# Report for Chem 101 Laboratory Exercise #4
# Spectrophotometric Determination of Salicylic acid[1]

*Using Microsoft Word, students are to insert responses in all yellow highlighted areas. It is recommended that the report be completed without changing font size, column width, row width, margins and highlights. The completed report must be uploaded to the 101 Brightspace site as a .pdf file by the due date posted on Brightspace. All answers must be the student's own work without assistance from others. Only reports which are completed using the template will be marked.*

**Name:** _Bree Hopkins_ **Lab Section:** _B07_**Quad:** _2_ **Date:** _Oct 20, 2022


**Abstract**

The % mass of salicylic acid in an acne cleanser[2], was determined to be _9.327%_ by measurement of the absorbance that was determined from a calibration curve. This was found to be _0.093%_ of the advertised value.


**Data/Results**

**Table 1.** Experimentally measured absorbances (A) and calculated concentrations (conc) for the standard salicylic acid solutions. *The observed data inserted in this table must be consistent with the observed data written in your laboratory notebook with the correct units.*

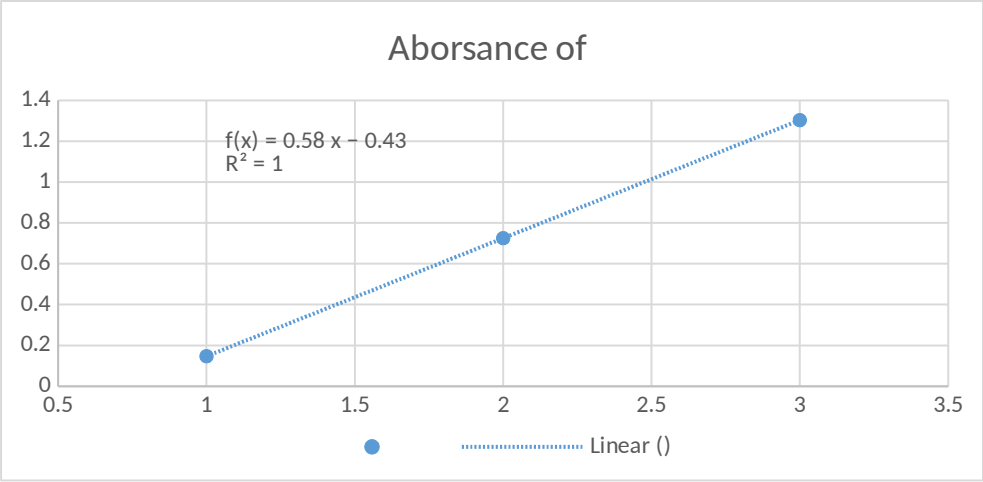
| | conc | |
|---|---|---|
| Stock salicylic solution | 0.002825M | |
| | A | conc |
| standard solution #1 | 0.147 | $1.13x10^{-4}M$ |
| standard solution #2 | 0.725 | $5.65\ x10^{-4}M$ |
| standard solution #3 | 1.303 | 0.00113M |

**Table 2.** Determination of the amount of salicylic acid in the acne cleanser. *The observed data inserted in this table must be consistent with the observed data written in your laboratory notebook with the correct units.*

| Volume of acne cleanser used in the analysis | | **0.30mL** | |
|---|---|---|---|
| | Acne cleanser aliquot #1 | Acne cleanser aliquot #2 | Acne cleanser aliquot #3 |
| Absorbance | **1.095** | **1.017** | **1.090** |
| [salicylic acid] from curve | **2.640** | **2.505** | **2.631** |

| | | | |
|---|---|---|---|
| Moles of salicylic acid in 25.00 mL | **0.066** | **0.063** | **0.066** |
| Mass of salicylic acid in 25.00 mL | **9.116** | **8.702** | **9.116** |
| Mass of salicylic acid in 1.00 mL of acne cleanser | **0.908** | **0.908** | **0.908** |
| % mass of salicylic acid in acne cleanser | **10.040%** | **7.901%** | **10.040%** |
| % comparison to advertised value | **0.100%** | **0.079%** | **0.100%** |

**Calibration curve for a standard solution of salicylic acid** *(cut and paste from Excel)* **and determination of the salicylic acid concentration in an acne cleanser by interpolation**




**Algebraic Equations** (see page 12 of the Chem 101 lab manual)

Concentration of a standard solution = _C=m/V_

Moles of salicylic acid in 25.00mL = _c*v=n_

Weight of salicylic acid in 25.00 mL = _n=m/M_

%RSD of weight of salicylic acid in the acne cleanser _10.81%_

**Discussion** *Respond to the following:*
*Explain how the calibration curve was generated and then used to provide a value for the concentration of the salicylic acid solution that was placed in the spectrophotometer (max 4 lines).*
_the calibration curve was generated by inputting the absorbance and concentration in the x and y values. The concentration was put on the spectrophotometer to see the amount of a certain light shine through it_
*1Was the % comparison greater than or less than 100%? Include the actual value in your answer. Give a scientific explanation as to why the value was less than or greater than 100%. Do not give personal (lost some of the solution, hard to see the calibration mark) or that the company cheated us on the quantity but rather take a close look at the experiment and determine from a chemical point of view what could have contributed to the variance (max. 4 lines).*

_more then. The bottle containing the acne cleanser wasn't being mixed before I took my sample possibly leaving all the salicylic acid right where I took my sample leaving me with more then what was advertised_

**Conclusions**
The % mass of salicylic acid in an acne cleanser, was determined to be _9.327%_. This was _0.01%_ of the advertised value.

**References**

1. Reimer, M. et al, *Laboratory Manual*, *Chemistry 101*, pp. 27-34. (University of Victoria: Victoria, B.C.). Fall **2022**.
2. _Clean and Clear Advantage Blackhead Clearing Astringent. Johnson & Johnson INC., Markham, Canada L3R 5L2_

| **Feedback Summary** | max. |
|---|---|
| **Pre-lab quiz:** Are all responses correct? | 4 |
| **Laboratory Notebook:** Have all data, observations and procedures been recorded? | 1 |
| **Report:** Are all sections completed accurately and correctly? | 3 |
| **Participation:** Did the student come prepared, was time used well in lab and was student engaged in the experiment? Did the students request the TA to check their drawers for completeness before they left the lab and show the TA the email of | 1 |

| | |
|---|---|
| successful submission? | |
| **Performance evaluation:** Did student follow the safe practice guidelines throughout the whole lab period? | 1 |
| **Total mark** | 10 |