

LAUNDRY MANAGEMENT AND ENVIRONMENT – A STUDY

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Abstract

Everything in this world is changing and developing itself into something new and more efficient. The concept of laundry has also evolved with time. Washing clothes by our own has been replaced by the laundry vendors then later washing machines came in to the picture. So, lots of hard work has been replaced by smart work. Though introduction of laundry shops reduced people's laundry work in their homes, in a great manner, saving more time and energy it has also been degrading the environment that we all live in. Everything has its own benefits and loopholes.

This is a conceptual research paper with secondary data and is completely based on facts, the views of the author and the review of literature. The main aim of this paper is to understand the cause-and-effect relationship of the laundry chemicals and the environment. The concept of laundry management, its need in the modern world, environmental concerns that are caused by the laundry processes and activities are the various aspects discussed in the paper. This paper also gives suggestions and introduces and elaborates about the best practices and the green practices that can be used by the laundry firms and individual thereby protecting and conserving the environment from further degradation.

Keywords: Laundry, Chemicals, Laundry Detergents, Laundry Firms, Environment, Mankind.

I. INTRODUCTION

Evolution is the key factor around which the entire universe spins. Every day, something new is being invented or created or discovered from something that is already existing. It may be the evolution of telephone or the evolution of visuals like cinema. Laundry also is one such example.

1.1: History of Washing:

Before the 1900s, people used to wash clothes with bare hands requiring more hard work and energy, which was cumbersome and time consuming. People experienced it as a burden. They brought their laundry to lakes and rivers

to wash and used rocks or boards as scrubbing surfaces. Women used rocks to beat the wet clothes as that was the best way to remove dirt and stains from the clothes. The process of drying was done in the open in the sunshine. The sun was also utilized as to bleach the whitening of fabrics. Removing of stains and dirt from clothes required lots of energy. This was a hectic and tiring task for the people.

Later on, for a few years large hand-turned drums came into existence in every household. Though it required muscle power, many clothes could be washed and cleansed at the same time instead of washing only one garment at a time.

It was in the 1900s that marked the milestone and changed the long history of hand washing. During this period the wringers came into existence. The wringers comprised of dual cylinders that released water from the clothes. However, the wringer was inefficient in drying the clothes completely. It only reduced the water quantity of the clothes, but did not actually dry it. The wringers still needed the involvement of human hand which became quite dangerous as people often got hurt in their fingers while washing the clothes. Later, the wringers were substituted by spinning systems in which the clothes twirled inside a container using a high speed.

It was in 1908, when the first electric powered clothes' washer machine was invented by Alva Fisher. This marked the beginning of the evolution of the "Laundry". After this invention, the Beatty Brothers company produced an agitator washing machine. Later in the year 1930, John W. Chamberlain invented a machine that can wash and rinse in a single operation. Moving to the year 1937, Bendix Home Appliances invented the first automatic domestic washing machines with features that were not available before, which reduced the cumbersome work of people and relived them from their burden of washing clothes. This automatic domestic washing machine was expensive in those times due to the use of high-priced equipment that was used in the making of these machines.

In 1947, Whirlpool Corporation introduced the first top-loading automatic washing machines. During the beginning of the year 1950, many number of washing machines included a spin-free feature that substituted the work of the wringers mentioned above and the GE introduced a washing machine that was equipped with 5 push buttons to control the temperature and the speed.

However, only two of the above washing machines survived till date namely; the agitator machine and the tumbling machine because these two machines have all the equipment and speed to carry out the hectic task of washing clothes. Overall, the washing machine was invented basically to convert hard work into

smart work since the machine would do all the work that were once done by bare hands.

1.2: Evolution of Soaps and Detergents:

Prior to the invention of soap or detergent, people used to use animal fat or lye to wash clothes. Sometimes, they also used chamber lye- a name that was given to urine which was collected from chamber pots. Other cleaning materials such as natron was also used for the cleaning purpose.

Later on, when the rain washed a mixture of the melted animal fat and ashes of down to the soil along the river of Tiber, women noticed that this mixture made their wash cleaner with less muscle power. Hence, this mixture was named as the "Soap" according to an ancient Roman legend. In Egypt Lye became a popular soap product for washing and cleaning the clothes.

