

Ready-to-use solutions

- Supporting electrolyte pH = 7.0: $c(\text{H}_3\text{PO}_4) = 40 \text{ mmol/L}$
 $c(\text{CH}_3\text{COOH}) = 40 \text{ mmol/L}$
 $c(\text{H}_3\text{BO}_3) = 40 \text{ mmol/L}$
 2.7 mL $w(\text{H}_3\text{PO}_4) = 85\%$, 2.3 mL $w(\text{CH}_3\text{COOH}) = 100\%$ and 2.5 g boric acid are dissolved in dist. water. Adjust the pH value of the solution to 7.0 with $c(\text{NaOH}) = 2 \text{ mol/L}$, then make up to 1 L with dist. water.
- Quinine standard solution, $\rho(\text{quinine}) = 1000 \text{ mg/L}$:
 To 100 mg quinine add 0.4 mL $c(\text{H}_2\text{SO}_4) = 1 \text{ mol/L}$, dissolve in dist. water and make up to 100 mL.

Sample preparation

- Drinks can be analyzed directly.
- Tablets are crushed, then suspended in 50 mL dist. water and 1 mL $c(\text{H}_2\text{SO}_4) = 1 \text{ mol/L}$ for 5 min. After this extraction time filter the mixture into a 100 mL volumetric flask, rinse with dist. water and fill to the mark.

Analysis

Place 5 mL supporting electrolyte and a quantity of sample containing no more than 0.2 mg quinine in the polarographic vessel. Make up to 10 mL with dist. water. The pH value of the measuring solution should be 7.0.

The polarogram is recorded using the following parameters:

working electrode	DME
stirrer speed	2000 rpm
mode	DP
purge time	300 s
equilibration time	5 s
pulse amplitude	50 mV
start potential	-800 mV
end potential	-1250 mV
voltage step	6 mV
voltage step time	0.40 s
sweep rate	15 mV/s
peak potential	-1030 mV

The concentration is determined by standard addition.

Remark

Above 40 mg/L quinine the standard addition curve is no longer linear.

Literature

- G. Sonntag, G. Kainz
 Bestimmung von Chinin in Tonic-Wässern und Limonaden mit Differential-Pulspolarographie
 Microchim. Acta 2, 1977, 425–436.
- M. Brezina, P. Zuman
 Die Polarographie in der Medizin, Biochemie und Pharmazie
 Akademische Verlagsgesellschaft, Leipzig, 1956, 327–331.

