Physiochemical Analysis of Different Soap and Shampoo Collected from the Different Local Market of District Karak, KP, Pakistan

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Abstract: The aim of this study was to investigate the content of pH, viscosity, conductivity, temperature, TDS (Total dissolved solid), TS (Total solute), color, odor, taste, effect on the human being. Sixteen samples were collected from different local markets in district Karak Pakistan. The results were analyzed that the pH of shampoo range from 7.04 to 7.64 and pH of soap range from 10.32 to 10.74, viscosity of shampoo range from 1.09 to 2.53 and viscosity of soap range from 0.127 to 2.436. Conductivity of shampoo range from 117.9 to 340 and the conductivity of soap range from 101.9 to 248. TS of shampoo range from 0.8 to 2.55. TDS of shampoo range from 0.09 to 0.24 and the TDS of soap range from 0.6 to 1.63. Temperature in shampoo range from 30 to 32.7°C and temperature of soap range from 29.1 to 32.2°C. Most of the soap and shampoo have different color, pleasant smell and bitter in taste.

Key words: Shampoo • Soap • Physiochemical Analysis

INTRODUCTION

Physiochemical analysis is a procedure of investigating physiochemical systems which made possible a determination of the nature interaction between the component of a system through the study of systems physical properties and composition. The principles of physiochemical analysis were established in the late 19th century by the analytical procedure received its development in the research of H. Lechaterlier, G. Tommann and his school. Physiochemical analysis contains the measurement of different physical properties (Thermal conductivity) and optical properties. They were fined the density, viscosity and hardness also they depend on the rate of transformation occurring in a system composition [1]. Physiochemical analysis of various shampoo, shows that all shampoo, are best for your hairs. All sample of shampoo panel tastes of the same sample have given the hairs wash with good result. The shampoo and soap are clean the hair from oil, which was applied prior to the application of shampoo and soap. The test result can show that shampoo and soap have chemical like SLS and SLES, or any other surfactant ingredient, which are not good quantity, which can be very toxic for the hair and skin. Result of Pentene, head shoulder, sun silk and Dove are on the top. All the sample of shampoo and soap has no harmful elements. Modern shampoo and soap using different chemicals and fragrances which can make the ability to clean the hair [2].

Normally human healthy skin has (PH) ranging from 5.4-5.9 and a normal bacterial flora. Soap and shampoo have high pHare uses to causes an increase in skin pH. Soap and shampoo are used for cleaning purpose which are usually made by reacting alkali i.e. (Sodium hydroxide) with naturally occurring fat and fatty acids [3, 4]. Taste of some soap and shampoo is a salt of fatty acid. House hold uses for soaps include washing, bathing and other types of housekeeping, where soaps act as surfactants. In industry they are also used in textile. Viscosity is a liquids resistance to flow. When the intermolecular forces of attraction are strong with in a liquid there is a larger viscosity. So some sample of soap and shampoo have high viscosity in our analyzed data, it means that their intermolecular forces of attraction are strong [5, 6].
the current study was to check the Physiochemical parameters of different Soap and Shampoo collected from the different Local Market of District Karak, KP, Pakistan.

MATERIALS AND METHODS

Samples of soap and shampoo were collected from the different local markets in district karak in from Jan to Jun 2017, in order to analyze it for different physiochemical parameter.

**Determination of pH:** Reading of pH was taken by using the pH meter (model-5603 Jenway, temperature-26°C). The samples were coded before the analyzing of PH.

**Procedure Used for Soap:** Soap sample weighted 10mg mixed in 100ml distilled water without producing much lather. It was kept undisturbed for 24 hours for maximum dissolution of soap.

**Procedure Used for Shampoo:** Sample of shampoo of 10ml is taken in a glass beaker and then 100ml distilled water is mixed to form a solution. The solution is kept undisturbed for 30 minutes. Then the pH, conductivity, viscosity, temperature, TS, TDS, odor, taste color of each sample are measured.

**Determination of Viscosity:** Ostwald Viscometer was used to determine the viscosity of different shampoo and soap samples. Lower bulb of Viscometer was filled with sample and upper bulb was filled by pipette pillar up to the mark. Then the sample was flowing freely from upper bulb and at the same time, the rate was detected by stop watch. The process was made twice to find the accurate value of the rate of flow. Standard Distilled Water was used to calculate the relative viscosity of water sample. Total rate of flow of the sample was calculated by following method,

\[
\text{Rate of flow of time } T = \frac{\text{Sum of time taken / No. of Time}}{T_1 + T_2} = \frac{T_1 + T_2}{2}
\]

Relative Viscosity \( n = \frac{d_1}{d_2} \), \( t_1 \), \( t_2 \), \( n_2 \)

\( D_1 = \text{density of sample}, \quad d_1 = \text{density of standard water}, \quad n_1 = \text{coefficient of viscosity of sample}, \quad n_2 = \text{viscosity of standard water.} \)

\( n_2 = 0.890 \) at STP

Hence density of water for \( d_1, \& d_2 = \text{constant} = 1.0 \text{ g/cm}^3 \).