The Germans developed the first synthetic detergent in retaliation to the shortage of fats for making soap during the World War I. This made way for further need of a cleaning agent that would work in cold water also.

In 1950s, liquid and powder laundry detergents became popular along with bleaches and fabric softeners. In the year 1960, Enzymatic laundry detergents were introduced marking a milestone in the history of detergents. In 1970s, fabric conditioners were included with the laundry detergents in order to produce an all-in-one product.

Ahead in the year 1980, concentrated laundry detergents began to boom in popularity. During the 1990s, biodegradable cleaners and conditioners and colour-safe bleaches started gaining momentum in the market. During the millennium, detergents for synthetic fibres were introduced.

Since, the soaps were no longer compatible with the emerging technology of washing machines, synthetic non-soap washing and cleansing products began to gain momentum and boom in the world.

1.2.1: Difference between Soaps and Detergents:

While soaps consist of fatty acid that has a long alkyl chain, detergents have a group of sodium attached to a long alkyl chain. Soaps are ineffective in hard water and saline water, whereas detergents are more effective in hard water and saline water. Soaps are biodegradable in nature as they contain fatty acids, whereas detergents are non-biodegradable in nature due to the presence of hydrocarbon chains. While soaps have a tendency to form a scum in a hard water environment, detergents do not form scum in a hard water environment. Soaps are prepared naturally using vegetable oils and animal fats, whereas detergents are derived from synthetics. While soaps are environment friendly, detergents are not environment friendly as they form a thick coat over the water body which can cause the death of the aquatic life. Some examples of soaps are sodium palmitate and sodium stearate and some examples of detergents are deoxycholic acids and sodium lauryl sulfate.

1.3: Introduction and History of Laundry:

Laundry refers to the process of washing of garments and textiles including other services such as drying and ironing. There have been many methods of laundry, but laundry as a concept has been a part of history since people started wearing clothes. For a major part of time, laundry was highly gendered i.e., only women used to bear the responsibility of washing and other activities related to the cleaning of garments. Different types of garments needed different treatments like cotton clothes needed a lot of washing whereas woollen and fibres like silk needed gentle washing and cleaning. Some top-quality fibres like the mulberry silks required even gentler washing mostly washing using hands. However, the Industrial Revolution marked the use of mechanized laundry work solutions, notably the washing machines.

During the late 20th Century, the cumbersome work of washing clothes was passed onto another person. This concept came to be known

as the laundry shops, where people would give their clothes to another person and the latter would execute his responsibility of washing the clothes. This concept converted the hard work of people into the smart work of the washing machines. It also helped the people to invest their time, energy and potential in other innovative and productive tasks.

Now, an individual home may have a laundry room which is a utility room that includes but does not restrict the function of washing clothes. An apartment or a student residence may have a shared laundry facility which is efficient and cost effective.

1.4: Laundry Management:

Laundry management refers to the objective of overcoming challenges that are faced by the laundry firms through the way of establishing an environment for laundry operations. It is a smart application programme that helps the laundry firms to improvise and manage the laundry activities. An efficient laundry management includes smart features and full-scale operating operations

It consists of taking orders, maintaining the records and the transportation and the management of the payment mechanism.

1.4.1: Key Features of Laundry management:

Some of the key features of laundry management are as stated below: -

- Customers can place their orders using a mobile app
- The laundry functions and operations are pre-planned thereby reducing the chances of any errors and ensuring the smooth flow of the laundry process
- Laundry firm and the mobile app will receive consent from the customers
- Garment sorting is done by the laundry firms
- Invoice or challan generation
- Fast and secured payments through online payment mode

- The laundry firms and the mobile app offer various discounts and rewards
- Convenient for the customers
- Refund or rewash is done if required
- Laundry firms provide customizable services

1.5: Need for Laundry Management:

Laundry Management helps in effective functioning of the laundry firms. It reduces the chances of errors while handling the customer's clothes. It facilitates smooth functioning of the laundry firms. It helps in providing employment.

