Project Report (BSCC3151)

on

Chemical Analysis of Glycerin

Submitted in Partial Fulfilment of the Requirement for the Degree of
B.Sc. (Hons) Chemistry.

Submitted by

Karishma

B.Sc. (Hons) Chemistry (VIth Semester)

Under the Supervision of

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May 2022

CERTIFICATE

This is to certify that Ms. **Karishma** has carried out project work entitled "**Chemical Analysis of Glycerin**" under my supervision. This work is fit for submission for the award of Bachelor's Degree (Hons) in Chemistry.

Dr. Umar Farooq
Assistant Professor
School of Basic & Applied Sciences
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(Prof.) Dr. A.K Jain
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Certificate from the organization where you are doing your project

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Date: 31st May 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms Karishma a 6th semester student of B.Sc (Hons) Chemistry from Galgotias University, Greater Noida has undergone in training from **01/02/2022 to 31/05/2022** as a part of fulfillment of her course, at our factory located at B-44, Phase II, NOIDA(U.P.) in Quality Control and Quality Assurance department.

During her training period she had undertaken a project on "**Chemical Analysis of Glycerin (Raw material)**"**– An HR Perspective."** She was found to be taking keen interest and has put in her efforts to work on the project very sincerely.

The project she has undergone, really helped us in identifying many strengths and areas of improvement in our working environment.

We wish her all the best in her future endeavors.

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CANDIDATE DECLARATION

I hereby declare that the dissertation entitled "Further Analysis of Glycerin" submitted by me in partial fulfillment for the degree of B.Sc. (Hons) Chemistry to the Division of Chemistry, Department of Basic Sciences, School of Basic and Applied Science, Galgotias University, Greater Noida, Uttar Pradesh, India is my original work. It has not been submitted in part or full to this University or any other University for the award of a diploma or degree.

(Signature)

Karishma

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B.Sc. Chemistry (VIth Semester)

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ACKNOWLEDGEMENT

In the accomplishment of this project, successfully many people have best owned upon me their blessings and the head pledged support, this time I am utilizing this to thank all the people who have been concerned with this project.

Primarily I would thank God for being able to complete this project with success.
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Karishma

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ABSTRACT

Glycerin is a co-product of heavy fats (hydrolysis), soap making, and transesterification of fats and oils. The history of glycerin and its financial value as an industrial chemical provides an introduction to its importance in our cultures in recent times. Two different types of glycerol are processed, the soapy lye, which contains essential levels of sodium chloride, and the sweet water crude, which has a low concentration of sodium chloride present. Processing glycerol into high purity marks requires pre-treatment measures followed by a loss to consider the glycerol solution into unrefined glycerin. Removal of sodium chloride requires certain equipment. To process crude glycerin into USP-grade finished glycerin requires a grinding tool, which works under a high vacuum. The final stage of the process is carbon adsorption to remove any colored particles of high molecular weight. Storage of finished and natural glycerin requires special demonstration. The effect of processing the smell and color of glycerin is detrimental to the final quality of the product. Processed plants require special consideration in terms of structure, building materials, materials, controls, and height. Total attention to glycerin processing includes material properties, quality and testing, marks and methods of testing, loss, and waste management. A discussion on glycerin use and future ideas provides a reference to the current glycerin industry. Glycerin is an important product in the production of biodiesel by transesterification, industrial soap by saponification, and, hydrolysis reaction. Attention to glycerol obtained is low due to the presence of bubbles such as prominent catalysts, water, soap, salt, and esters formed during the reaction. The purification of glycerol and the conversion of glycerol into essential products have won growing interest in recent years due to the remarkable progress of the biodiesel industry.

Chapter 1

INTRODUCTION

The division of the glycerin molecule balance is its signature and is central to its decade of use as an important factor in the cosmetics industry. Inside hydrogen, the limit is three carbon atoms, the formation of a living world, which is equal to three oxygen atoms that need moisture. Moisture is the key to skin flexibility and health.

Glycerin is dihydroxy-containing alcohol with several commercial effects. It is a colorless, odorless, sweet-smelling liquid that is widely used in many liquids therapeutic products. Some requests contain its use as anemollientthen humectants in cosmetics. It is used in practically all categories of individual maintenance products including antibacterial hair stimulants. Experiments have too remained made on mammal's and bulls' diets. It is an important product derived from the production of biodiesel. In the situation of pharmacological preparations, glycerin is used mainly as an excipient, and dosage variation may greatly affect the use of these conditions. Like humectants in cosmetics and hair products someplace it is used as an energetic component, glycerin dosage may adversely affect product quality. A well-proven method of measuring glycerin from a hair tonic is very important.

A comprehensive review of the literature provides a large number of glycerin measurement methods. In addition to chemical analysis, other methods include its biodiesel derivatives using EASI-MS technology or other dietary compounds and glycerin fatty acid esters as well as using enzymatic reactions. Most methods include a chromatographic method that may be a fluid-based chromatography method otherwise gas chromatography-mass spectroscopic method or capillary gas chromatographic method. These methods are often expensive and time-consuming as many of these methods involve adjusting the copied and tracked measurements by the analyst. In this study, we developed a simple, fast, accurate, and cost-effective way to measure glycerin in the presence of a complex matrix comprising resorcinol, ethanol, biotin, keratin hydrolysate, alkyl HBU, D-biotin, nicotinic acid, polyvinylpyrrolidone. Sample adjustment is very simple and does not include other output adjustment steps. The procedure is therefore suitable for the general analysis of glycerin from hair tonics.

