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Building of the Absorbances Spectral curve as it relates to the wavelength in solution containing SDS

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Abstract:

The biodegradability of detergents is one aspect of the much more wide ranging and very topical problem of environmental pollution in general and water pollution in particular. For these reasons industry, in agreement with public authorities, has progressively shifted its production to detergents containing biodegradable surfactants. Nevertheless, for certain applications in the food industry, the metallurgical industries and in dishwasher detergents, small amounts of certain non-ionic surfactants of low biodegradability must be used for technical reasons: machines used in these industries work at high speed and have to use low-foaming and highly alkali-resistant surfactants of high detergency. For the time being there is no surfactant which is 80% biodegradable and has these properties. The methods used for the determination of AD can be divided into two major groups:

1- Methods for the determination of the total content of AD. These methods are mainly used for the evaluation of the environmental pollution.

2- Methods for the determination of the specific components of AD. They are mainly new and expensive methods as GC-MS, HPLC,

IR-Spectroscopy, ionic chromatography, etc., and they are used mainly in scientific research. We are interested in the first group of methods, in particular in those that use common analytical techniques, as UV-VIS spectroscopy, SAA and electro-analytical techniques, ion-selective potentiometry, etc. The difficulty of determination of AD in environmental samples is due to the wide range of the concentrations, insufficient selectivity and sensitivity of the analytical procedures and the lack of the standard samples.

Key words: detergents, standard samples, spectroscopy, ion-selective

Introduction

Studies conducted before the Section of Analytical Chemistry for the determination of total content detergenteve anionic (DA) in waters have been concentrating on previous extraction methods (the DA complexes with ketone) in organic solvents and subsequent measurements with the spectrophotometer or spektometer atomic absorption. These methods, which usually recommended in the literature, provide high sensitivity, but they are relatively complex; takes time and health danger (since used organic solvents, such as klorofrom, izobutimetilketon, toluene, etc.).

Following this work, we set ourselves to order:

- To experiment some direct method of determining the DA (which do not require prior extraction); The main advantages of these methods are simple procedure, short time and removal of the use of organic solvents.
- To experiment the possibility of using these methods in the determination of DA in seawater. It is known that almost all urban and industrial discharges to DA terminate in marine waters, especially near the coast, causing pollution and affecting marine ecosystems. Analytical methods of determining the DA in marine waters do not provide satisfactory results.

Materials and methods

a) Apparatus used: Measurements turbidimetrik (photometric) are performed with UV-VIS spektophotometer type Pye-UNICAM SP6-550, we wavelengths 700nm and using glass container 1 = 1,0 cm. Time measurement is calculated from the moment of casting the last jet (PVA). Results are reported in absorbance A (which in this case is equivalent to perturbation).

b) Cleaning of glass vessels:

A special care was devoted to glass containers cleaning. The glass containers that are going to be used for the AD determination should not be cleaned with powdered or liquid detergent. In our work we have followed this procedure to improve cleaning before we use these glass containers:

- water-washing
- washing with hypochlorite solution
-rinse out water and distilled water
-washing with HNO_3
-rinse out distilled water
-sponge the mixture HCl + alcohol (ethyl or methyl) 1: 1
-rinse out distilled water.

In some cases we have made rinses with acetone.

Results and discussion

Experiment 1. Spectral curves.

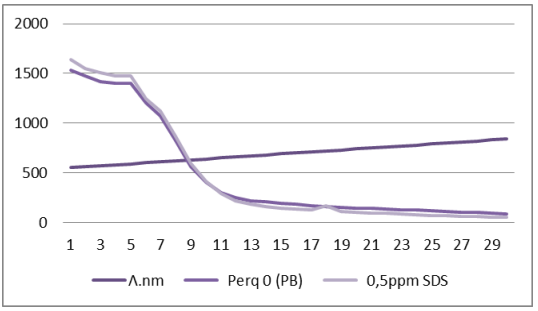
Absorbances measurements are for the solution with concentration 0 (BP) and SDS 0,5ppm with 3 % NaCl matrix spectral area from 550 to 850nm . Concentration in solution of the EV is $4x10^{-5}$M (1,0ml EV ethyl violet 10^{-3}M in 25 ml), and time of measurement after 20 minutes .

The results of measurement are presented in the statement 1 and the corresponding absorption curves in Figure 1 .In this statement 1 are given the differences between the two solvates of the absorbance ΔA for each wavelength .

Pasqyra 1: varesia e absorbances nga gjatesia e vales.

Λ.nm	*Absorbanca x* 10^3		
	Perq 0 (PB)	0,5ppm SDS	ΔA=A-A_{PB}
550	1,531	1,640	0,109
560	1,477	1,547	0,007
570	1,419	1,506	0,087
580	1,402	1,474	0,072
590	1,404	1,478	0,074
600	1,205	1,247	0,042
610	1,070	1,121	0,051
620	822	866	44
630	565	597	32
640	405	413	8
650	300	290	-10
660	250	221	-29
670	221	181	-40
680	205	160	-45
690	191	145	-46
700	180	134	-46
710	167	124	-43
720	161	166	-45
730	152	106	24
740	145	104	-41
750	139	96	-43
760	133	91	-42
770	128	85	-43
780	124	80	-44
790	116	73	-43
800	113	68	-45
810	105	62	-43
820	99	58	-41
830	94	55	-39
840	89	53	-36
850	82	51	-31

Figure 1



Conclusions

Noted that up to the 650nm , the absorbance of solution 0,5ppm SDS is greater than that of the test white solution :in the 640 nm the minimum of value reaches change (0,008) , while for λ < 650nm absorbance of surfactant SDS 0,5ppm becomes less than the PB.This difference reaches its maximum value at λ = 680nm (DA = -0.045) and remains nearly constant up to about 810nm.

LITERATURE

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