Laundry Management helps the laundry firms to optimise their performance in terms of all aspects considered. It's affordability and enabling the firm to track the garments or clothes makes it secure and reliable. The tasks become much easier and effective with laundry management. It also helps the firm to collect real time data from all locations.

1.6: Laundry business

1.6.1: Opportunities:

- Easy management of business
- Increase in turnover and profit of the business
- Business services are needed in both seasonal and non-seasonal phases of the year
- Flexible according to the customer demands
- Does not require too much muscle power

1.6.2: Limitations:

- Initial capital requirement is high
- Cut throat competition in the market
- Investment on assets required is high

1.7: Best Practices of Laundry management:

Some of the best practices of laundry management that have been implemented or should be implemented are as follows:

- Establishment of layout – A layout should be properly planned. Separate processes like drying, dying and folding should be carried out in separate places.
- Infection control – Laundry firms should be established in areas which are separate from residential units in order to reduce the rate of infection.
- Quality control – Laundry firms should ensure that the equipment and chemicals that will be used in the process of laundry are of top quality.
- Hygiene of laundry baskets – The laundry firms should ensure that the laundry baskets are cleaned and sanitized regularly.
- Adopt green laundry practices – Laundry firms should educate themselves about the green laundry practices in order to preserve the environment.

2. REVIEW OF LITERATURE:

(Bajpai and Tyagi, 2007) The author states that mildness plays a vital role for the use of surfactants in domestic household products. But the demand for anionic surfactants has increased, but this demand is expected to be relatively slow as they are being replaced by milder nonanoic. (Sharma, 2014) The authors opine that since Actinomycetes are the most economically and biotechnologically valuable prokaryotes, hence they can be used as a detergent additive. (Francois and Niyongabo, 2015) The author concludes that detergent proteases and lipase with better properties can be used as detergent substitutes which may also partially reduce the use of surfactants and other detergent chemicals that are not environmentally friendly. (Maruthiah, 2016) The author highlights that the novel marine bacterium *P. Saliphilus* APCMST-CS5 could efficiently produce HAOP enzyme and has established various potentials for industrial applications. He also concludes that the chemicals present in the detergents which is discharged into the water bodies can severely affect the marine life. He also specifies that the novel marine bacterium *P. Saliphilus*

APCMST-CS5 could efficiently produce HAOP enzyme and has established various potentials for industrial applications. (Geetha, 2016) The authors conclude that though the APGs have become the synonym for the biodegradable eco-friendly surfactants by their novel nature and versatile applications, the challenge of replacing the surfactants still exists. (Abdullah, 2017) The authors conclude that the presence of high levels of carbon-dioxide, nitrogen and phosphorous in the bed sediment of the river Ganges has been causing variations in the water body which is also affecting the aquatic life. (Edwinthangam, 2018) The author highlights the fact that the degradation and depletion of water bodies are narrowing the survival chances of the aquatic ecosystem which may eventually lead to the extinction of the species if the problem is not considered with immediate concerns. (Gupta and Nidhi, 2018) opine that there is a serious need for green laundry as laundry detergents are harming the environment. They also suggest that if the society along with well-organized legislations on energy, water and detergents are combined then they can promote green and sustainable laundry service among Indian households. (Ajwalia, 2019) The author highlights that the urban development process and urban activities have impacted the environment in an extremely negative manner by affecting the quality of the water bodies. The author also suggests that the chemical discharging industries should have a separate effluent treatment plant to avoid the discharging of chemicals into the water bodies. (Gupta and Sekhri, 2021) The authors conclude that the laundry detergent industry should responsibly address the concerns of the environmental degradation and should ensure that in future the laundry detergents are safe for the environment and the consumers. They also state that the green laundry detergents must be modified for its effective use in westernized equipment.

2.1: OBJECTIVES:

1. To understand the cause-and-effect relationship of laundry chemicals and environment

2. To create awareness among people about the rising environmental concerns

3. To provide suggestions as to how to reduce the environmental degradation that is being caused by the laundry chemicals.

