

## Quadrant II – Notes

**Programme:** T.Y.B.Sc (Hons) Home Science

**Subject:** Textiles and Clothing

**Course Code:** GE15

**Course Title:** Textiles: Care and Conservation

**Unit II:** Materials and Practices in Care

**Module Name:** Composition of Detergents

**Module No:** 08

**Name of the Presenter:** Charlotte Facho

---

### Detergent

A **detergent** is a **surfactant** or a **mixture** of surfactants with cleansing properties when in **dilute solutions**.<sup>[1]</sup> There are a large variety of detergents, but the most commonly found are **alkylbenzene sulfonates**: a family of **soap-like** compounds that are more soluble in **hard water**, because the polar **sulfonate** (of detergents) is less likely than the polar **carboxylate** (of soap) to bind to calcium and other ions found in hard water.

### Types of Detergents

1. **DIY:** DIY homemade laundry detergents are an easy way to save some bucks. You can give them the fragrance of your choice and select the ingredients as per your comfort and skin suitability. Though they are organic with no toxins and harsh chemicals and last for long, yet they come with their own share of difficulties and challenges. The DIY detergents are less convenient, less effective and efficient than the conventional detergents, take time and are messy to prepare.
2. **Conventional Detergent:** Conventional Laundry detergent, like any other household product, can contain toxic chemicals and even carcinogens. The conventional detergents use chemicals to bring fragrance, the cleaning agents to make the laundry cleaner, the stabilizers to stabilize their shelf life, and bleach, brighteners and phosphates to make the detergents more effective in hard water. Their remains are

found to be there on the clothes even after washing and are likely to come into contact with skin, causing irritation.

2. **Powder detergents:** Powder detergents have a longer shelf life than liquid detergents, thus you can easily buy them in bulk without any worry. The main limitation of powder detergents is that, they don't dissolve well into the liquid and can leave deposits of chalky residue on clothes.
4. **Liquid detergents:** Liquid detergents work great with water, especially in cold water. Before washing the clothes, they can easily be used to pre-treat stains also. However, the limitation with them is that being liquid, they can easily be overused and their packaging also creates more waste.
3. **Non Toxic detergent Pods:** Non-Toxic detergent pods are free from chemicals and are easy to use. They free the user from the chaos of using the correct dose, which often happens naturally. Cleancult is one such non-toxic detergent. It is highly effective and is a box of sensitive laundry pods that combine cleaning, stain removal, and brighteners. The best part is that it is free of Chlorine, Dyes, Phosphates, and Masking Agents. It has also achieved a cleaning rating equivalent to conventional detergents. Since these are hypoallergenic and great for sensitive skin, you can sit, relax and know that you can have clean laundry with great and skin friendly ingredients.

### **Composition of Detergents**

Composition of detergents: up to 15 % washing-effective substances for cleaning action (tensides) up to 50 % water softening agents up to 25 % bleaching agents up to 10 % alkalies up to 10 % accessory agents, enzymes, optical brighteners etc. Surface-active agents ("surfactants"; Tensides): These are substances that work on the same basis as soaps. Surfactants, however, do not have the same disadvantages as soaps! Water softeners: Sasil; Without water-softening substances, precipitating insoluble salts (lime) would settle on the heating units (and eventually cause them to blow) when we heat hard water. Also, sharp-edged crystalline deposits would settle on the fabric and dirty or even tear the garment. Years ago, people used phosphates as water softeners which unfortunately acted as fertilisers in ground water at the same time (eutrophication). Bleachers: Sodium Perborate releases atomic oxygen at elevated temperatures, and thus destroys coloured stains via oxidation. Enzymes: Small volumes of enzymes are added in order to remove dirt containing protein (milk, blood...).

