Introduction
Analysis of synthetic pyrethroids by gas chromatography is often a difficult and confusing task for environmental laboratories. Difficult because synthetic pyrethroids are based upon the natural pyrethrin structure extracted from chrysanthemum flowers, namely the chrysanthemic acid (Figure 1) where the R group can be any type of substituent. Some pyrethroids may act as a precursor to other active pyrethroids. The analysis may be confusing because some synthetic pyrethroids such as Cypermethrin (Figure 2a) can have anywhere up to 8 isomers in some instances due to the presence of chiral centers. This makes analysis of synthetic pyrethroids by gas chromatography confusing when multiple peaks represent a single pyrethroid (Figure 2b) with some of these signals are overlapping. Also of concern is the ability of environmental labs to meet the performance requirements of their test methods for the analysis of synthetic pyrethroids. BPX5, 35 and 50 give excellent resolution of the 16 synthetic pyrethroids in less than 32 minutes.

Pyrethroids are extremely potent insecticides that are widely used in agriculture, disease control and in household products. For instance all fly sprays use pyrethroids as their insecticides whether they are surface or airborne sprays. Pyrethroids act by interfering with the insect’s nervous system and in high concentrations affect humans in a similar way. They can also bring on asthma attacks, cause liver damage and allergic reactions and many of the pyrethroids are also carcinogenic. Their persistence in the environment can be anywhere between 1-16 days in soil and as such can reach natural water ways for which they are especially toxic to fish and other aquatic organisms. For these reasons, the levels of synthetic pyrethroids in foods and the environment are always under close scrutiny.

Summary
BPX5, BPX35 and BPX50 columns show unparalleled performance for the separation of the 16 synthetic pyrethroids. They can be conditioned at the end of each analysis to remove any high boiling point contaminants without any degradation to the stationary phase. The bleed levels are exceptionally low at 300°C and excellent peak shape indicating a high degree of inertness are all features of these three columns.