LITERATURE REVIEW

As we all know about oil products, Microorganisms in mammals can reduce production and, when pathogenic, pose a serious health risk to people worldwide. As a result, when making the product, it should be clean and free of germs. Liquids, oils, drops, creams, and emulsions are among the materials available. The reconstituted composition had pH levels ranging from acidic to alkaline. Microorganisms, regardless of water content, pH, or production process, can contaminate the formation of a particular l. Ingredients for raw materials play an important role in the cosmetics business because they form the basis of all finished products. According to different levels of cosmetics such as BIS, and IFSCC different tests are divided into materials. According to the various industries of each test, their standard list was developed to satisfy the BIS standard, as well as the IFSCC.

REFERENCE ARTICLE LINKS

https://journals.sagepub.com/doi/full/10.1177/1091581819883820

https://pubmed.ncbi.nlm.nih.gov/31840548/

CHEMICAL ANALYSIS OF RAW MATERIAL

- Specific gravity
- Refractive index
- Infrared Scan
- Iodine value
- Acid value
- Saponification value

Generally, all tests are performed according to the type of raw material. Different tests were conducted for different raw materials.

DETERMINATION OF SPECIFIC GRAVITY OF RAW MATERIALS:

This method applies to liquids of less than 2000cPs in viscosity. All tests should be performed on the sample at 22 5:25 C Equipment:

Meter Toledo Density meter, Beaker for waste liquid.

Chemicals used:

- Methanol
- Water pH range from 6 to 7.

Procedure:

- Turning on the light. To turn on the display, press and hold the ese key. By holding down the keys, you may get to the menu.
- For calibration check with distilled water before beginning any measurement.
- Before each measurement, make sure the measuring cell is clean.
- Make sure the samples you're going to measure are: liquid enough to be sucked up or injected It's possible to dissolve it in a solvent that's good for cleaning the measuring cell. In the measuring cell, homogeneous have attained ambient temperature.
- Carry out measurement with distilled water before adjusting the measuring
- Clean the measuring cell with water and methanol Slowly inject water.

- Hold the sample tube over the waste container beaker) Check for air bubbles in the measuring cell and slowly press the drain button downward, then gently press the fill button up.
- Repeat the cleaning process by applying the above same step with methanol.
- Slowly inject the sample into the measuring cell and note the temperature measurement.
- Clean it and repeat the same steps with another raw material sample.

DETERMINATION OF REFRACTIVE INDEX OF RAW MATERIAL:

The refractive index of a solution is one of its most essential features. The ratio of the sine of the angle of incidence to the site of the angle of refraction of a beam of light traveling from air into the substance is the refractive index of material concerning air.

It is a crucial quality for identification because it reflects the purity of the substance.

APPARATUS: Beaker, Spatula, Tissue paper

Chemicals used: Methanol, Water of pH range between 6 to 7

Equipment: Refractometer

Procedure

- Ensure the Refractometer is calibrated.
- Switch the instrument to the ON position.
- Uncover the lighting window and move the mounting with the cover prism until it strikes.
- Clean the surface of the glass prisms with ethanol and tissue paper.
- Using a spatula, place a few drops on the surface of the measuring surface covered with the sample.
- Lower the cover prism and press on onto the measuring surface.
- Wait for a few seconds before taking the measurements so that the sample and the prisms are at the same temperature.
- Set the lighting window of the cover prism in the direction of maximum light intensity.
- To obtain a sharp, distinct, colorless delimitation line exactly in the center of the cross with help of an eyepiece and turning knob.
- Press the red button and wait for a few seconds for appearing the results on the display.
- Clean with methanol and water on the measuring surface then clean with tissue paper before applying to it.

IR SPECTROSCOPY

Infrared spectroscopy (IR Spectroscopy) is a type of spectroscopy that investigates light in the infrared spectrum, which has a lower frequency and a longer wavelength than visible light. It includes a variety of approaches, the majority of which are based on absorption spectroscopy. The Fourier Transform infrared (FTI) Spectrometer is a common laboratory device that employs this approach. The electromagnetic spectrum's infrared component is separated into three regions: near-infrared, mid-infrared, and far-infrared, which are named for their distances from the visible spectrum. Overtone or harmonic vibrations can be excited by higher-energy near-IR wavelengths ranging from 14000-4000 cm (0.8-2.5 um). The fundamental vibrations and accompanying rotating vibrational structure can be studied in the mid-infrared, around 4000-400 cm (2.5-25 pm). The far-infrared, which lies close to the microwave zone and has a wavelength of 400-10 cm (20 1000m), has low energy and can be utilized for rotational spectroscopy. The names and classifications of these sub-regions are merely conventions based on their molecular or electromagnetic properties

Different chemicals used in IR Spectroscopy are NaCl, KCI, and KBr. KBr is mostly used in IR Spectroscopy techniques because when contrasted to NaCl, it does not absorb moisture at ambient temperature. Furthermore, it does not produce its peak.

