

Summary

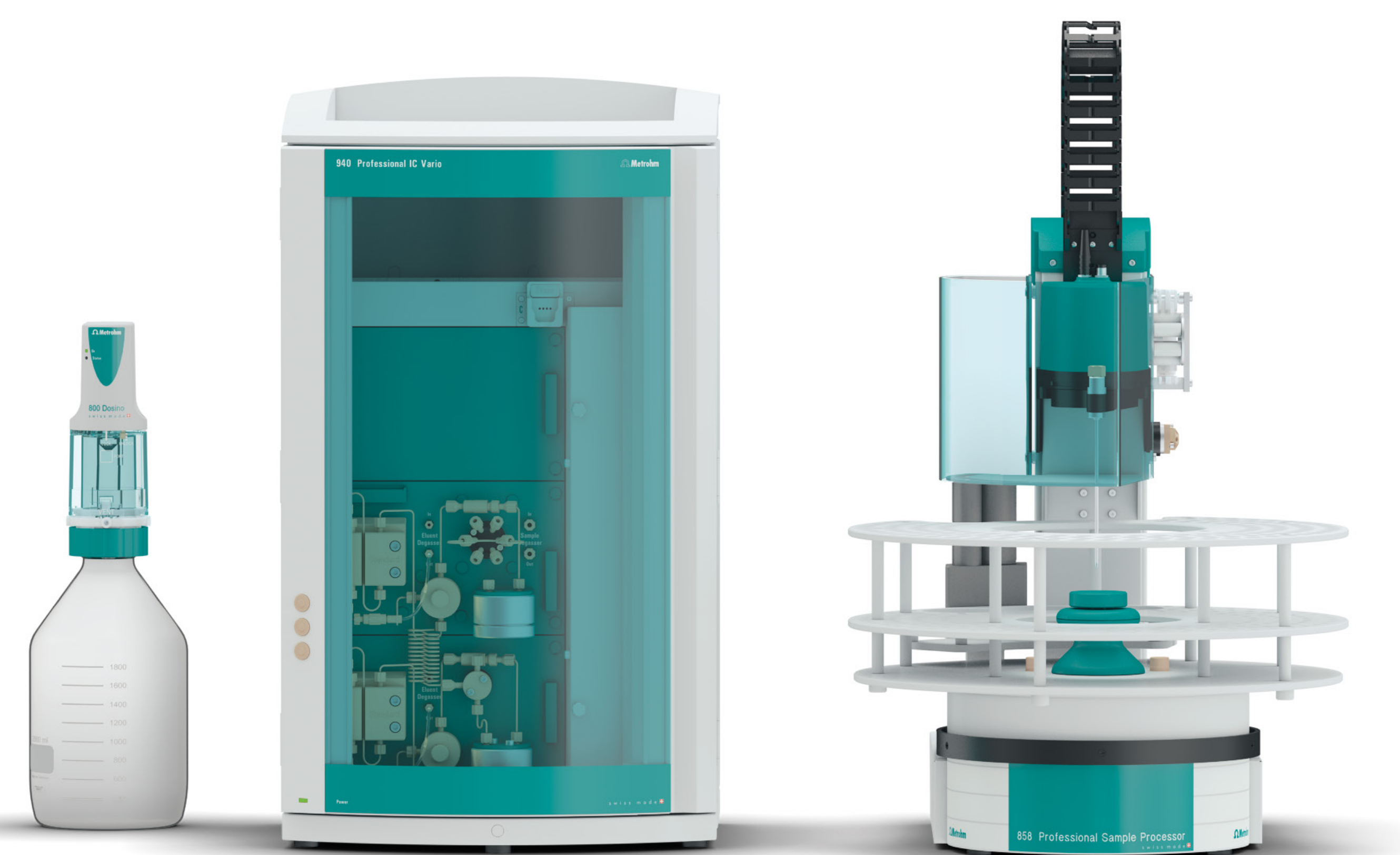
The rapid analysis enables high throughput laboratories to maximize production, and may be shortened to approximately 15 minutes if oxalate is not present. This application may be deployed utilizing a 930 Compact IC Flex, and is also suitable for use with Metrohm's In-Vial Dilution Technique (MiVDT).

