

**Titration of Indigo and  
Sodium hydrosulfite in Indigo  
Vat 40**

# Application

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## Use

Indigo is a so-called vat dye, which means that it needs to be reduced to its water soluble leuco-form before dyeing. The reduced form is absorbed into the fibres, and when oxidized back to its blue form it stays within the fibre. Earlier the reduction and dyeing was done with fermentation. Nowadays, the most of the reduction has been done chemically by sodium dithionite.

Concentrations of indigo and dithionite (hydrosulfite) are titrated simultaneously automatic titration using potassium ferricyanide as titrant

## Appliances

Titration: 7000 M1/20 consists of

- Basic device
- Magnetic stirrer TM 235
- 20 mL exchange unit WA 20, with brown glass bottle for titrant complete

Accessories:

- Titration head Z 306
- Glass beaker 100 ml without sprout, tall form
- Nitrogen gas for purging

## Electrodes

- Electrode: SA Pt 7780 or Pt 62
- Cable: L 1 A

# Application

## Reagents

- Titrant: Potassium ferricyanide 0.05 mol/l
- NaOH 0.1 mol/l
- Dispersing agent solution such as Sera Sperse Setamol WS 5 %

## Description

### Potassium ferricyanide 0.05 mol/l solution

4.11 g  $K_3[Fe(CN)_6]$  are weighed in a 250 ml volumetric flask and filled up with distilled water to the mark. The solutions have to be stored in a dark bottle. The solution can be used for 1 week.

### Sample titration

In the 100 mL glass beaker (tall form) are added 50 ml of the NaOH 0.1 m solution + 1 ml of a 5 % dispersing agent solution. The titration head is placed on the beaker and the solution is then purged with nitrogen for 5 minutes. To this solution are then pipetted 5 or 10 ml of the Indigo sample solution. Load the suitable method and start the titration.

### Important:

The solution must be yellow. If the solution is brown or even blue then the purging with nitrogen was not enough. Maybe the addition of some Hydrosulfite turns the colour of the sample solution into yellow.

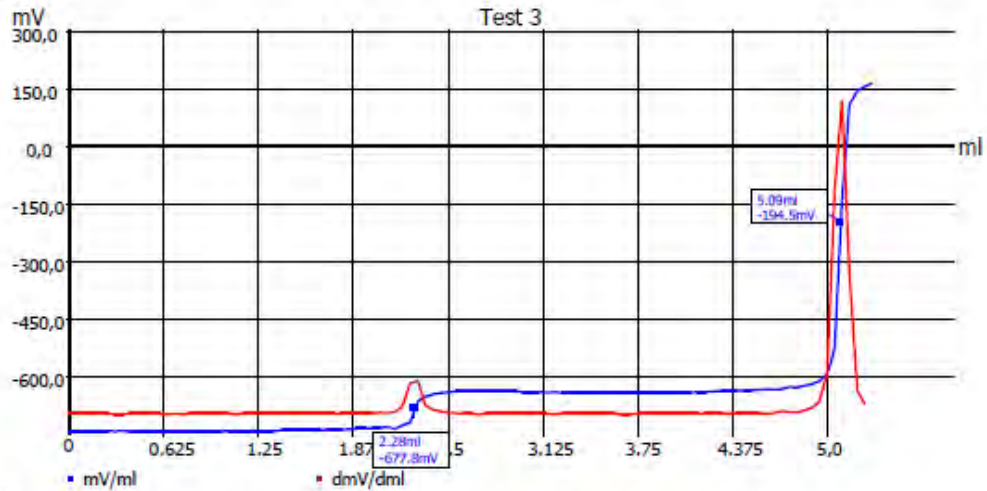


# Application

This example was made with 5 ml sample volume:

## Standard documentation

### Titration graph



### Method data

Method name:	Hydro-Indigo 5 ml a	Titration duration:	6 m 12 s
End date:	25.01.12	End time:	15:52:52

### Titration data

Sample ID:	Test 3		
Start mV	-733.2 mV	End mV	165.4 mV
EQ1:	2.280 ml/-677.8 mV	Hydrosulfit:	2.234 g/l
EQ2:	5.092 ml/-194.5 mV	Indigo:	3.824 g/l

### Calculation formula

Hydrosulfit:	$(EQ1 * F1) - F2$
Mol (M):	1.00000
Indigo:	$(EQ2 - EQ1) * F3$
Mol (M):	1.00000

Factor 1 (F1):	0.9800	Factor 2 (F2):	0.0000
Factor 3 (F3):	1.3600		

## Method

### Method data

Method name:	Hydro-Indigo 5 ml	Created at:	05/14/13 14:39:54
Method type:	Automatic titration	Last modification:	05/14/13 14:39:54
Measured value:	mV	Damping settings:	None
Titration mode:	Linear	Documentation:	GLP
Linear steps:	0.100 ml		

Measuring speed / drift:	Normal:	minimum holding time:	02 s
		maximum holding time:	15 s
		Measuring time:	02 s
		Drift:	20 mV/min

Initial waiting time:	0 s		
Titration direction:	Increase		
Pretitration:	Off		
End value:	300.0 mV		
EQ:	On (1)		
Slope value:	User-defined	Value:	1350

#### Dosing parameter

Dosing speed:	100.00 %	Filling speed:	30 s
Maximum dosing volume:	20.00 ml		

#### Calculation formula

Hydrosulfit:	(EQ1*F1)-F2	Decimal places:	3
Unit:	g/l		
Indigo:	(EQ2-EQ1)*F3	Decimal places:	3
Unit:	g/l		
Factor 1 (F1):	0.9800	Factor 2 (F2):	0.1000
Factor 3 (F3):	1.3600	Statistics:	Off

# Application

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## Notes

If you have any questions on the application, you can feel free to contact us..

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