IR SPECTROSCOPY INSTRUMENTATION:

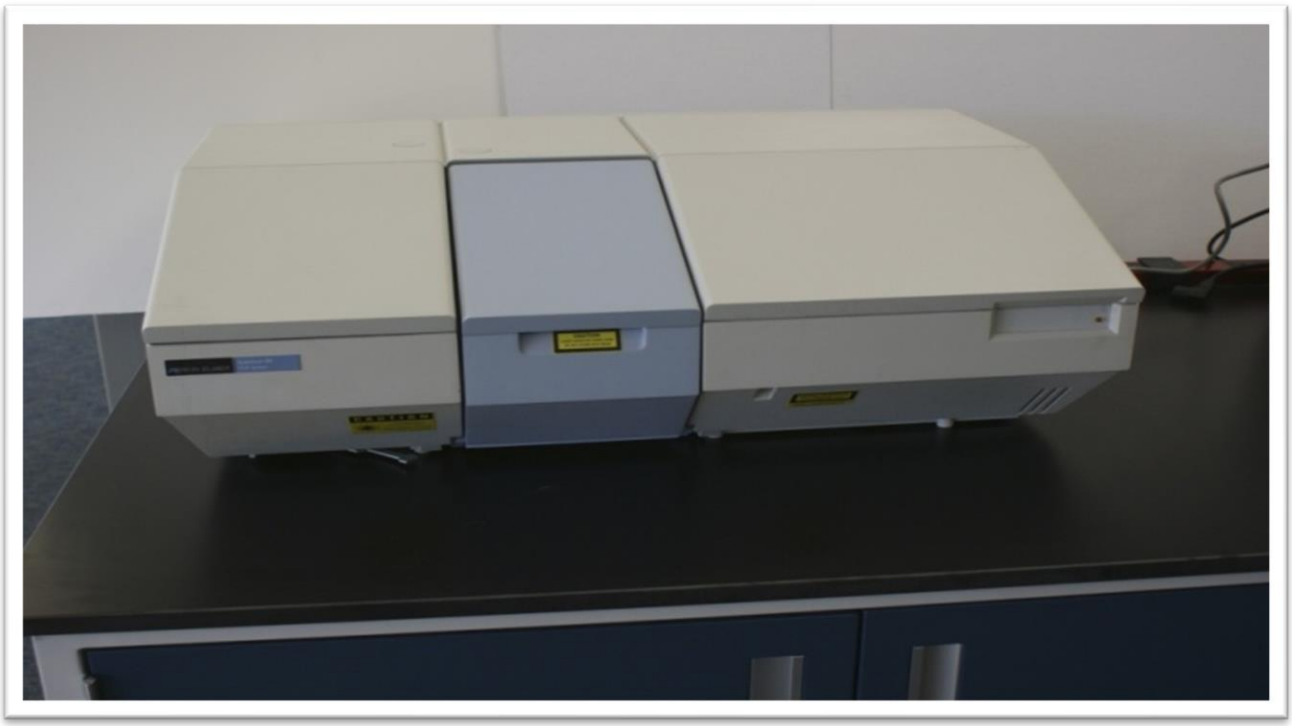
The method by which I have prepared I sample is the pressed pellet technique which is described below:

Pellets/disks of KBr (for solid samples): Follow the steps outlined below to make a KBr pellet: Ratio of sample to KBr: In KBr, the sample concentration should be in the range of 0.2 percent to 1%. Because pellets are thicker than liquid films, they require a lower concentration in the sample (o's

Law). Obtaining low-cost pellets is frequently challenging when the concentration is too high. The beam is absorbed or scattered by the material, resulting in very noisy spectra.

Sample preparation: Although the greatest results come from a homogenous combination, considerable grinding of the potassium bromide is not required. Because potassium bromide is finely powdered, it absorbs more humidity from the air (it is hygroscopic) and so increases background in particular ranges. Make sure you work quickly. Remove some KBr from the oven and place it in a mortar. Mix in around 1% to 2% of your sample, then crush to a fine powder. For really hard samples, finely ground the sample, then add KBr and grind again. The sample must be ground very finely.

Taking two stainless steel discs from the desiccators is a good idea. Place a precut piece of cardboard on top of one disc (in the tin can adjacent to the oven) and fill the cutout hole with the finely powdered mixture. Place the second stainless steel disc on top of the sandwich and, using a pumping motion, transport the sandwich to the pistil in the hydraulic press. When the pistil reaches the top of the pump chamber, it will begin to climb upward. Then, raise the pump lever and pump until the pressure hits 20,000 pounds per square inch. Allow a few seconds before releasing the pressure with the little lever on the left side (hold until the sample and pistil are down). Pull separate the discs after removing them. Remove the film, which should be uniform in appearance and transparent. Using scotch tape, secure the sample in the IR sample holder. Run the spectrum.



DETERMINATION OF IODINE VALUE OF RAW MATERIALS

The iodine value is a figure that expresses in grams the amount of halogen (calculated as iodine) absorbed by 100g of a substance under the defined conditions. The method used to determine it is as follows.

Reagents:

- iodine monochloride solution
- 0.1M sodium thiosulphate
- Carbon tetrachloride
- 10% potassium iodide solution
- starch solution

Equipment:

- iodine flask
- lab glassware
- Iodine Monochloride Method or JW is Method

Procedure:

In a dry 500ml iodine flask, weigh an accurately weighed quantity of the item under investigation, then add 10ml of CCl4 and dissolve. Take 20 mL of NaCl solution to the bottle, close it, and leave it in the bleak for 30 minutes a temp. of 15°C to 25°C. Set aside for 30 minutes in the dark at a temperature of 15°C to 25°C after adding 20ml of iodine monochloride solution to the bottle. Make a mental note of how many mL you'll need. Without the substance under evaluation, repeat the procedure and record the number of ml required.