Introduction

Product consistency and quality is of utmost importance to winemakers. It is also critical to monitor and evaluate yeast performance and efficiency throughout the fermentation process. This wine analysis can aid vintners with ensuring predictable flavor and aroma characteristics in finished wine by monitoring common indicators of acidity, mouthfeel, and balance. It also evaluates nutrients and other additives that have potentially deleterious effects on efficiency and production during the fermentation process. This application work shows the use of Metrohm IC to analyze red and white wine for chloride, phosphate, sulfite, sulfate, malate, tartrate, and oxalate. For this work, a Metrohm Professional IC with sequential suppression and conductivity detection was used in combination with an 858 Sample Processor and in-line Ultrafiltration. The in-line Ultrafiltration protects the column and system components from particulates and ensures trouble-free operation. The rapid analysis offered by this method enables high throughput laboratories to maximize production.

Instrumentation

- » 940 Professional IC
- » 858 Professional Sample Processor
- » 887 Professional UV/VIS Detector
- » Inline Ultrafiltration



Samples and Standards Preparation

Standards

1000 ppm stock standards were used for all analytes. Sulfite, tartrate, malate, and oxalate stocks were prepared from salts. Chloride, phosphate, and sulfate were prepared using commercially purchased standards.

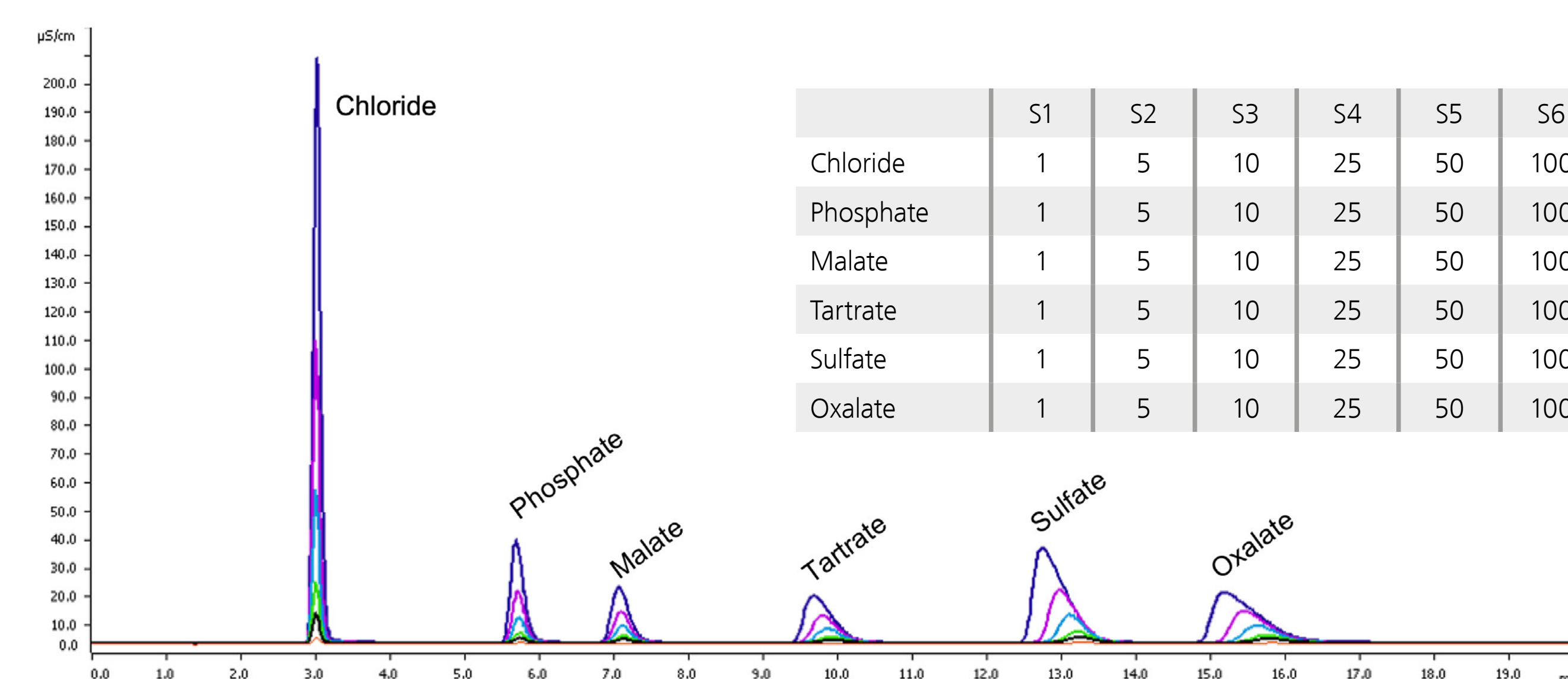
Sample Preparation

Wine samples were gravimetrically diluted 1:10 and 1:50 in ultrapure water. Vial caps were used to minimize oxidation. Samples were then directly injected by the 858 Sample Processor with ultrafiltration.

Instrument and Method Parameters

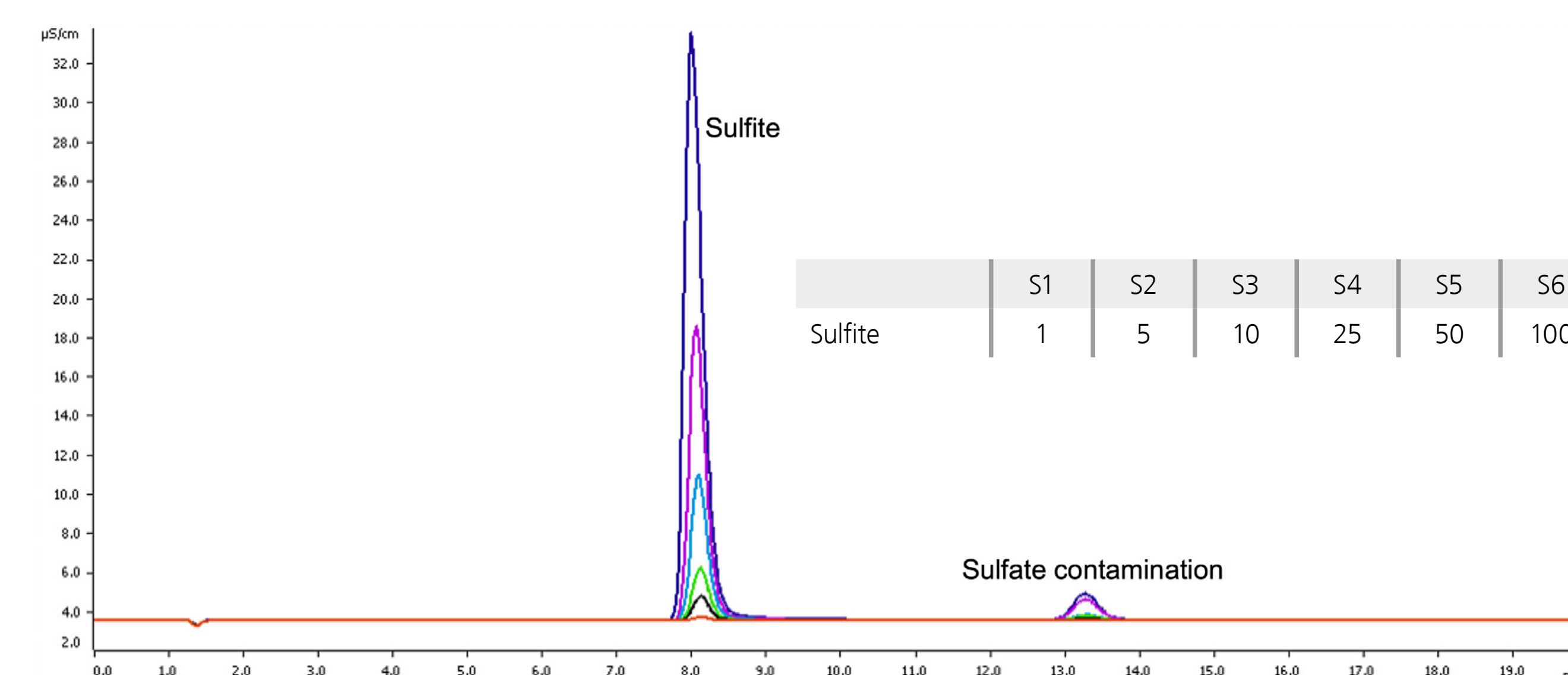
Anion eluent flow	1.0 mL/min	MSM Rinsing	Stream
Column temperature	35°C	MCS	On
Injection volume	20µL	Degasser	On
Anion P _{max}	20 MPa	Recording time	20 minutes

