Profiling medications for decorative or aquarium fish using the Agilent 1290 Infinity LC system and Agilent ZORBAX Poroshell 120 2.7 µm columns

Application Note

Consumer Products

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Abstract

The Agilent 1290 Infinity LC system has significant capabilities for a wide range of HPLC and UHPLC applications. It exhibits a broader power range (for example, the combination of pressure and flow capabilities), and the flexibility to operate a wide range of column dimensions and particle sizes than any other commercially available system. Advanced optical design in the diode array detector allows a wide dynamic range and high sensitivity, both of which are critical in the monitoring of small impurities in fine chemicals.

The combined benefits are demonstrated by a separation of primary components and related impurities including sulfa drugs, nitrofurans and malachite green found in samples of fish medications. A broad range of products for treating ailments in decorative or pet fish are available. Many of these medications are banned or restricted for use in edible fish. If present in edible fish, the levels would be very low or undetectable by HPLC with UV based detection. These examples show a few medications and detail the rapid method development used to establish a rapid MS-compatible separation environment. Many fish medications advertise the use of "pharmaceutical quality" ingredients, and may imply pharmaceutical quality manufacturing and quality control procedures. When profiling these products one should expect to see very low levels of related impurities, consistent with the goals of pharmaceutical quality manufacturing

The high pressure capability of the system allows the use of methanol, and acetonitrile, to explore the selectivity of the two solvents. At 1 mL/min, using a simple 3 minute gradient and a 3.0 mm x 50 mm Poroshell 120 column, the analysis time is only less than 5 minutes including the late eluting phthalate artifact. The separation of the main components of a medicated powder with acetonitrile and methanol is shown in Figure 1, and the extraction of a medicated feed is shown in Figure 2.

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The speed, resolution and flexibility of the system are further demonstrated by a separation of a sulfa standard mix using solvent, gradient and temperature optimization with a 100 mm length Poroshell 120 column (see Figure 3).

After further optimization of the sulfa mix using methanol with the elevated temperature, all of the samples were run with the final method configuration, as shown in Figure 4.

Configuration

- Agilent 1290 Infinity Binary Pump with Integrated Vacuum Degasser (G4220A)
- Agilent 1290 Infinity Autosampler (G4226A)
- Agilent 1290 Infinity Thermostatted Column Compartment (G1316C)
- Agilent 1200 Diode Array Detector (G1315C)

Conclusion

Taking advantage of flexible solvent and column selection features, and high pressure capability, of the system allows one to use highly efficient columns to rapidly develop separations with remarkable resolution while conserving solvent over the use of 4.6 mm id columns.

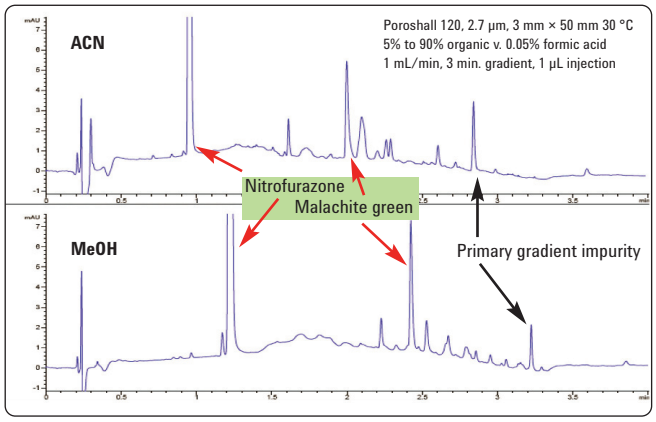

Figure 1
"Super Ick" medicated powder.

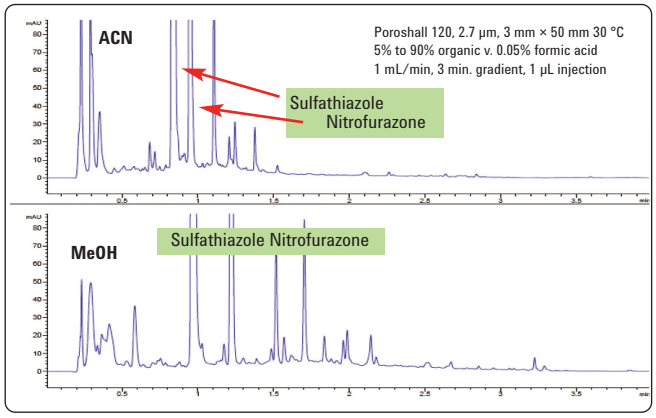

Figure 2
Separation of "Jungle" medicated fish food after methanol/water/formic acid extraction.

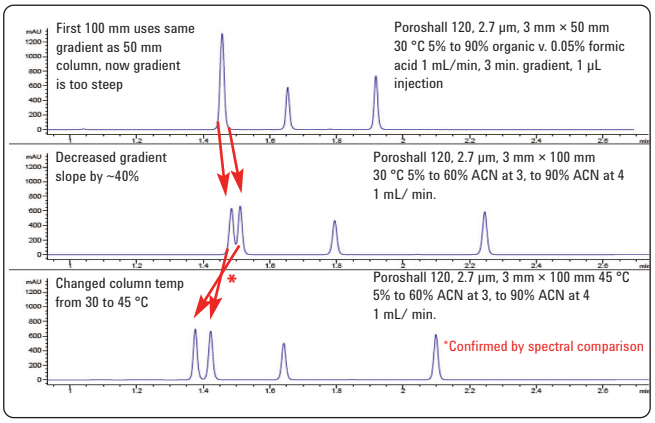

Figure 3
Sulfa standard mixture (Agilent p/n 59987-20033).

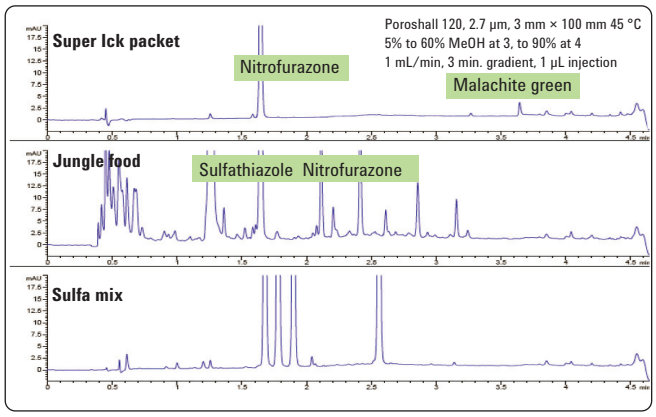

Figure 4
Final method configuration.

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