DETERMINATION OF ACID VALUE OF RAW MATERIALS

The acid value can be defined as the amt. of KOH in milligrams required to neutralize the free acids in one gram of fat.

It's a rancidity measurement based on the generation of free fatty acids during the breakdown of oil glycerides.

$$A.V = 5.61 \times n/w$$

Here, n=No. of millilitre of KOH (0.1M)

w= wt. Of sample in gm

PRINCIPLE*:* -

The acid value is obtained by titrating the oil/fat directly against a standard KOH/NaOH solution in an alcoholic media**.**

APPARATUS AND REAGENTS NEEDED FOR DETERMINING ACID VALUE*:*

- Burette, conical flask, funnels, round bottom flask.
- KOH, ethanol, diethyl ether, phenolphthalein indicator.

Procedure: -

1. Make a 0.1 M KOH solution and fill the burette with it.
2. Dissolve approximately 10 g of sample in 50 ml of a 50/50 combination of ethanol (95%) and ether, and then add 1 ml of phenolphthalein indicator.
3. Add 0.1 M KOH and titrate until the solution is slightly pink.
4. Take concordant readings.
5. Then, calculate the Acid Value.

Significance

It not only indicates the age of the oil sample, but also how much free fatty acid has been generated as a result of the attack of atmospheric oxygen, hot wet air, or microbes.

DETERMINATION OF SAPONIFICATION VALUE OF RAW MATERIALS

Saponification Value: Under the parameters provided, the SAP Value represents the number of milligrams of potassium hydroxide or sodium hydroxide necessary to saponify Ig of fat. It's a measurement of all the fatty acids' average molecular weight (or chain length). Because the three fatty acids make up the majority of a fat/bulk, the triester's average fatty acid chain length can be compared. Fatty acid chain lengths are relatively small, given the following relation:

Equipment:

- An analytical balance
- Four 250 ml flasks with joints to fit the condenser below
- Four condensers fitted with joints to match the flask
- Hot plate
- 20ml pipette, volumetric
- 50ml burette with 0.1 ml graduation

Reagents

- 1.0 N alcohol KOH
- 0.5 N HCL
- 1% phenolphthalein in ethyl preparation

Procedure

Weight accurately 10g of sample into a tare 250ml flask. Pipette accurately 20ml. 1N alcoholic potassium hydroxide, swirl to disperse sample and fit on the condenser. Reflux for 30min for creams and lotion and 1h for oils. Cool and add 4 drops of phenolphthalein solution. Titrate with 0.5N HCL from 50ml burette until the solution just turns colorless. Record volume by using 5N HCL. Run two

blanks i.e., without sample by titrating 20ml of the 1N alcoholic KOH with 0.5N HCL to phenolphthalein above.

SAPONIFICATION VALUE = 28.05 (B-A) /W

W- Wt. in gm, of sample

B = Volume of 0.5M potassium hydroxide required without sample

A- Volume of 0.5M potassium hydroxide required with sample

Significance

It is used to determine the free acids and esters, saponifiable by alkali hydroxide in the organic substance.

Chemical analysis of final product

- Determining of Ph.
- Determining viscosity.
- Determining specific gravity.
- Determining total fatty acid.

DETERMINATION OF PH

Apparatus Used: -

- pH meter.
- Water dematerialized process water.
- pH Buffers of pH 7.0 and pH 4.0

Fig. 1 pH Meter

Procedure:

- Calibrate the pH meter with a known pH buffer solution of pH 7.0 & pH 4.0 before checking the pH of the sample to be tested. Wash the electrode with process water & wipe dry.
- Place the electrode in the sample directly or on the sample in solution. The bulk must be at the temperature as directed by the bulk product specification.
- Switch the instrument to pH mode & note the reading when the display has stabilized.
- Switch the instrument to pH mode & note the reading when the display has stabilized.

Significance:

The acidity or alkalinity of a sample is determined by its ph. The product's pH should comply with the range given in the bulk specification. The pH of our skin is on the acidic side, the various products should be maintained in a range safe and effective for use.

Applicable Test For:

Gels, Creams, Lotions, Surfactant products, Tonners, etc.

DETERMINATION OF VISCOSITY

Apparatus Used: -

- Brookfield digital viscometer spindle (as specified):
- S spindle (SI-S5) For liquid products, Shampoo, Toner, etc.
- T-bar spindle (TA- TF) For emulsion products, creams, and lotions.

Procedure:

- A 250 ml sample is adjusted to a temperature of 25 degrees.
- The viscometer is turned on.
- The S spindle or the T-bar is immersed in the sample, the speed is selected and the motor is switched on as well as the helipad switch in case of emulsion product. The telepath stand lowers the T-bar into the sample.
- The viscosity is automatically displayed in cps after 60 seconds.
- This is a direct reading.

Significance: Viscosity is resistance to the flow of a fluid hence it should be calculated to access the flow ability of the product.

Applicable Test for Cream, lotions, surfactant products, gels, etc.

DETERMINATION OF SPECIFIC GRAVITY OF GIVEN SAMPLE

Apparatus Used:

- Weighing Balance
- Spatula
- Pycnometer

Procedure:

I. Choose a pycnometer that is completely clean and dry. Fill the pycnometer with 4°C water to calibrate it.

II. Adjust the temperature of the sample to 20 degrees and fill the pycnometer with it.

III. Subtract the pycnometer's tare weight from the pycnometer's loaded weight.

IV. Multiply the weight of the sample, in grams, that fills the pycnometer at the specified temperature by the capacity of the pycnometer when filled with 4°C water to determine the sample's specific gravity.