Calibration Standards



Working Standards

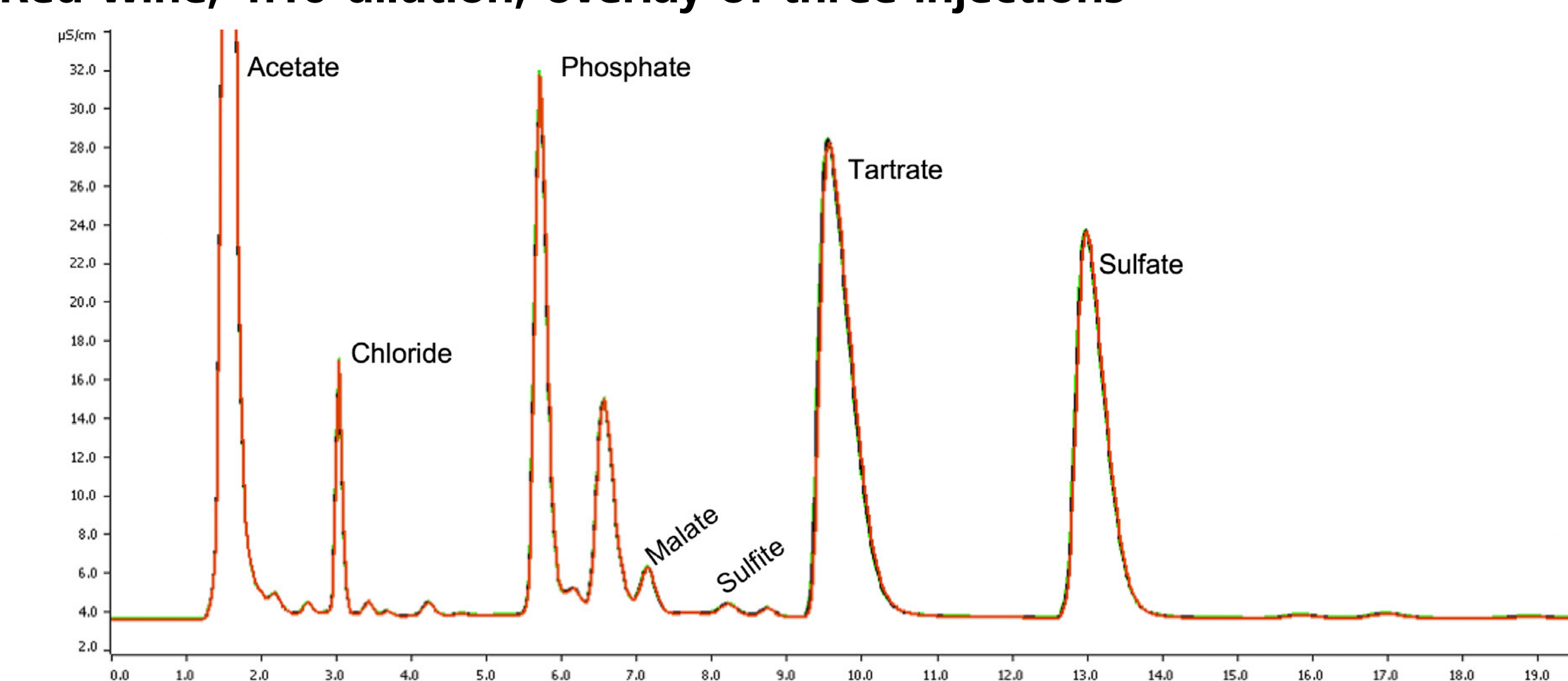
Sulfite working standards were prepared in 2% Isopropanol



Results

Red and white wine samples were injected on a Metrosep A Supp 10-100/4.0 column and the following chromatograms and results were generated:

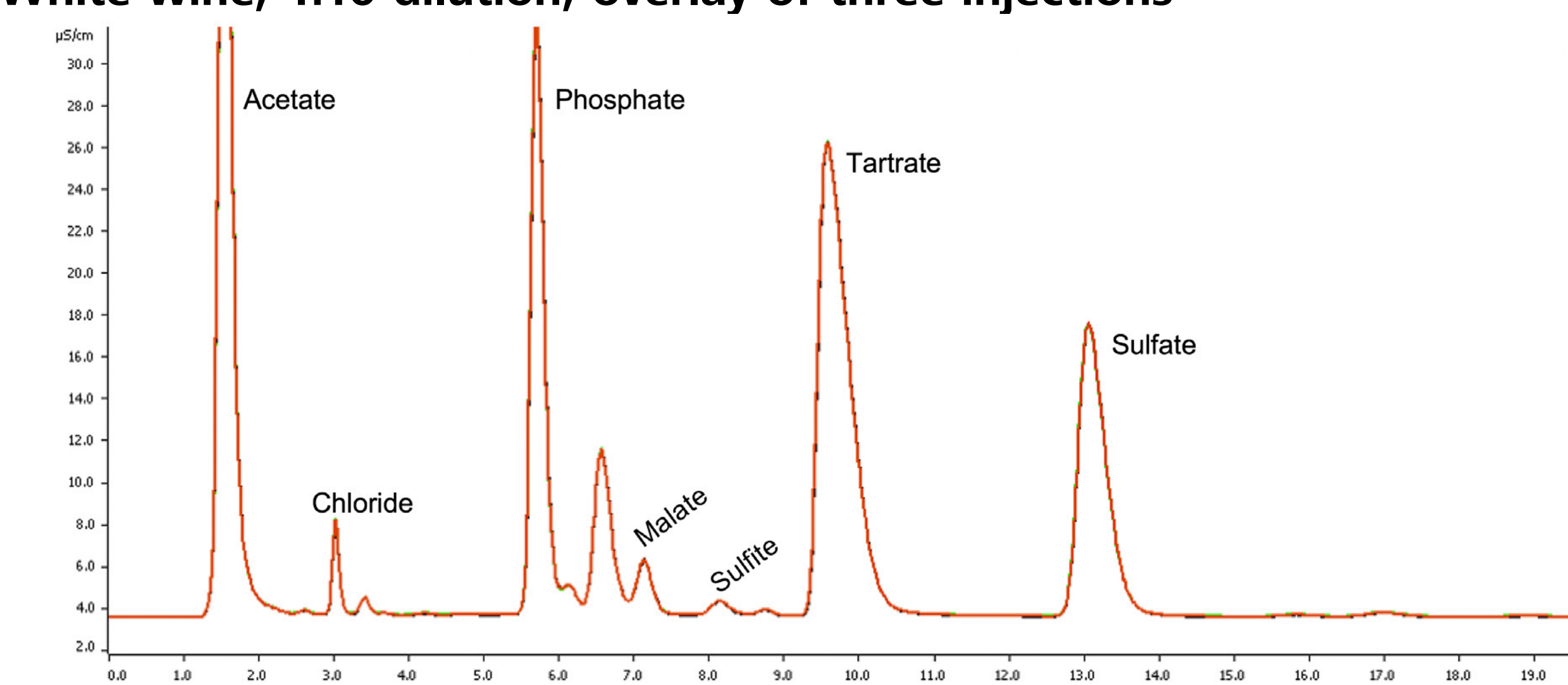
Red wine, 1:10 dilution, overlay of three injections



Red Wine (ppm)	Chloride	Phosphate	Malate	Sulfite	Tartrate	Sulfate	Oxalate
Average	60.0	771.6	92.1	26.7	1755.6	553.0	<10
RSD (%)	0.027	0.23	0.064	1.9	0.092	0.007	

Acetate not quantified.

White wine, 1:10 dilution, overlay of three injections



White Wine (ppm)	Chloride	Phosphate	Malate	Sulfite	Tartrate	Sulfate	Oxalate
Average	21.5	818.0	105.3	28.8	1534.2	366.7	<10
RSD (%)	0.040	0.098	0.19	0.44	0.56	0.009	

Acetate not quantified.

References

- (1) AW IC US6-0249-062017: Analysis of Chloride, Phosphate, Malate, Sulfite, Tartrate, Sulfate, and Oxalate in Red and White Wine
- (2) AW US6-210-122014: Metrohm In-Vial Dilution Technique (MiVDT) for Anions with Intelligent Dilution, Ultrafiltration, Analyte Delimiter Logic, and Eluent Production Module