

METHOD OF METACHROMATIC DETERMINATION FOR SODIUM LAURYL SULFATE

SODYUM LAURİL SULFONATIN METAKROMATİK TAYİN METODU

SERAP AKINCI\*, KASIM C. GÜVEN

Institute of Marine Sciences and Management, University of Istanbul, 34470, Vefa/Istanbul, Turkey

*This work reports the determination of SLS based on metachromasy method. The assay was made for SLS at 485 nm. The sensitivity of this assay was 20 µg/L.*

*Bu çalışma SLS 'nin metakromatik metot ile tayinine dayanır. SLS için 485 nm de tayin yapılmıştır. Metotun hassasiyeti 20 µg/L dir.*

**Keywords :** *Metachromasy; Sodium lauryl sulfate; Spectrometry*

**Anahtar kelimeler:** *Metakromasi; Sodyum lauril sulfonat; Spektrometri*

## Introduction

Sodium lauryl sulfate (SLS) (SDS) is a sodium salt of sulfuric acid mono dodecyl ester. It is prepared by catalytic hydrogenation of lauric acid to lauryl alcohol and then esterification with sulfuric acid. The resulting compound is neutralised with alkali under controlled condition SLS is used as a detergent in medicated shampoos, skin cleansers, tooth pastes or/powers, in textile, metal, paper and pigment industries. It is also used for electrophoretic separation of proteins and lipids, as emulsifying agent, wetting agent and foam builder (1-2).

Metachromasy which is used in this assay was found first by Ehrlich (3) in the course of histological staining of particular tissue elements in animals. This phenomenon was defined by Lison (4) as the change of the absorption band of the dyes from long to shorter wavelengths. The substance that can induce metachromasia in a dye is called a chromotrope. The metachromatic dyes are methylene blue, Azure A, Nile blue, Night bule, etc.

This method was used for the identification of anionic detergents by thin-layer chromatography (5) and also for the assay of Linear Alkylbenzene Sulfonate (LAS) in seawater (6-7).

SLS is determined by titration with benzenonium chloride or spectrophotometrically by Azure A at 637 nm ( $\alpha$ -band of dye) (8).

Azure A, a metachromatic dye, is 3-amino-7-dimethyl amino phenothiazine-5-ium chloride, absorption max for 637 nm and

metachromatic band at 485 nm. It is of the same cationic dye group as methylene blue (dimethyl derivative of Azure A). Other Azure dyes are Azure B (methylene Azure), Azure C (monomethyl thionine chloride), Azure I (obtained by oxidation of methylene blue) and Azure II (the mixture of methylene blue and methylene Azure) (1).

In this work a metachromatic method was proposed for the identification by thin layer chromatography and for the spectrophotometric determination of sodium lauryl sulfate.

## Materials

Na lauryl sulfate (Merck)  
Azure A (Gurr)  
Barbiton (Merck)

Na lauryl sulfate stock solution: 100 mg in 50 ml water .

Spectrophotometer (Shimadzu UV-220)

Azure A solution was prepared at a concentration of 1/100 in water. Barbiton buffer : 0.44 mg babiton dissolved in 2 ml 0.5 N NaOH and the volume adjusted to 20 ml with distilled water.

## Methods

10 µl, 25 µl, 50 µl, 75 µl and 150 µl from stock solution (corresponding to 20, 50, 100, 150 and 300 µg SLS) was used for plotting of standard curve.  $\lambda$  max at  $\beta$  bands of Azure A in barbiton buffer was recorded spectrophotometrically. LAS solution added to a mixture of 2 ml Azure A and 2 ml barbiton buffer solution then the absorbance was recorded, the absorption curve plotted and the equation was taken from the spectrophotometer.

\*This paper is based on a M.Sc. Thesis

## Results and Discussion

The absorption max. for  $\beta$ -band (metachromatic band) was 485 nm for SLS. The standard curves for SLS is shown in Fig. 1.

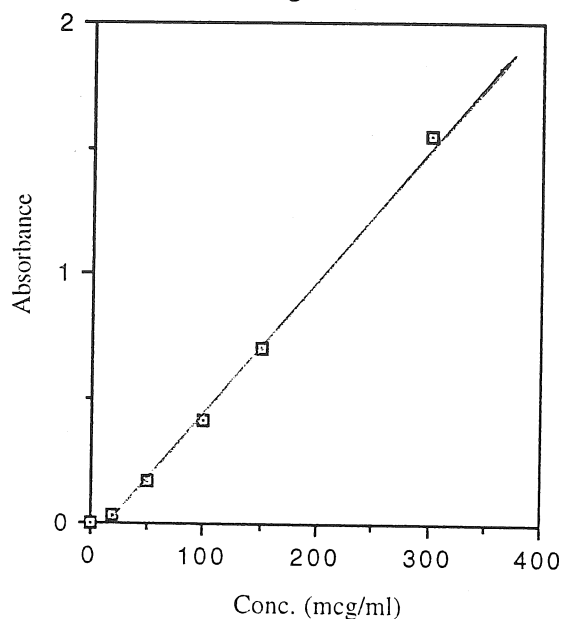


Fig. 1. The standard curve of SLS Each value is the mean of five experiments

The equation of the standard curve for SLS was:

$$y = 182.51x + 16.735 \quad r = 0.9998$$

The sensitivity of the assays were  $20 \text{ mcg.ml}^{-1}$  Hence SLS can also be determined at metachromatic band ( $\beta$ -band) as  $\alpha$ -band.

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