Significance: The test is done to determine the weight in grams per ml (or c.c.) of the sample.

Applicable Test in Gels, Creams, Lotion, Shampoo, toner, Hair oils, etc.

DETERMINATION OF TOTAL FATTY MATTER

Reagents:

- Dil. HCl 1:1(v/v)
- Ethyl ether
- Methyl orange indicator solution
- Sodium sulfate

Procedure:

- In a conical flask, accurately weigh around 2g of the substance.
- Add 25 mL oil. HCl to the mixture**.**
- Install a reflux condensé if necessary.
- Boil the solution until it is completely clear.
- Allow the contents of the flask to cool to 20 degrees Celsius before putting them into a 300 ml separating funnel.
- Rinse the conical flask in a portion of 10 ml with 50 ml ethyl ether.
- Pour the ether into the separating funnel, and then rinse the ether rinse into the separating funnel.
- Separate the aqueous phase and shake it twice with a 50 mL ether portion. Wash all of the ether extracts with water until they are acid-free (as determined by methyl orange indicator solution).
- Filter the ether extract into a conical flask through a filter paper containing sodium sulfate.
- Using ether, wash the sodium sulfate on the paper and combine the washing with the filter.
- Distill the ether and dry the residual material in the flask to a consistent mass at 60+2 degrees Celsius**.**

Calculations:

$$\textbf{T.F.M. \% By mass} = 100 \times m1/m2$$

Here,

m1 = mass in gm of the residue, and

m2 = mass in gm of the material required for the test.

Significance:

T.F.M. is determined to calculate the total fatty material present in the product.

Applicable test for Creams etc.

BASIC ELEMENTS OF COSMETICS FORMATION

- **Water*:*** Water is found in almost all cosmetic products, including creams, body lotions, cosmetics, perfumes, shampoos, and conditioners. Water is required for the procedure since it serves as a solvent for dissolving other ingredients and forming emulsions. Cosmetics are made with water that isn't your typical tap water. It should be "ultra-pure," or escape bacteria, toxins, and other pollutants. As a result, it'll probably be referred to as distilled water on your label. Aqua (purified water) or aqua (purified water) (aqua).

- **Emulsifiers**: Any component that facilitates the separation of dissimilar substances is referred to as an emulsifier (such as oil and water). Emulsions are little drops of oil in water or small drops of water in oil used in a wide range of cosmetics. Emulsifiers lower the surface tension between water and oil, resulting in a uniformly mixed homogenous product with a constant texture. Polysorbates Lauretha and potassium cetyl sulfate are emulsifiers found in cosmetics.

- **Preservatives:** are essential components. They're used in cosmetics to lengthen shelf life and prevent germs and fungi from deteriorating the product and harming the user. Preservatives must be water-soluble because most bacteria live in water, making it easy to choose which ones

to use. Natural or synthetic (man-made) preservatives are employed in cosmetics, and their performance varies depending on the product's formulation, which will necessitate levels as less as 0.01 percent, on the other hand, others will necessitate levels as more as 5%. Parabens, benzyl alcohol, formaldehyde, and tetrasodium EDTA are some of the most often used preservatives (Versine acid).

- **Thickening agents:** At room temperature, lipid thickeners are solid, but they can be liquefied and added to cosmetic emulsions. Carnauba wax, cetyl alcohol, and stearic acid, for example, contribute thickness to the mix by their intrinsic thickness. Natural thickeners, as the name says, are obtained from nature. Polymers including hydroxyethyl cellulose, guar, corn sugar gum, and gelatin absorb water and swell, increasing the viscosity of a product. Magnesium aluminosilicate, silica, and bentonite are examples of mineral thickeners. The fourth category includes synthetic thickeners. It's typical to find them in lotions and creams. Carbomer, an acrylic acid polymer that is water-swellable and may be used to make clear gels, is the most popular synthetic thickener.

- **Emollient:** Emollients moisturize the skin and soften it. They can be found in lipsticks, lotions, and other cosmetics. Beeswax, olive oil, coconut oil, and lanolin are natural and synthetic emollients, as are petrolatum (petroleum jelly), mineral oil, glycerin, zinc oxide, butyl stearate, and diglycine laurate. Emollients promote keeping the skin hydrated. Many natural and synthetic compounds, including beeswax, can be utilized as emollients. Mineral components include FeO2, mica flakes, Mn, chromium oxide, and coal tar. Plants can produce a variety of natural hues.

- **Fragrances:** No matter how great a product is, if it smells bad, no one will want to use it. One of the most important aspects of a product is its smell. To give cosmetics a pleasing aroma, natural and synthetic chemicals are used. In addition, "unscented" items may contain masking smells to hide the smell of other substances. The term "fragrance" is widely used by manufacturers as a catch-all term. A single fragrance component entry on your product's ingredient list could be made up of dozens, if not hundreds, of unlisted chemical components that were combined to generate the final odor.

GLYCERIN

Glycerin is reported to be effective in cosmetics such as denaturants, fragrance ingredients, hair repair agents, humectants, oral care agents, oral health care drugs, and skin protection, skin.