Optical brighteners: They make your laundry ..whiter than white". They have the property of converting invisible ultra violet light (from the sun) into visible blue light. This reflection of more light than normal makes the clothes look brighter than they actually are. Auxiliary agents: foam-control agents, corrosion protection, scents etc

### **Detergent making process**

Although there are three ways of manufacturing dry laundry detergent, only two are commonly used today. In the blender process favored by smaller companies, the ingredients are mixed in large vats before being packaged. The machines used are very large: a common blender holds 4,000 pounds (1,816 kilograms) of mixed material, but the blenders can accommodate loads ranging from 500 to 10,000 pounds (227 to 4,540 kilograms). By industry standards, these are small batches for which the blender process is ideal. While some settling may occur, the resulting detergent is of high quality and can compete with detergents made by other processes. The second commonly used method of production is called the agglomeration process. Unlike the blender process, it is continuous, which makes it the choice of very large detergent manufacturers. The agglomeration process can produce between 15,000 and 50,000 pounds (6,800 and 22,700 kilograms) of detergent per hour. In the third method, dry ingredients are blended in water before being dried with hot air. Although the resulting product is of high quality, the fuel costs and engineering problems associated with venting, reheating, and reusing the air have led to this method being largely replaced by agglomeration.

### **The blender process**

- 1 First, ingredients are loaded into one of two machines: a tumbling blender or a ribbon blender. The tumbling blender, shaped like a rectangular box, is turned and shaken from outside by a machine, while the ribbon blender is a cylinder fitted with blades to scrape and mix the ingredients. After the ingredients inside the blender have been mixed, a doorway at the bottom of the bowl is opened. With the blender still agitating the ingredients, the mix is allowed to run out onto a conveyor belt or other channeling device. The belt then moves the detergent to another area of the factory where it can be dropped into boxes or cartons for delivery to wholesalers or distributors.

### **The agglomeration process**

- 2 In this method, dry ingredients for a detergent are first fed into a large machine known as a *Shuggi agglomerator* (Shuggi is the manufacturer). Inside the agglomerator, sharp,

whirling blades mix the material to a fine consistency; the process resembles food being textured inside a food processor.

- 3 After the dry ingredients have been blended, liquid ingredients are sprayed on the dry mix through nozzles fitted into the agglomerator's walls. The blending continues, causing an exothermic (heat-producing) reaction to occur. The resulting mixture is a hot, viscous liquid similar to gelatin that hasn't hardened.
- 4 Next, the liquid is allowed to flow out of the agglomerator. As it leaves the machine, it collects on a drying belt where its own heat, exposure to air, and hot air blowers render it friable—easy to crush or crumble. The newly made detergent is then pulverized and pushed through sizing screens that ensure that no large lumps of unmixed product go out to the market. The result of this process is a dry detergent made up of granules of the mixed detergent.

### **The slurry method**

- 5 In this process, ingredients are dissolved in water to create a slurry. With a pump, the slurry is blown through nozzles inside the top of a cone shaped container as hot, dry air is simultaneously forced into the bottom of the cone. As the slurry dries, "beads" of dry detergent fall to the bottom of the cone, where they can be collected for packaging.

### **Liquid detergent**

- 6 If the detergent is to be liquid rather than powder, it is simply mixed back in—after all ingredients are blended—with a solution consisting of water and various chemicals known as *solubilizers*. The solubilizers help the water and detergent blend together more fully and evenly.

### **Advantages of detergents:**

1. Detergent powders are known to help extend the life of your clothes. When you use a detergent powder like surf excel easy wash, the powder eliminates the insoluble salts which could stay on your clothes. This helps in increasing the life of your clothes.
2. Detergents may be more cost effective compared to other options.
3. It can scrub off difficult stains. This does not leave behind stains or marks on your clothes.
4. Washing cloth in detergents is safer, because it does not contain any harsh chemical which causes skin to effect.

5. It contains certain water softening agents, which helps in using this powder in different water quality.

#### References

1. <https://en.wikipedia.org/wiki/Detergent>
2. <https://www.cleancult.com/blog/different-types-of-detergent/>
3. <https://www.gym-leibnitz.at/cms/wp-content/uploads/2015/09/NWL4-11Detergents.pdf>
4. <http://www.madehow.com/Volume-1/Laundry-Detergent.html>
5. <https://www.vedantu.com/question-answer/are-advantages-and-disadvantages-of-detergent-class-11-chemistry-cbse-60959a96e81e4e6c97b4b202>