2.2: STATEMENT OF PROBLEM:

While mankind's development has been tremendously impressive, the impact of the same on the environment has worsened. The chemicals discharged into the nature without taking proper measures is contributing towards the rapid degradation of the environment. Natural resources like water and air are being polluted which is threatening the survival of all biological beings. Due to the fast pacing of people's life, this major issue has been sidelined from the top priorities of people as well as the government. If this environmental concern is not taken into serious consideration, then it will not be long before the environment surrounding and supporting life will completely be destroyed and the future generations will have to suffer the consequences of the same.

3. RESEARCH METHODOLOGY:

This paper is conceptual in nature. The data necessary for this study is secondary in type and has been collected through an extensive survey of literature and the opinions of some people who belong to the concerned parties such as students staying in and as paying guests and women who are home makers. Some necessary data is also collected via various articles.

3.1: LIMITATIONS OF THE RESEARCH:

This research is limited to the opinion and views of the author along with few other concerned people. It is also limited to the extent of review of literature.

4. DISCUSSION:

- 4.1: Laundry chemicals and its effects on the Environment:

While the modern world considers this concept of laundry as a boon to individuals, it has effectively become a bane to the environment that surrounds the world. The detergent chemicals that are used to do the laundry is being discharged into the environment without proper and necessary precautions. These dangerous chemicals are polluting one of the important resources that is required for the survival of mankind - 'Water'.

The laundry detergents contain several chemical compounds such as Phosphate which can react adversely when they reach the water table. When the nitrogen in these detergents react with the phosphorus in the water, it creates an environment for the growth of algae thereby contaminating the water body and reducing the oxygen present inside the water body. Thereby resulting in the death of the aquatic life. Another destructive effect of surfactants is the easy absorption of different pesticides and pollutants in the water. This is possible due to the reduced surface tension of water. Not only that, surfactants also affect the normal breeding process of aquatic animals. This chemical is also responsible for disrupting the endocrine system in most animals and human beings.

Alkyl Benzene Sulfonate is a common surfactant that is added to laundry detergents. It is an anionic surfactant. This chemical biodegrades very slowly; thus, it is a hazard to our surroundings. During the production of this surfactant, benzene-like chemicals are released in the environment that are carcinogenic. Different researches carried across various water bodies such as the Sambhar Lake of Rajasthan, the river Ganges, river systems of southern Western Ghats of India and Sabarmati River near Gujrat have revealed the above stated points.

Apart from the process of laundry, other associated processes such as dyeing are also contributing in the degradation of the environment. The toxins and synthetic fibres that is used in the dyes are adversely affecting the water bodies thereby adding to the degradation of the environment and thereby

threatening the survival of the biological beings.

These laundry detergent chemicals are highly toxic to the aquatic life. According to the U.S. Environmental Protection Agency (EPA), surfactants break down the mucus layer that coats fish, protecting them from parasites and bacteria. They also reduce the surface tension of water, making it easier for waterways to absorb pollutants and pesticides. These surfactants do not break down well or dilute, in fact they further breakdown into more toxic by-products.

Apart from endangering the aquatic life, these chemicals also threaten the survival of mankind by causing severe ailments like skin cancer and many more. According to a 2010 study published in the Journal of Integrative Environmental Sciences, the U.S. residential sector is responsible for about 21% of all U.S. carbon emissions, and laundry cycles accounted for 8.29% of all residential emissions. The study also reveals that U.S. residential laundry emits 179 million metric tons of carbon dioxide every year, which is the equivalent to the full energy usage and emissions of 21 million homes. This is extensively polluting the air and the water resources of the environment which constitute a very essential part in the nature and in the sustainability of biological beings.

Along with water, these hazardous chemicals are also affecting another important resource of nature known as the "Soil". The activity of laundry includes the dischargement of a substance known as the greywater which is carelessly let out into the environment. This greywater contains high concentration of surfactants, which is non-biodegradable in nature and does not breakdown easily. Laundry greywater is a mixture or composition of harmful chemicals like magnesium, nitrate, sulphate, carbonate and chloride which when comes in contact with the soil, degrades the soil from the inside resulting in various natural destructions like soil erosion and depletion of groundwater and freshwater. The greywater also increases the level of pH in the soil which ultimately results in soil irrigating and soil

degradation. The current practice adopted for the disposal of the laundry greywater is unacceptable due to the distribution of pollutants such as the chemical agents and the pathogens which are negatively affecting the quality of soil, thereby affecting the biological beings via food chain.