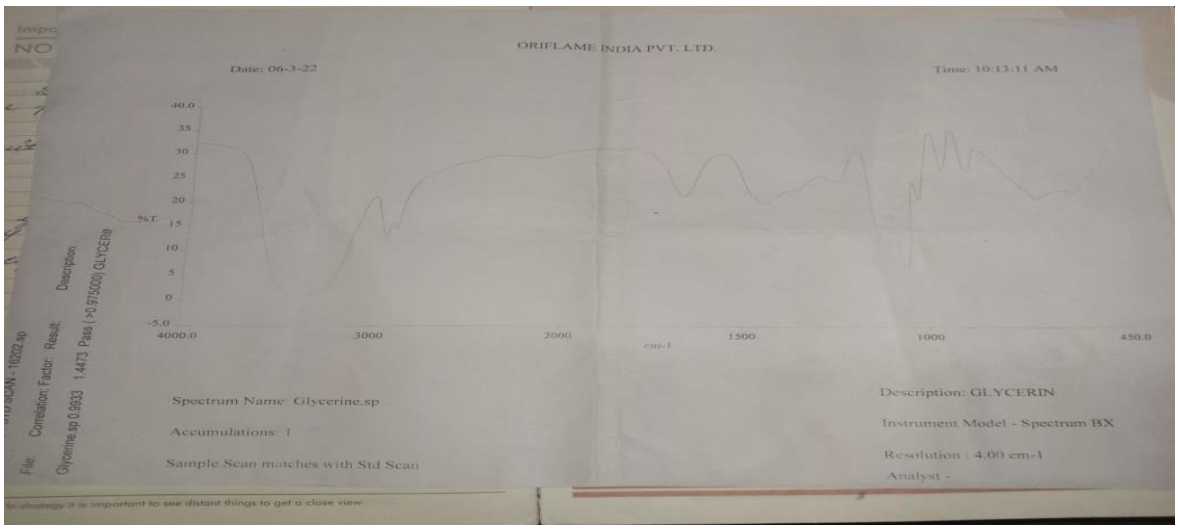
Fixing agent — humectants, and viscosity reducing agent.

Most of the information in this safety audit is based on the information provided by the Economic Partnership and Data Development Agency, The European Commission-European Chemicals Bureau, and the European Chemicals Agency. Glycerin, also known as glycerol, is a natural compound found in vegetable oils or animal fats. It is a clear, colorless, odorless, and sugary liquid with a pleasant taste.

Glycerin is a humectant, a type of moisturizing agent that absorbs water on the outer surface of your skin at deeper levels of your skin and air. In skincare products, glycerin is often used with occlusives, another type of moisturizing agent, to trap moisture in the skin.

Glycerin is the “most effective humectants” available to increase water flow to the upper layer of your skin, compared to many others, including:

- Alpha hydroxy acids, like lactic acid and glycolic acid
- Hyaluronic acid
- Propylene glycol and butylene glycol
- Sorbitol
- Urea



DEFINITION AND STRUCTURE

Glycerine (CAS no. 56-81-5) is a polyhydric alcohol formula of C3H8O3 cells. Glycerine (also called glycerol in literature) is a simple triol, that is, it has 3 hydroxyl groups.

Glycerine is naturally found in all animals and plant matter in a composite form such as glycerides in fats and oils or areas within cells such as lipids. Although the chemicals are similar, there is naturally occurring glycerine found in plants and animals as well as synthetic glycerine found in the non-triglyceride source.

Physical and Chemical Properties

Glycerine is a clear, sugary liquid. It may be in a shiny condition but it is rarely due to its normal cooling and the pronounced effect of small amounts of water on compressing the freezing point.

Glycerine contains soluble substances such as water and simple aliphatic alcohol. . The chemical mixes well with water, methanol, ethanol, and isomers propanol, butanol, and pentanol. Glycerine is also fully synthesized with phenol, glycol, propanediol, amines, and heterocyclic compounds containing the nitrogen atom in the ring (e.g., pyridine, quinoline). Glycerine is insoluble in acetone, diethyl ether, and dioxane and is insoluble in hydrocarbons, aliphatic liquid with long chains, fatty acids, and halogenated solvents such as chloroform

Temperature: The freezing point is 18.17O degrees Celsius. Glycerol is rarely seen in its glossy state, due to its tendency to have super coolness, as well as the effect of small amounts of water on it.

Thermal Conductivity: The thermal conduction of alcohol solutions will increase as their water content will increase. In parallel, it will increase with increasing temperature, the speed of conversion to linearity.

Viscosity: When glycerol cools too much, its viscosity will gradually increase, and then a rapid transition from the liquid to the solid state of the glass occurs at a temperature of 70 to 1 degree Celsius. Once inside the vitreous state, its physical constants remain closer to those of crystalline glycerol than liquid glycerol.

PH Control: The optimal pH-pH regulation of microorganism growth in cosmetic products is between 5 and 8, which means that any pH outside this range creates adverse conditions, thereby reducing their

growth rate. The acidic pH of cationic hair conditioners (pH = 4, approximately) contributes to the antimicrobial action of these products. Some acidic pH formulations can inhibit the growth of microorganisms, such as products containing salicylic acid and aluminum compounds in antiperspirants (pH from 3.5 to 4.5) [62]. Liquid soaps with an alkaline pH (pH 9.5 to 10.5) indicate a malignant growth zone of microorganisms (e.g., depleting their membrane), due to the effects of ionized acids and free alkalinity of alkalinity NaOH present. At present, microorganisms cannot multiply or survive in the manufacture of cosmetics with a pH of less than 4 or more than 10.

