



Redefining Environmental HPLC

Pesticides & Herbicides

HPLC is the method of choice for the separation of several classes of pesticides that are highly polar, thermally labile, and non-volatile. The bonded phases employed for such analyses must possess a shielded silica surface and uniform coverage as well as a high degree of reproducibility from lot-to-lot. Restek's Pinnacle™ HPLC columns exhibit excellent selectivity and low adsorptivity for several classes of pesticides, including anticoagulant pesticides, carbamates, uron herbicides, and triazine herbicides.

Anticoagulant Pesticides

Although highly effective at controlling rodents, the anticoagulants shown in Figure 1 pose a serious threat to livestock, pets, and humans. These compounds prevent blood clotting, which may cause death by hemorrhage. Traditional analyses used a time-consuming ion-pair method and a standard ODS column. Although complete resolution is achieved, the analysis takes 21 minutes and diphacinone and chlorophacinone exhibit severe tailing. By using Restek's Pinnacle™ ODS Amine column and a simple binary gradient, all eight components elute in less than 10 minutes with excellent peak symmetry. The new method doubles sample throughput and improves quantitative reliability.

Figure 1: Pinnacle™ ODS Amine resolves anticoagulants in less than 10 minutes - a 50% savings in analysis time!

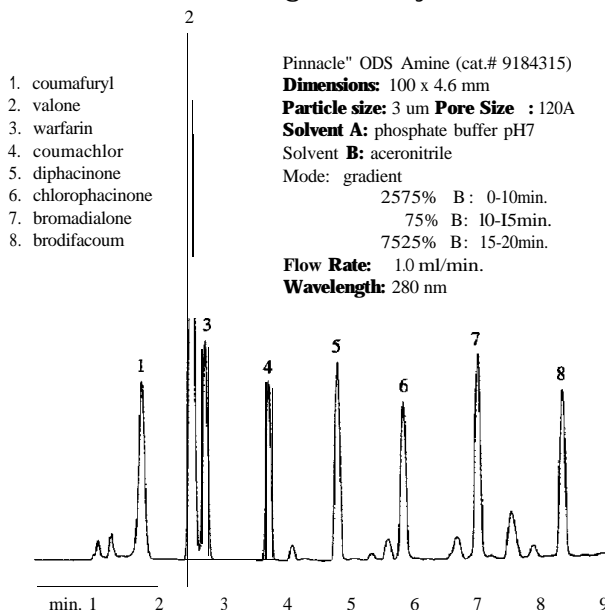
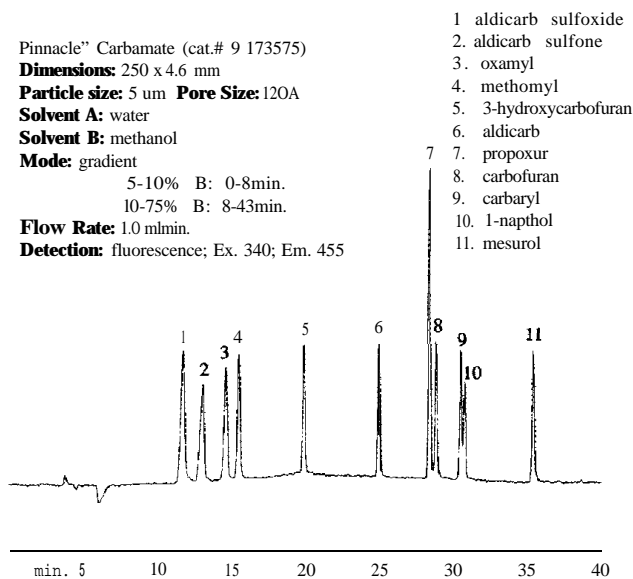


Figure 2, The Pinnacle Carbamate column offers optimized selectivity for free carbamate pesticides.



Carbamates

Carbamate pesticides have been regulated by the U.S. EPA because they leach into ground waters. Drinking water must be monitored to determine if carbamate levels exceed the proposed limits of 0.003 to 0.2 mg/L. The Pinnacle™ Carbamate column offers selectivity for free carbamates that is not available with standard bonded phases. Coupled with post column derivitization and fluorescence detection, this column is a powerful tool when performing EPA Method 531.1 as shown in Figure 2.

Uron Herbicides

Uron herbicides act as weed-controlling agents by inhibiting photosynthesis after being absorbed through the weed root system. Their presence in the environment poses a threat since these compounds have been shown to cause anemia and methemoglobinemia in laboratory animals. Figure 3 demonstrates that the Pinnacle™ EcoSep column is optimized for the separation of these analytes with a simple four-minute isocratic method. Although not shown, an improved resolution of isoproturon and diuron in the gradient mode is obtained by using the EcoSep column.

Triazine Herbicides

Selective weed control may be accomplished with triazine herbicides in either a post- or preemergence capacity. Livestock that have ingested