4.2: Urgency of the environmental situation:

Nature provides us with the means and resources that are necessary for the survival of biological beings and if the nature or the environment is endangered then so is the life of all biological beings that exist within the nature. The contribution of laundry chemicals towards the degradation and destruction of environment has been increasing over years and is now at the peak. People don't realize it now, but by the time they realize about this it will be too late to rectify this mistake and this mistake would have already caused the world dire consequences which biological beings cannot sustain.

If the above stated environmental concerns are not tended to immediately, then it will have consequences that will threaten the survival of biological beings and their habitats. Hence, this environmental degradation or nature's destruction should be taken into serious consideration, so that the future generation can cherish the "nature."

4.3: Green and Sustainable Laundry Practices:

Some of the green and long-term laundry practices that can contribute in the protection and preservation of environment are as discussed below: -

1. Hang it out for dry – Instead of using the drying machine for hundred times in a day, clothes can be hanged out in the open for natural drying.
2. Switch to energy-efficient washing machines – By switching to energy-efficient washing machines, one can save up to 26,498 litres of water per year. The amount of water saved can be used by millions of people to quench their thirst.

3. Use green laundry detergents – People concerned with the laundry processes should use green laundry detergents that will not harm the environment.

4. Wash clothes in colder water – Washing clothes in cold water will help in saving energy and the clothes will also be cleaned properly.

5. Avoiding shedding microplastics – Purchase a wash bag that can capture fibres in the wash thereby avoiding the shedding of microplastics.

6. Choose concentrated detergents – Concentrated detergents have smaller carbon footprint because of which they are more useable and effective product.

7. Make your own laundry detergent – Making our own laundry soap is easy with all the necessary ingredients available in the grocery store.

8. Avoid Chlorine bleach – Chlorine bleaches not only destroy the clothes but also contributes in the environmental degradation. Hence it is advised to avoid the chlorine bleaches.

9. Head to the Laundromat – Commercial washers are more efficient than domestic washers, hence taking the bundle of clothes to the laundromat which may use less energy.

10. Wash in full loads – Avoid washing in partially full loads to reduce the number of times that laundry needs to be done thereby saving energy and water.

4.4: RECOMMENDATIONS:

In this paper we lay down few recommendations that might help in the conservation or preservation of the environment. The recommendations are as below:

1. Laundry firms should establish a planned and effective system for the discharge of the laundry chemicals.
2. People associated with the work of laundry should use laundry additives or laundry

substitutes along with or instead of the laundry detergents which are hazardous to the environment.

3. The process of dying should be done with chemicals that do not harm the environment and cause adverse effects on the environment.

4. Establish an effective and efficient laundry management system.

5. Be aware of the environmental crisis that is faced by the world and take necessary precautions accordingly.

5. CONCLUSION:

No Doubt, clothes and laundry are an indispensable part of an individual's life and hence certain laundry services are inevitable. But these laundry services are directly or indirectly affecting the environment that surrounds the same individual. The laundry chemicals used in the process are adversely affecting an important natural resource known as water. When the water is polluted, the survival of aquatic life is directly threatened and while consuming the same water, the survival of humankind and other biological beings of the world are threatened. These laundry chemicals are also polluting the quality of soil thereby contributing further into the environmental degradation. These facts are supported by various researches that were carried out in water bodies such as the Sambhar Lake of Rajasthan, The river Ganges and the Sabarmati River of Gujrat.

The research has also provided instances and ideas where detergent additives or detergent substitutes can be used in the process of laundry which will have less or no effect on the environment.

Hence people concerned with the laundry processes and activities should identify and understand the threat that laundry chemicals pose to the environment and should take necessary and serious precautions to avoid these threats. It is the duty and responsibility of every individual to keep the environment safe

thereby to keep the Earth safe for the future generations to cherish the beauty and benefits of the nature.

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