Figures

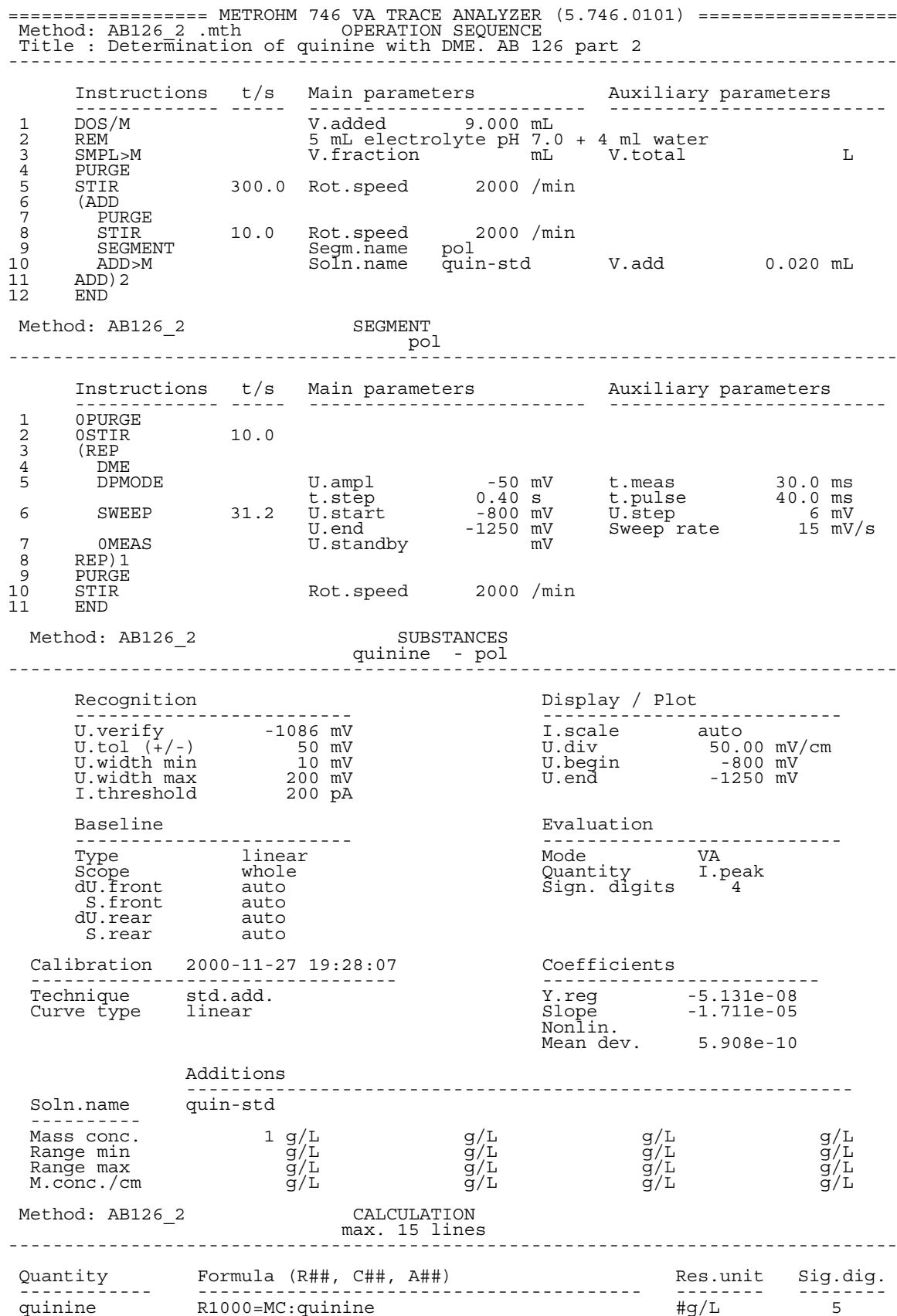


Fig. 1: Method for the determination of quinine with the 746 VA Trace Analyzer.

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===== METROHM 746 VA TRACE ANALYZER (5.746.0101) =====
Determ.      : 06010758      User:      Date: 1999-06-01
Modified     : 1999-06-01 08:10:30 Run : 0      Time: 07:58:30
Sample table: -
    
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Pos.  Ident.1/S1  Ident.2/S2  Ident.3/S3  Method.call  Sample size/S0
quinine
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Method : AB126_2
Title  : Determination of quinine with DME. AB 126 part 2
Remark1: Determination of quinine
Remark2: in Bitter Lemon
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Substance : quinine      Comments
Mass conc.: 29.99 mg/L   Add.mass : 20 ug
MC.dev.   : 0.518 mg/L (1.73%)  V0.sample: 1000 uL
Cal.dev.  : -
    
```

VR	U/mV	I/nA	I.mean	Std.dev.	I.delta	Comments
00	-1075	-51.93	-51.52	0.5721		
01	-1076	-51.12				
10	-1069	-85.31	-84.94	0.5124	-33.42	
11	-1070	-84.58				
20	-1065	-119.9	-119.5	0.5130	-34.55	
21	-1065	-119.1				

Substance	Techn.	Y.reg/offset	Slope	Nonlin.	Mean deviat.
quinine	std.add.	-5.131e-08	-1.711e-05		5.908e-10

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Final results      +/- Res.dev.  %      Comments
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quinine = 29.985 mg/L      0.518  1.73
    
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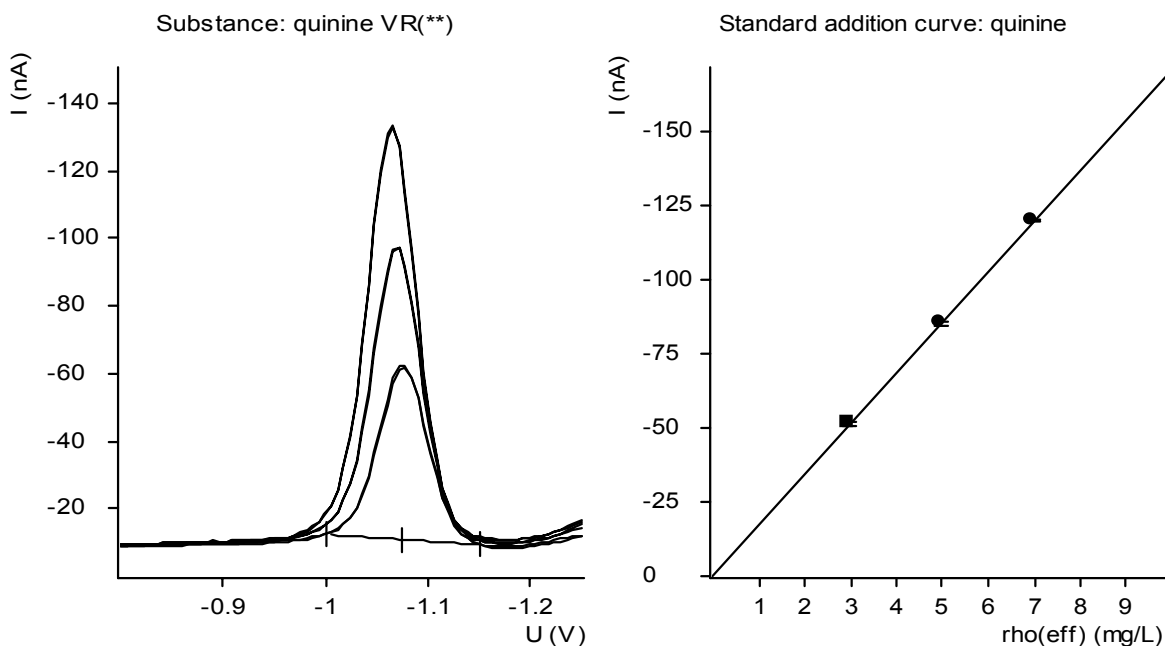


Fig. 2: Example of a determination of quinine with the 746 VA Trace Analyzer.