**Determination of TDS:** Two beakers, 100ml volume were used to determine TDS and every sample of 10ml was taken number wise. Each sample was first filtered with filter paper Whatman No.42. The beaker was first weight by digital balance and then the filtered sample was poured into specific beaker and finely solvent of sample evaporated by using hotplate. In this way two types of weight were obtained as given below,

\( W_i = \text{Weight of empty, clean beaker.} \)

\( W_z = \text{Weight of dissolved Solute in Sample.} \)

Total dissolved solute is calculated by following method

\( \text{TDS} = W_z - W_i \)

Hence two beakers are used so their weight in gram is

Weight of Beaker (a) is \( W_i = 101.23 \) g

Weight of Beaker (b) is \( W_z = 110.60 \) g

Each sample used \( V = 10 \text{ ml.} \)

**Determination of Total Solid (TS):** About 10 ml of different samples of soap and shampoo which collected from different local shop in distract Karak were placed in 100ml clean and dry beaker and weight it, then the samples were evaporated with the help of hot plate until the solute in sample left behind. The beaker was then weighted; two values were calculated for each sample after the process. These values are given below [7].

\( W_i = \text{Weight of Beaker} \)

\( W_z = \text{Weight of solute sample} \)

Total solute (TS) value was calculated by following method

\( \text{TS} = W_z - W_i \)

Weight of 100ml beaker \( W_i = 150.10 \) g

Each sample were used \( V = 10 \text{ ml.} \)

**Electrical Conductivity:** Electrical conductivity of the assembled shampoo & soap samples was measured under the laboratory conditions using JENWAY portable Conductivity meter model No.4520. The shampoo and soap samples temperature was determined with the help of mercury in glass thermometer (0-110°C), graduated with 0.1°C interims. The odor and taste were physically observed with nose and tongue.


