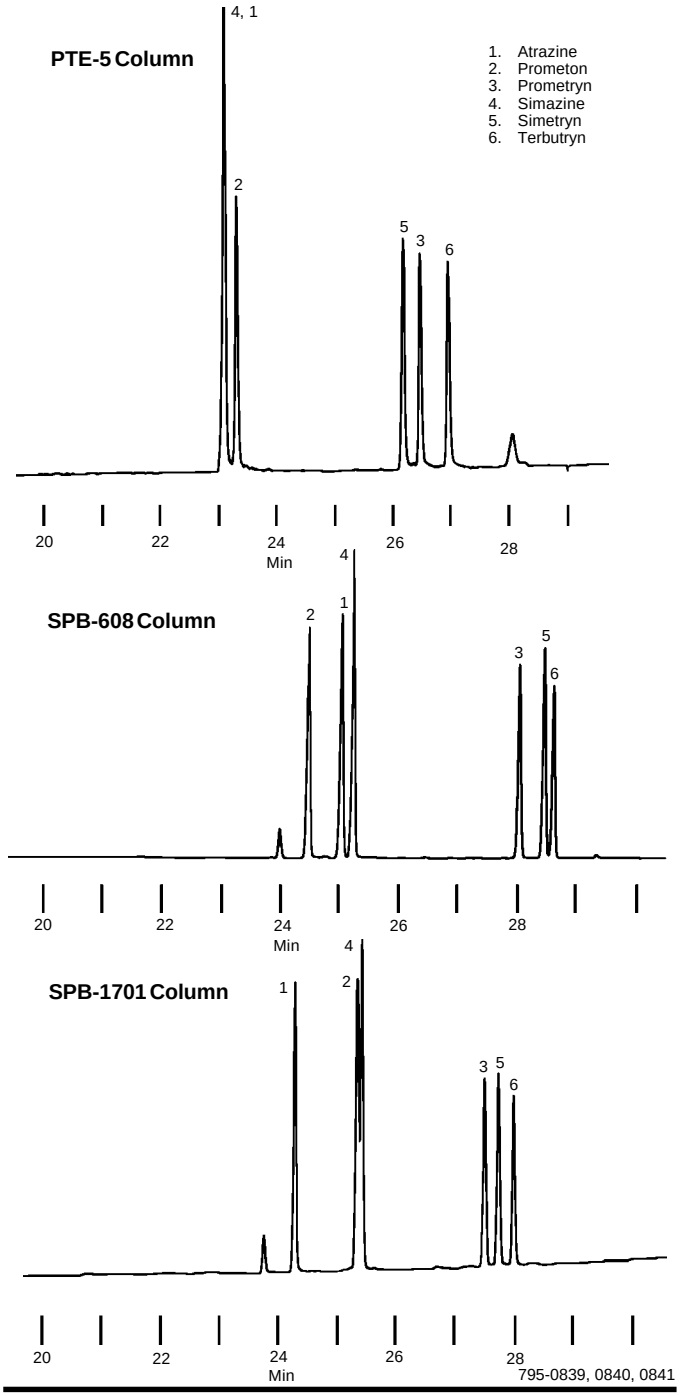
Based on these evaluations, we determined that the three stationary phases, PTE-5, SPB-608, and SPB-1701, exhibited differences in retention times, resolution, and elution order for six common triazine pesticides. Using these columns, screening analyses for low levels of triazine pesticides can be performed effectively, in less than 30 minutes, with split/splitless injection and a thermal specific detector (TSD).

Table 2. Recovery of Triazine Pesticides from Dry Pet Food (SPB-608 Column)

Pesticide	Recovery (%)
Prometon	117
Atrazine	110
Simazine	114
Prometryn	104
Simetryn	112
Terbutryn	104

Figure A. Triazine Pesticides from Dry Pet Food

Stationary Phases: PTE-5, SPB-608, SPB-1701
Column Dimensions: 30m x 0.25mm ID, 0.25µm phase film
Catalog Nos.: **24135-U** (PTE-5), **24103-U** (SPB-608), **24113** (SPB-1701)
Oven: 80°C (1 min) to 280°C at 6°C/min
Carrier: helium, 40cm/sec.
Det.: thermal specific, 250°C
Sample: 1µL of 10µg/mL extract, split/splitless 45 sec, 200°C



795-0839, 0840, 0841

Ordering Information:

Description	Cat. No.
Fused Silica Capillary Columns	
all 30m x 0.25mm ID, 0.25µm phase film	
PTE-5	**24135-U**
SPB-608	**24103-U**
SPB-1701	**24113**
Triazine Pesticide Standards	
neat, 100mg	
Atrazine	**49085**
Prometon	**49086**
Prometryn	**49087**
Simazine	**49089**
Simetryn	**49090-U**
Terbutryn	**49091**

Reference

1. Kaphalia, B.S. *Assoc. Official Analytical Chemists* **73** (4) 1990.

Note: For a suitable extraction procedure, refer to AOAC Methods, 16th edition. (Order from AOAC International, 481 North Frederick Avenue, Suite 500, Gaithersburg, Maryland 20877-2504 USA. Tel.: +1-301-924-7077; FAX: +1-301-924-7089.)

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