

# Impact of textile wastewater pollution on the environment

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The impact of textiles is considered to be the most polluting element in the textile industry. It affects the environment and in a developing country like Pakistan, this condition is more prominent. The wastewater becomes the main source of pollution of the environment. It pollutes the surface and subsurface water, soil and air. Today its proper management and remedial measures such as disposal systems have become the most serious challenges all over the world, including Pakistan.

## Impacts of textile wastewater on the environment

The textile industries release a large amount of wastewater containing toxic and hazardous pollutants that badly degrade the environment<sup>[1]</sup>. Textile industrial wastewater also shows toxic effects on aquatic macrophytes and algae, as it is noticed that, aquatic macrophytes could hardly survive two days on textile effluent.

## Soil Pollution

The textile wastewater pollutes the soil. The soil is the most important medium for growing plant, bushes, crops, etc. The quality of crops depends upon the quality of the soil. So, when the quality of the soil decreases due to polluted industrial wastewater, subsequently, the amount and quality of crops also decline. It is also seen that the lower lands become more polluted than the higher lands, as the effluents are ultimately deposited in the lower lands.

## Water Pollution

The water pollution is considered to be the biggest environmental threat all over the world. Generally, surface water is used for dyeing, printing, sizing, bleach-

ing and washing, and therefore, this water mixes with the water in rivers and thereby increases pollution.

## Categories of Air Pollution

Air pollution is categorized by the emissions of Carbon dioxide, Aerosol fumes and gases, Toxic gases, Smoke and Dust.

## Air pollution in textiles

Most processes performed in the textile mills produce atmospheric emissions. Gaseous emissions have been identified as the second greatest pollution problem (after effluent quality) for the textile industry.

The major air pollution problem in the textile industry occurs during the finishing stages, where various processes are employed for coating the fabrics. Coating materials include lubricating oils, plasticizers, paints and water repellent chemicals essentially, organic compounds such as oils, waxes or solvents, acid vapour, odors and boiler exhausts<sup>[2]</sup>. The cleaning and production changes result in sludge in the tanks with process chemicals, which may contain toxic compounds and metals<sup>[3]</sup>.

## Hazardous waste

Many chemicals, even when used properly can still harm human health and the environment. When these hazardous substances are thrown away without any proper disposal protocols or treatments, they become hazardous waste.

Hazardous waste is most often a by-product of a manufacturing process and some hazardous wastes come from our homes: our garbage can include such hazardous wastes as old batteries, bug spray cans, and paint thinner. Regardless of the source, unless we dispose of hazardous waste properly, it can create health risks for people and damage the environment.

## How can hazardous waste effect us?

When hazardous wastes are released in the air, water, or on the land they can spread quite easily and thus contaminating even more of the environment and posing greater threats to our health. For example, when rain falls on soil at a waste site, it can carry hazardous waste deeper into the ground and thus polluting underlying ground water. If a very small

Different gases & effects		
S. No.	Pollutants	Effects
1	Carbon-mono-oxide	React with blood & form carboxy-haemoglobin which will rest the blood transportation to other part of body
2	Oxides of Nitrogen	Acid rain, bronchitis, eye irritation.
3	Sulphur-dioxide-sulphate	Eye irritation, breathing problem
4	Methane	Lungs disorder
5	Carbon-dioxide	Head ache, nausea
6	Hydrocarbon (methane, ethylene, acetylene)	Carcinogenic effects

amount of a hazardous substance is released, it may become diluted to the point where it will not cause injury. A hazardous substance can cause injury or death to a person, plant, or animals.

### Impacts of solid waste on the Environment

The solid waste breaks down in landfills to form methane, a potent greenhouse gas. This exacerbates climate change, triggering the destruction of the ozone layer. Due to improper disposal of biodegradable waste, that is, illegal dumping, the environment is affected adversely. Leaching is a process through which solid waste enters the porous soil and pollutes groundwater, contaminating the land. <sup>[4],[5]</sup>

### Things to do

#### Increasing Awareness

If we want to reduce the adverse impact of Textile Effluent on the environment, we should be aware of the bad effects of the Effluent. The authorities at the Textile Ministry and industry should be aware of these factors. The authorities always look for their benefits, but they should also look for the healthy environment.

#### Government rules and regulations

The government of every country put some rules and regulations for these kinds of industries, therefore industry should follow the government rules and regulations.

### Remedial measures

#### Effluent treatment and disposal system:

The textile wastewater includes a large variety of dyes and chemicals which is the major cause of the various environmental issues and challenges for the textile industry. The main pollution comes from dyeing and finishing process. The main pollutants in effluent are high suspended solids, Chemical Oxygen Demand (COD), heat colure, acidity and other soluble substance. So, substances which need to be removed from the effluent are mainly COD, BOD, Nitrogen, Heavy metals and dyestuffs. <sup>[6]</sup>

The process sequences involved in effluent treatment are as follows.

1. Primary filtration.
2. Cooling and mixing.

Some effect of water pollution				
S. No.	Process	Chemical discharge	Pollutants	Health effects
1	Singe	Benzene, Starch, PVA, Gum.	Resin, Fats, Wax, Starch and Glucose.	Carcinogenic, Mutagenic & effects central nervous system.
2	Bleaching	Hydrogen, NaOH, Detergent	Wax, Sodium silicate, Caustic.	Prolonged exposure with effect Kidney and lever.
3	Dyeing	Sulfate, Salt	Dyes, Sulfate, Urea	Eye & respiratory problem.
4	Printing	Nitrate, Phosphate, Dyes	Starch, Gum, PVA, Pigment Colors.	Harmful health hazards.
5	Finishing	Fats, Silicone	Starch, Finishing Agent.	Suppression of hematological system.

3. Neutralization.
4. Chemical coagulation.
5. Separation sludge.
6. Pressure Filter press.
7. Discharge to drain.

#### 1. Primary Filtration

Primary Filtration is the first stage of the effluent treatment plant, where effluent comes from weaving, bleaching, dyeing, printing and finishing units.

#### 2. Cooling & mixing

In this stage different type of effluent is mixed and cool down with the help of fan motor.

#### 3. Neutralization

After cooling and mixing, the effluent is transferred to neutralization tank with the help of a pump. Here acid and alkali are mixed to neutralize the effluent. In this context, sometimes, the pH meter is also placed in the neutralization tank.

#### 4. Coagulation

After neutralization, the effluent is transferred to a coagulation tank. Here coagulant is added with the effluent.

#### 5. Separation sludge

The separation sludge tank separates effluent from the water and sludge is formed in the lower level of the tank.

#### 6. Pressure filter press

The next step filtration under pressure. A certain amount of pressure is created here in this context.

#### 7. Discharge to drain

After completion of all these processes, the effluent is purified and can

be safely drained without any impact to the environment.

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