



# Analysis of Inorganic Sulfate in Water with ZirChrom<sup>®</sup>-SAX

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Scientists at a leading cattle feed additive company, SarTec Corporation, needed a robust, linear method for the quantification of inorganic sulfate in water. ZirChrom method developers found the solution on ZirChrom<sup>®</sup>-SAX. The new method provides quantitation of inorganic sulfate ( $\text{Na}_2\text{SO}_4$ ) in under 3 minutes by indirect UV detection (Figure 1).

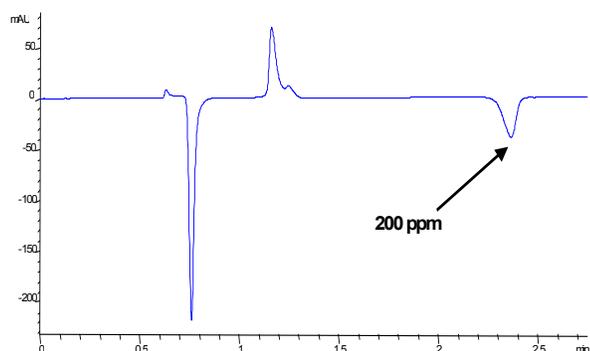


Figure 1: Analysis of Inorganic Sulfate in Drinking Water.

### Introduction

Consumption of water with high levels of sulfate anion has been shown to lead to higher incidence of PEM (polioencephalomalacia) in beef cattle (1). The scientists at SarTec needed a way to reliably quantitate the amount of sulfate in water before they could test their hypothesis for its removal.

### Experimental

A set of sulfate standards was made through serial dilution. Four replicates were performed for each of the concentrations.

Column: 4.6 mm x 150 mm ZirChrom-SAX  
Mobile Phase: 2mM ethylenediaminetetra(methylphosphonic) acid (EDTPA), 20mM 2-(N-morpholino)ethane sulfonic acid (MES), 5mM Sodium Chloride  
Injection Vol.: 10 ul  
Pressure Drop: 195 bar  
Detection: UV at 220 nm  
Flow Rate: 2.5 ml/min  
Temperature: 50 °C

This method of sulfate quantitation is reproducible, fast and produces a very linear standard curve (figure 2). The ZirChrom-SAX method allowed scientists at SarTec to quickly determine the sulfate concentration of water samples before and after experimental procedures to remove sulfate anions.

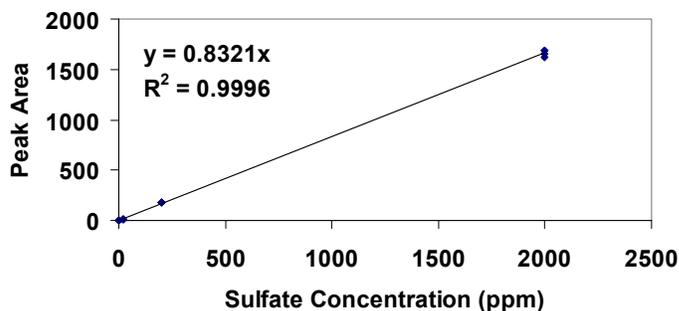


Figure 2: Standard Curve for Sulfate Analysis on ZirChrom<sup>®</sup>-SAX

Dr. Peter Greuel of SarTec corporation said “Not only is the analysis fast but so was the method development process. We are extremely happy with the results we’ve seen and look forward to working with ZirChrom in the future.”

### References

- (1) J.J. Wagner, Continental Beef Research, Lamar, CO; G.H. Loneragen and D.H. Gould, Colorado State University, Ft. Collins, CO.

### Acknowledgments

Dr. Peter Greuel, General Manager, SarTec Corporation

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