Method of Manufacture

Natural glycerine is to be had as a product inside the hydrolysis of fats and oils. There are many procedures to make artificial glycerine. The easy components of glycerine embody allyl chloride, acrolein, propylene oxide, sugar, certain polyalcohol, oil, or epichlorohydrin.

As an alternative, Allyl chloride is oxidized with hypochlorite to offer Di chlorohydrin that is transformed, without separation, into epichlorohydrin with the aid of ring closure with calcium hydroxide or sodium hydroxide. Epichlorohydrin is hydrolyzed to supply glycerine at a temperature of as much as 80 ° C to two hundred ° C and an aqueous solution of 10% to fifteen% sodium hydroxide or sodium carbonate at atmospheric strain or immoderate stress. The glycerine yield, calculated from allyl chloride, is 98%, available as a dilute solution (10% -25%) containing 5% to 10% sodium chloride and <2% and other impurities. The aqueous glycerine solution is concentrated in a multi-phase evaporation plant under vacuum to produce glycerine concentration >> seventy-five%, after dissolving sodium chloride in water. The glycerine answer is then purified underneath an immoderate vacuum and the condensed water is separated through the way of fractional condensation. Glycerine is dealt with constantly to eliminate shade impurities and odors; this could be done, for example, through the way of the usage of activated carbon.

The second technique consists of oxygenation of propene to acrolein, which is likewise reduced below the Meerwein-Ponndorf-Verley situations to supply all alcohol. Allyl alcohol is then launched with hydrogen peroxide and the glycidol effect is digested and hydrolyzed to supply glycerine.

IMPURITIES

Us Pharmacopeia-national Formulary standards state that the quantity of any impurities in glycerine has to not exceed zero.1% and that the full quantity of all contaminants, such as diethylene glycol and ethylene glycol, need to no longer exceed 1%. The united states food and drug Administration (FDA) notes that glycerine is a biodiesel gasoline product produced from the Jatropha plant. There is a possibility that poisonous pollution, which includes phorbol esters, may be present in the glycerine produced in this manner. Normal infection might not come across that pollution, and glycerine from this source must now not be utilized in human and animal diets, clinical products, cosmetics, and different FDA-regulated merchandise. The FDA advises the enterprise to bear in mind of viable modification or use of fat, glycerine, and proteins determined in the Jatropha plant.

The mature cosmetics provider reported that glycerine is 95% to 99.5% pure. Contamination is a liquid and follows polyglycerol levels

USE IN COSMETICS

The study was conducted by the Community Care Products Council (Council) to focus on the maximum use of this ingredient. Glycerine is reported to be used in 79.2% of break products, 99.4% of laundry products, and 47.9% of blended products. It is used in baby products up to 21, 40.6% of eye cosmetics, 25% in perfumes, 47.3% in hair products, 68.6% in oral hygiene products, and 99.4% in skin care products, and 17.9% in suntan. Arrangements.

Lotions and moisturizers containing glycerine hydrate the skin and make us feel smooth, soft, and healthy. Also, glycerine is not comedogenic, which means it will not close the pores (which makes it good for facial use). Glycerine can be found in intones. The purpose of the toner is to moisturize and replenish the skin, provide essential ingredients, and act as an additional cleanser. Tones containing glycerine nourish the skin.

Cosmetic removal cosmetics are designed to easily remove used cosmetics. People with sensitive skin may develop strong reactions to certain types. Glycerine-based detergents can soothe irritated skin and make removing cosmetics hot air.

Glycerine can do wonders for the hair and act as a great condition for hair left out. When applied to the hair, it draws water into the air to keep your hair looking shiny and nourished.

Glycerine has been reported to be used in aerosol/spray products that include up to 30% concentrated hair sprays (up to 10% propellant spray products and up to 30% spray products), spray up to deodorants 30% -4. %, Facial and neck products up to 10%, body and hand products up to 5%, cosmetics up to 3.3%, and suntan products up to 10% (with spray products up to 6% and spray products up to 10% at 10%). These propellant/pump spray products may be inhaled. 95% to 99% of droplets/particles extracted from cosmetic sprays with the same aerodynamic diameter> 10 µm and respirators produce a greater proportion of droplets/particles less than 10 µm compared to the pump sprays. Therefore, many drops that are accidentally injected with the cosmetic spray will be injected into the nasopharyngeal and bronchial areas and will not be drawn (i.e., he could not enter the lungs) by any recommended amount. There is some evidence suggesting that deodorant spray products can release the largest particles of aerodynamic particles at a level that is considered respiratory. However, sufficient knowledge is not enough to determine the cause of the increase in exposure to the lungs, compared with other cosmetic sprays.

