IJBPAS, November, 2022, 11(11): 5555-5559

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

SPECTROPHOTOMETRIC DETERMINATION OF SODIUM LAURYL SULPHATE CONTENT IN DIFFERENT BRANDS OF SHAMPOOS

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Received 8th Jan. 2021; Revised 27th March 2022; Accepted 27th May 2022; Available online 1st Nov. 2022

https://doi.org/10.31032/IJBPAS/2022/11.11.6615

ABSTRACT

A Spectrophotometric method for estimation of Sodium lauryl sulphate which is commonly used ingredient in shampoo. But slightly higher concentration may cause harmful effect on scalp. The proposed method shows intensity of absorption at 650nm and beers law obeyed in concentration range of 2-10 µg/ml in final volume of 10ml by using quartz cells and the concentration of unknown sample has been determined successfully.

Keywords: SLS, Shampoo, uv-visible Spectrophotometric method

INTRODUCTION

Shampoo is a basic hair care product for cleansing of scalp &hair. Shampoo is typically in the form of a viscous liquid which was developed to replace soap for cleansing scalp and hair by removing unwanted sebum, dandruff, environmental dust, and residues of hair **[1-3]**. Therefore, a shampoo containing a combination of

surfactants is necessary. The content of surfactants in a shampoo should be between 10% and 20%.

The oily dirt on hair and scalp are emulsify with surfactant, then the dirt can be pulled into water and washed off easily **[4-7]**. A class of anionic surfactants such as sodium laurate sulfate, ammonium laurate sulfate, sodium lauryl sulfate, and ammonium lauryl sulfate are used as primary cleansing agents in shampoo **[8, 9]**.

Sodium lauryl sulphate is used as cheap ingredient in shampoo as it works as a surfactant, trapping oil and dirt in hair. As shampoo is used daily it may lead to health issues **[10-11]**. The highest risk of using SLS is irritation to your eyes, causes redness,swelling,inflammation on hair and scalp. The concentration of SLS is usually not indicated on the product although 1 % concentration of SLS is permitted in hair **[12-13]**. It is therefore needed to develop a cost-effective, sensitive and rapid method for constant quality assessment of marketed products.

PROPERTIES:

Physical state: white powder

Molecular formula: C12H25NaO4S

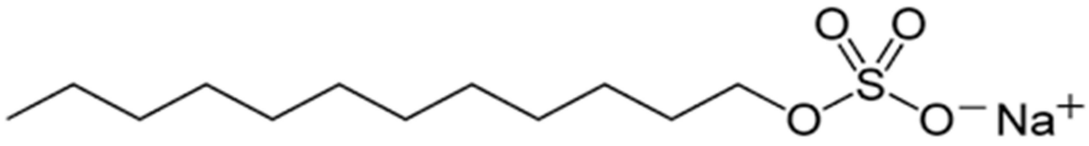
Molecular formula: 288.38

Melting point: 204-207C

pH: 9-10

Solubility: soluble in water

Structure



Mechanism of action:

SLS is amphiphilic. Which migrates to the surface of liquids, when its arrangement and accumulation with the other SLS molecules lowers the surface tension. This allows for easier spreading and mixing of the liquid.it has potent protein denaturing activity and inhibits the infectivity of viruses by solubilizing the viral envelope and/or by denaturing envelope and/or capsid proteins.

MATERIALS AND METHODS

Materials: sodium lauryl sulphate (SLS), shampoos, sulphuric acid, methylene blue, dichloromethane.

Method:uv –visible spectrophotometer

Procedure:

Preparation of standard solution:

- Take about 0.25g of standard sample (SLS) in glass stoppered test tube and

add 25 ml of water which gives 10,000ug/ml concentration

- From the 10,000ug/ml pipette out 0.1ml and make upto volume to give a 100ug/ml concentration.
- pipette out 1ml,0.8ml,0.6ml,0.4ml&0.2ug/ ml from 100ug/ml.
- Add o.1ml of 0.1w/v of methylene blue and 2ml of 1 N sulphuric acid and 2ml of dichloromethane shake well and make up to volume with water
- Check the absorbance of sample at 651nm using water asblank.

Preparation of sample:

- Take about 0.25g of sample(shampoo) in beaker add 25 ml of water
- From solution pipette out 0.1 ml and dilute to give 100ug/ml
- pipette out 0.8 ml and dilute with water from 100ug/ml
- Check the absorbance at 651 nm using water as blank
- Then concentration was determined by plotting calibration curve.

RESULTS AND DISCUSSION:

The reports states that SLS is found to be harmful when present in excess in any formulation, it is necessary to evaluate SLS containing products for safer use. The quantity of SLS in sample is found to be within the acceptable limits which indicate that such products can be used carefully particularly to children and elderly people.

The proposed method can be taken into consideration for the quantification of SLS in pure form [API] as well as in marketed formulations by using the uv visible spectrophotometer **(Table 1)**.

The Concentration of the unknown sample from graph was found to be: Brand 1-2.273ppm; Brand 2-1.432ppm; Brand 3-6.130ppm **(Figure 1)**.

Table 1: Concentration of SLS content in shampoo

concentration	Absorbance
2	0.155
4	0.322
6	0.462
8	0.593
10	0.743
Brand 1	0.175
Brand 2	0.132
Brand 3	0.376

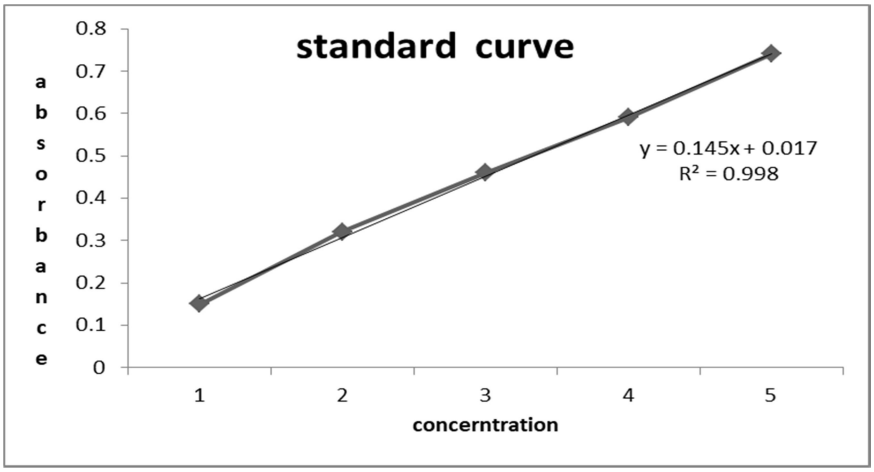


Figure 1

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