

The influence of bioinert column hardware on small molecule analysis

The separation of certain small molecules can be influenced by the use of stainless steel column hardware. Metal-coordinating compounds such as chelating agents can interact with the metallic surface of the column body, which can

adversely affect the analysis. The interaction can lead to loss of recovery, deterioration of peak shapes and sample carry over. The impact is enhanced when new columns are used so that tedious pre-conditioning is necessary.

Adsorption

The YMC Accura column hardware with a strict bioinert coating of the column body and frits is designed to prevent unwanted interaction of the analyte with metal surfaces. In this application note the analysis of two chelating

agents 8-hydroxyquinoline and hinokitiol, using the bioinert YMC Accura Triart C18 is compared to the analysis using the corresponding conventional column with stainless steel hardware.

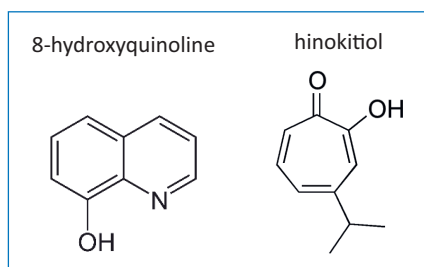
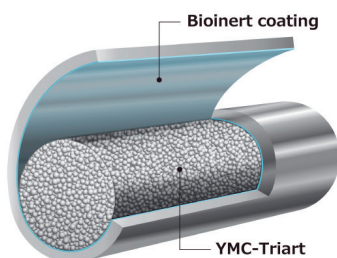
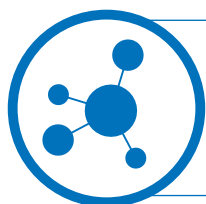


Table 1: Chromatographic conditions.

Columns:	YMC Accura Triart C18 (3 μ m, 12 nm) 100 x 4.6 mm ID (bioinert hardware) YMC-Triart C18 (3 μ m, 12 nm) 100 x 4.6 mm ID (standard hardware)
Part Nos.:	TA12S03-1046PTC TA12S03-1046PTH
Eluent:	water/acetonitrile (60/40)
Flow rate:	1.0 ml/min
Temperature:	30 °C
Detection:	UV at 310 nm
Injection:	10 μ l (0.1 mg/ml)
Sample:	hinokitiol, 8-hydroxyquinoline
System:	Agilent 1200 Series HPLC



Both metal-coordinating compounds showed strong peak tailing when the standard stainless steel column was used (Figure 1). This was clearly demonstrated by a tailing factor of 1.55 for 8-hydroxyquinoline and 1.72 for hinokitiol (Table 2). In contrast, the use of the bioinert coated

YMC Accura Triart C18 column led to higher peak intensities and superior peak shapes (Figure 1). Virtually no tailing could be observed with the bioinert hardware. Peak area and height also increased significantly by about 36%/44% for 8-hydroxyquinoline and 78%/83% for hinokitiol (Table 2).

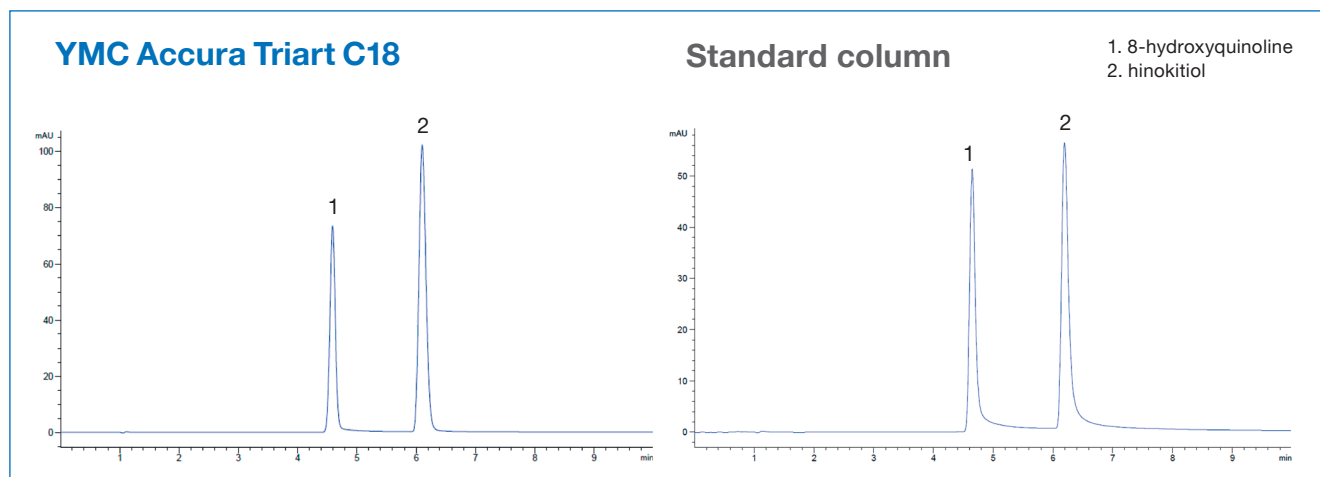


Figure 1: Analysis of the metal coordinating compounds 8-hydroxyquinoline and hinokitiol using the bioinert coated YMC Accura Triart C18 column compared to a conventional column with stainless steel hardware.

Table 2: Chromatographic parameters of 8-hydroxyquinoline and hinokitiol analysis using a YMC Accura Triart C18 column and the corresponding conventional column.

	Retention time (min)	Area	Height	USP* Tailing	Resolution
YMC Accura Triart C18 column					
8-Hydroxyquinoline	4.59	502.26	73.61	1.09	–
Hinokitiol	6.10	860.41	102.15	1.18	7.75
YMC-Triart C18 column					
8-Hydroxyquinoline	4.65	369.84	51.21	1.55	–
Hinokitiol	6.19	482.95	55.76	1.72	7.98

*United States Pharmacopeia

The use of bioinert column hardware leads to

- Improved peak shapes
- Higher sensitivity
- Higher recovery
- Greater reproducibility

The bioinert YMC Accura Triart columns are the best choice for the analysis of metal sensitive analytes such as chelating agents.

Application data by courtesy of YMC America, Inc.