BULK GIORDANI GOLD ESSENZA PERFUMED BODY CREAM

Humectant - Glycerine

TEST NAME	SPECIFICATION	RESULT
Colour	White	Complies
Odour	Floral	Complies
Appearance	White Smooth Emulsion	Complies
Specific Gravity	0.98-1.2	0.998
PH	5.5-6.5	5.99
Viscosity	40000-80000	51667cps
Pathogens	Absent	Absent

BLACK SHINE SHAMPOO

Humectants Glycerine

TEST NAME	SPECIFICATION	RESULT
Colour	Light Gray	Complies
Odour	Floral	Complies
Appearance	Pearlized surfactant gel	Complies
PH	4.5-5.2	4.70
Specific Gravity	1.02-1.04	1.02
Viscosity	7000-12000	11750 cps
Pathogens	Absent	Absent

LOVE NATURE SHOWER GEL

Humectant **Glycerine**

TEST NAME	SPECIFICATION	RESULT
Colour	Red with green beads	Complies
Odour	Sweet Fruity	Complies
Appearance	Green beads Gel	Complies
PH	6.3-6.6	6.77
Specific Gravity	0.98-1.04	0.993
Viscosity	18000-40000	24167cps

LOVE NATURE PURIFYING GEL WASH WITH ORGANIC TEA TREE & LIME

Humectant **Glycerine-**

TEST NAME	SPECIFICATION	RESULT
Colour	Blue Green	Complies
Odour	Green Freshly	Complies
Appearance	Clear Gel	Complies
PH	5.0-6.0	5.97
Specific Gravity	1.0-1.04	1.023
Viscosity	4500-13000	4683cps

NON-COSMETIC

List of State Code of Conduct (CFR) regarding glycerine. For example, glycerine is considered safe (GRAS) by the FDA for its use in dietary supplementation and is a GRAS dietary supplement for many purposes when used properly. Production processes [21CFR182.90; 21CFR182.1320]. Also, glycerine is approved for use in exported medicines, such as anorectal drug products, skin protectors (up to 45%), ophthalmic drug products (up to 1%), and oral health care products [21CFR346.14; 21CFR347.10; 21CFR349.12].

Glycerine acts as a humectant, solvent, cake icing, confectionery component, bodying agent, and food plasticizer.

Glycerine is given orally and/or intravenously to reduce intracranial pressure caused by various health conditions. Glycerine has been used to reduce brain volume through neurosurgical procedures. It is also used as an active ingredient in laxative products (i.e., glycerine suppositories

Glycerine is used in paints, lacquers, and varnishes; polymers; tobacco products; absorbents and adsorbents; adhesives and binding agents; anti-freezing agents; cleaning agents and disinfectants; explosives; heat transfer agents; pesticides; and cosmetics. It is a monomer in between resins, polyols, and polyurethanes.

Production Department

Collection: A specific amount of raw material, packaging material, or product obtained by one or more operations and considered equivalent. Collection number: A single number, alphabet, or reference to letters and numbers or the use of a word to specifically identify a bulk. Bulk Product Product that has gone through all the different stages of the production process, without filling in the product packaging packages. Manufacturing: All technical and administrative-related operations required to obtain a finished product (purchase, production process, packaging, storage, storage, storage, certification, testing, etc.) Production Process: All technical production activities, including ingredient preparation, and production. the process and where appropriate filling the product in bulk in the first package.

FINAL PACKAGING:

Packaging is the act of enclosing or protecting the products for distribution, which means the wrapping or bottling of products to make them safe from damage during loading and storage. It keeps a product safe and saleable and helps in categorizing, describing, and sponsoring the product.

Type of packaging

1. **Mono Carton**

2. **Corrugated Carton**

3. **Rigid Box**

FUTURE SCOPE

The new raw material (RM2) used has certain advantages over the old one (RM1), therefore replacing this raw material could turn out to be beneficial for producers and consumers both. RM2 is more natural and ecofriendly, not totally but in comparison to RMI, it is a better option thus benefitting consumers as harsh chemicals have side effects on our body thus nowadays people are opting for more natural options, and replacing RM1 with RM2 can be a step toward getting a more natural product. On the producer end, RM1 is costlier so if successful replacement occurs it would be a benefit for the manufacturing plant. There is a drawback of using RM2 that its properties are certain way which makes the process of making scrub complex, it also took more time in dissolving and producing homogenous mixture, this problem can be solved by doing a study in this area that what other raw material can be used that can be miscible with RM2 and produces a homogenous mixture or easiest the process of producing scrub.

CONCLUSION

While doing the seven-week training & study work at Oriflame India Pvt. Ltd, the conclusion formed is that all the products are of good quality i.e., they fulfill all standards & are devoid of any sort of contamination. All the employees are quite vigilant regarding their respective works & responsibilities towards the company. Not a single fault in any of the products can go unnoticed under their control & supervision.

Their managing abilities are extraordinary which could be seen in their day-to-day work with just co-operation & coordination among themselves. All of the above has confirmed together in establishing Oriflame, not as some other cosmetic company but as an international brand known for its superb quality at the world forum.

Antimicrobial efficacy is considered a primary characteristic of beauty preservatives. But, the toxicity of those elements is a problem that the cosmetics industry should be involved approximately. Therefore, it miles vital to continue the search for non-toxic and effective preservatives. Guidelines limit, or restrict the use of disinfectants due to their toxicity and, further, require non-contaminated beauty products. As a result, beauty producers are seeking out new environmental techniques to keep away from regulatory necessities and, at the identical time, introduce a more comfortable product in terms of microbiological and poisonous environments. Then again, preservative has a restrained spectrum of interest depending on the goal species and kinds of microorganisms (spores, mycobacterium, Gram-bad micro organism, Gram-tremendous bacteria, yeasts, fungi) that promote producers. That they use the combinations themselves. In end, cosmetic microbiology specialists face the daunting project of finding new molecules well, new systems, or superior techniques of this already in use.

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