Table 1: Physiochemical parameters of Soap & Shampoo collected from district Karak.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Viscosity</th>
<th>pH</th>
<th>Conductivity</th>
<th>Temperature</th>
<th>TS</th>
<th>TDS</th>
<th>Odor</th>
<th>Taste</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life buay Shampoo</td>
<td>2.532 μη</td>
<td>7.25</td>
<td>180.0 η</td>
<td>30°C</td>
<td>1.11</td>
<td>0.14</td>
<td>Pleasant</td>
<td>Bitter</td>
<td>Green</td>
</tr>
<tr>
<td>Clear Shampoo</td>
<td>1.350 μη</td>
<td>7.27</td>
<td>162.8 η</td>
<td>32°C</td>
<td>1.9</td>
<td>0.1</td>
<td>Pleasant</td>
<td>Bitter</td>
<td>White</td>
</tr>
<tr>
<td>Sunsilk Shampoo</td>
<td>1.078 μη</td>
<td>7.22</td>
<td>149.8 η</td>
<td>32.7°C</td>
<td>1.2</td>
<td>0.15</td>
<td>Light Pleasant</td>
<td>Bitter Black</td>
<td></td>
</tr>
<tr>
<td>Dove Shampoo</td>
<td>1.110 μη</td>
<td>7.04</td>
<td>182.8 η</td>
<td>31.4°C</td>
<td>1.8</td>
<td>0.15</td>
<td>Slightly Pleasant</td>
<td>Salty Bitter White</td>
<td></td>
</tr>
<tr>
<td>Onic Shampoo</td>
<td>0.934 μη</td>
<td>7.41</td>
<td>340.0 η</td>
<td>31.5°C</td>
<td>1.85</td>
<td>0.09</td>
<td>Odorless</td>
<td>Slightly Bitter</td>
<td>Brown</td>
</tr>
<tr>
<td>Selsun Shampoo</td>
<td>1.090 μη</td>
<td>6.61</td>
<td>117.9 η</td>
<td>31.3°C</td>
<td>1.1</td>
<td>0.13</td>
<td>Light Pleasant</td>
<td>Bed Taste Blue</td>
<td></td>
</tr>
<tr>
<td>Head Shoulder Shampoo</td>
<td>0.962 μη</td>
<td>7.64</td>
<td>190.6 η</td>
<td>31.1°C</td>
<td>0.95</td>
<td>0.24</td>
<td>Light Pleasant</td>
<td>Mint Fresh White</td>
<td></td>
</tr>
<tr>
<td>Pantene Shampoo</td>
<td>0.949 μη</td>
<td>7.50</td>
<td>186.6 η</td>
<td>32.5°C</td>
<td>1.55</td>
<td>0.11</td>
<td>Light Pleasant</td>
<td>Bitter White</td>
<td></td>
</tr>
<tr>
<td>Life buay Soap</td>
<td>0.158 μη</td>
<td>10.66</td>
<td>183.4 η</td>
<td>30°C</td>
<td>1.25</td>
<td>0.75</td>
<td>Pleasant</td>
<td>Salty Red</td>
<td></td>
</tr>
<tr>
<td>Lux Soap</td>
<td>0.127 μη</td>
<td>10.34</td>
<td>110.5 η</td>
<td>31.7°C</td>
<td>1.7</td>
<td>0.21</td>
<td>White Rose</td>
<td>Bitter Salty White</td>
<td></td>
</tr>
<tr>
<td>Silk Soap</td>
<td>0.159 μη</td>
<td>10.65</td>
<td>248.0 η</td>
<td>29.1°C</td>
<td>2.55</td>
<td>0.63</td>
<td>Pleasant</td>
<td>Salty Blue</td>
<td></td>
</tr>
<tr>
<td>Safeguard Soap</td>
<td>0.236 μη</td>
<td>10.36</td>
<td>150.0 η</td>
<td>31°C</td>
<td>1.2</td>
<td>0.6</td>
<td>Pleasant</td>
<td>Salty Cream</td>
<td></td>
</tr>
<tr>
<td>Dettol Soap</td>
<td>2.436 μη</td>
<td>10.68</td>
<td>174.2 η</td>
<td>30.5°C</td>
<td>1.2</td>
<td>0.76</td>
<td>Dettol Like</td>
<td>Mint Fresh Yellow</td>
<td></td>
</tr>
<tr>
<td>Dove Soap</td>
<td>0.156 μη</td>
<td>10.32</td>
<td>199.9 η</td>
<td>30.9°C</td>
<td>0.8</td>
<td>0.42</td>
<td>Pleasant</td>
<td>Salty White</td>
<td></td>
</tr>
<tr>
<td>Luv Soap</td>
<td>0.151 μη</td>
<td>10.59</td>
<td>146.6 η</td>
<td>32.2°C</td>
<td>1.15</td>
<td>0.62</td>
<td>Red Rose</td>
<td>Bitter Salty Pink</td>
<td></td>
</tr>
<tr>
<td>Imperial Soap</td>
<td>0.230 μη</td>
<td>10.74</td>
<td>101.9 η</td>
<td>31.2°C</td>
<td>1.15</td>
<td>0.45</td>
<td>Light Pleasant</td>
<td>Salty Cream</td>
<td></td>
</tr>
</tbody>
</table>

**RESULTS AND DISCUSSION**

The results of our study contain that the pH of the skin was about same to that of the pH of soap and shampoo. Upon reviewing these products have mentioned their pH and the finding of our study was consistent in the pH claimed by them. But in our study, most of the sample of soap had a pH ranges between 10.32 and 10.74, while the pH of the shampoo ranging between 6.61 and 7.64. With our analyzed data the pH of the soap were higher as compared to the pH of the skin. While the pH of the shampoo is about same to the pH of the skin. High pH causes dehydrated effects for skin. The temperature of the soap and shampoo are different, the temperature of the soap ranging between 29.1-32.2°C through thermometer. While the temperature of the shampoo ranging between 31.1-32.7°C. The high temperature soap and shampoo are used in different product that are used in cleaning agents, i.e. clothes, hands, dishes, pretty, or car are everything that needs cleaning. Conductivity also the effects on soap and shampoo, more conducted soap and shampoo were used for people with dandruff, color treated hair. From the tabulated data, it could be noticed that the conductivity of shampoo ranging between 0.934-2.532 μη. TS in shampoo and soap are an OTC product which can affect the thickening of the hair and hair loss. It can also make healthy hair with the ingredients of biotin, dextran, nicotinic acid. The analyzed data of TS in soap are 0.8-2.55, while the TS in shampoo are 0.95-1.55. The analyzed data of TDS in soap ranging between 0.6-1.76. While the TDS in shampoo ranging between 0.1-0.24.

**CONCLUSION**

From the above discussion, it is clear that the pH, conductivity, temperature, TS and TDS of soap and shampoo are high from the normal skin level. They can affect the hair and skin and also causes different diseases.

**REFERENCES**