Optimizing and validating analysis method of sulfides in water by potentiometry

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Introduction

CARSO-LSEHL is a big firm which cares about water quality. Every day, new dosage methods are to be validated for the purpose of giving reliable results to clients.
Sulfide is a water compound, which in high quantity, can be dangerous to health. This is why, there is an increasing demand for analysis which makes the need to speed up analysis time a priority consideration.
In fact, the Research and Analysis Center (CAR) developed a sulfide dosage method which has to be optimized and validated by CARSO so as to be used.
This is a simple method which uses a sulfide specific electrode to link up water potential to it concentration by proportionality.

Experimental methods

Development of the method
For this method, the equipment used was an ionometer TIM870 from "Radiometer Analytical" and a sulfide specific electrode from Radiometer.
Samples had to be kept without air and the pH had to be between 11 and 14.
Before any analysis it was necessary to make a standardization with a range of known concentrations (Fig 1).
For the measurement, we placed in a bottle 10ml of the water to analyze and 50ml of ISA solution made with ascorbic acid, NaOH and EDTA. The ISA solution was an electrolyte support used to keep sulfide ions during 24H.
Electrodes were placed in the solution under agitation, and after the stabilization, the potential was read on the ionometer.
After that, the result has to be written on an Excel file. The file has the ability to link up the analyzed water potential to its concentration by the standardization method.

Validation of the method

In fact, the main goal was to validate this method as a result of statistic tests. This is why, several parameters were tested such as: linearity, repeatability, reproducibility and accuracy. These criteria were validated with the software "FGCNT08" made by CARSO

Results and discussion

Figure 1 represents the standardization with a range of known concentrations. Moreover it is simple to link up the potential read on the ionometer to the concentration of the water to analyze by an equation of the linear line.
Moreover the table shows that the method can be used in all conditions and assures reliable results. The method is validated.

Figure 1: Standardization with a range of known concentration before measurement of a sample

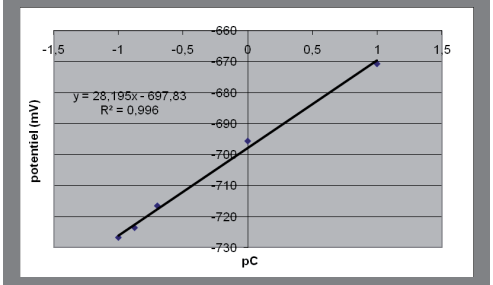

Figure 2: An extract of the table uniting the different statistic tests

Range of concentration	Sample *LQ* 0.1 mg/l	Sample 1 mg/l
measure	*5 x 6 repetitions*	
Average (mg/l)	**0,1022**	**0,998**
repeatability	0,0001	0,0011
sr (mg/l)	0,0079	0,0331
CV repeatability	**7,77%**	**3,31 %**
reproducibility	0,000032	0,0019
sR (mg/l)	0,0057	0,0437

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