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Developing Biodegradable Solid Soap from Powder for Domestic and Industrial Applications

Vinaya[1], Jyothi B[2], Dr. Sharanraj V[*3]

[1] Senior Grade Lecturer, Dept. of Chemical Engineering, S J Government Polytechnic, Bangalore.

[2] Senior Grade Lecturer, Dept. of Chemical Engineering, Karnataka Govt Polytechnic, Mangalore.

[*3] Senior Grade Lecturer, Dept of Mechanical Engg. (W&SM), , S J Government Polytechnic, Bangalore.

ABSTRACT

A detergent is a surfactant or a mixture of surfactants having "cleaning properties in Dilute solutions Soaps are surfactants and detergents. Most commonly, detergent refers to Alkyl benzene sulfonates, which are similar to soap hat are less affected by "hard water." In Most household contexts, the term detergent by itself refers specifically to laundry Detergent or dish detergent, vs hand soap or other types of cleaning agents. Most detergent is delivered in powdered form. The main aim of this project is to develop the liquid soap solution.

INTRODUCTION:

All soaps and detergents contain a surfactant as their active ingredient. This is an ionic Species consisting of a long, linear, non-polar 'tail' with a cationic or anionic "head" and a Counter ion. The tail is water insoluble and the head is water soluble – a difference Insolubility which has two important implications. Firstly, this makes the surfactant molecule a wetting agent: the tails migrate to align Themselves with the solid: water interface, lowering the surface tension at that point so that It penetrates the fabric better. Secondly, it allows the oily dirt particles to form an emulsion with the water the tails of many surfactant molecules surround an oily dirt particle, forming a micelle with a drop of oil in the centre and the ionic heads of the surfactant molecules pointing outwards and hence keeping the micelle in the polar solution[1].

Both soaps and detergents are cleansing products that we frequently use in our daily lives. We use these products to clean our skin and hands wash our clothes without really paying any attention to how they work or is there any difference between them. Although both the soap and detergents perform same action, i.e. cleansing, there is a significant. difference between them. We can differentiate the soaps and detergents on the basis of several factors, like - Ingredients, structure, properties, and more[2].

MATERIALS AND METHODS:

Soap Detergent Difference - Properties in Hard Water:

The most important difference between a soap and detergent is their behavior in water. A big drawback of washing with soap is that it forms a scum in hard water, which is not easy To clean and is known to turn laundry into a hue. Soaps form a scum in hard water, which is not easy to rinse away and is known toTurn laundry, a grayish hue.

The insoluble film that soap leaves can leave a residue on the Laundry same like as would see in a shower stall where hard water is present. On the other Hand, detergents react less to minerals in water hence does not leave this residue. In case You are living in an area, where the water is soft, a soap will work satisfactorily, but even Then a gradual build-up of calcium and magnesium ions (also called 'curd') will be left on the Fabric.

Another important difference between soaps and detergents is the sensitivity of soapsTo acidic conditions. On putting a soap into an acidic (p"<4.5), it protonates the carboxyl ate Group.The protonated soap molecule does not have a charged head, and so it becomes Insoluble in water. The soap molecules precipitate out thereby producing a cloudy mixture.

That leads to the formation of a scum. Hence, we can say soaps are not suitable for uses in Acidic conditions. Although both are surfactants (or surface active agents that means a washing Compound, which mixes with grease and water), soaps and detergents are not the same Thing. Soap manufacturing process is different from that of detergent making. Soaps are Usually manufactured using natural materials while detergents are generally synthetic that Were developed during World War II, when there was scarcity of oils that are used to make Soaps.

PROPERTIES OF DETERGENT:

Soaps and detergents are similar in their general structure and properties, but different in Their composition and some specific properties. This will become apparent to you as you Study the following characteristics: emulsifying properties, behavior in hard water, alkalinity, And ability to react with mineral acids. In each of the following tests use the soap and detergent you prepared in parts A and B of This experiment. If you were unsuccessful in preparing the soap or the detergent, you can Use a sample of Ivory soap and/or laundry or dishwashing detergent available in the Laboratory.

Materials needed

- Oil, cooking, mineral, or lubricating oil
- Calcium chloride, CaC12, 1% solution
- Magnesium chloride, MgC12, 1% solution
- Iron(III) chloride, FeC13, 1% solution
- Phenolphthalein, 1% solution
- Hydrochloric acid, IM
- Litmus paper, red and blue
- 8 Test tubes, 16 or 18 mm, with stoppers
- Test tube rack
- Droppers

THEORY OF DETERGENT:

The detergent action of soap or synthectic detergent is due to a simultaneous Action of a number factors which are,

1. The wetting or dispersive power – This factor is responsible for the intimate Contact of the dirt molecules & the detergent or soap in solution.

2. The emulsifying &peptising power – This factor helps in emulsifying the liquid dirt &also aids in loosening solid dirt particles from the fabric or substrate.
3. Hydrolysis alkali – This factor favours the cleaning action. To obtain maximum Detergency, the above factors are made to contribute their full effects by proper Formulation of the products.

Process of Manufacture:

Steps:

1. Add colour (Pitholocynine blue) to acid slurry & mixer it well. So that it gets Uniformly disappears in acid slurry. If perfumed detergent powder is required. Required Perfumes mixed at this stage.
2. Powder 480grm of soda as to remove lumps & sieve it or spread it over guitar plastic Tray or basin. Add acid slurry contain pitholocynine blue to soda ash mixed well, see that Each lot is trefoil mixed with soda ash.
3. Keep the above mixture for about 1 hour for drying & completion of reaction (call this Mixture is a)
4. Mix the other ingredients TSP, STPP, CMC, & lumbar salts, call this mixture is B Mix

mixture B thirdly with mixture A for about 10 min finally add any perfume of you choice in small quantities as required sieve & pack. The above powder in suitable quantities in printed politic & printed coition for final sale.The detergent powder prepared in this will have a higher bulk density than spray dried detergent powder.

SAMPLE PREPARATION:

Manufacture of solid soap

Chemical reaction of Soap

Triglyceride + KOH Glycerol + soap (Fat) (NaOH) ($C_3H_8O_3$) ($C_{17}H_{35}COONa$)

Saponification:-The process of making soap.

Apparatus Required:-Measuring Jar, NaCl (Salt), Beaker, coconut oil, 20% NaOH solution, Bunsen burner, Funnel, Funnel stand, Glass rod, Red Litmus paper, Blue litmus paper, Fillter paper, Spatula ect.

Procedure:-

➢ Take 25ml of Coconut oil in a beaker and add 30ml of 20% NaOH to the beaker and stir it well using a glass rod.

➢ Know touch the beaker, you feel it is warm due to the Exothermic Reaction.

➢ Place the beaker on a Bunsen burner and heat it up to the white paste is occurred.The soap is made up of suspension form and glycerol.

➢ Use the litmus paper to check whether the white paste is a acid or basic.

➢ Add 15gm of NaCl(salt) to the suspension soap and stir it.

➢ Know filter the suspension, dry the soild cake remained in the filter paper.

RESULTS:

As a result Saponification was simple process of making soaps. Soaps consists of just potassium or sodium salts of long-chain fatty acids. During saponification, ester reacts with an inorganic base to produce alcohol and soap. Hence the solid soap was biodegradable.

CONCLUSION:

The reaction between vegetable oil and sodium hydroxide solution is exothermic in nature because heat is liberated during the reaction. The white suspension formed is made up of soap and glycerol. The process of formation of soap is called saponification. Hence the solid soap was produced.

REFERENCES:

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