



Industrial Wastewater Treatment through Grasses: A Comparative Study



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Abstract

Alkaline water and other alkaline products have gained popularity in recent years, becoming a new health trend. Alkaline drink. Acidic environments in the body cause several chronic illnesses, which they claim could not persist in an alkaline environment. The thinking behind this is that drinking alkaline water helps the body itself to become more alkaline, which will treat several illnesses, including cancer. However, alkaline water may still be helpful for some people. In general, alkaline water tends to be more alkaline because it has minerals and electrolytes in it. Due to this, drinking this water after a workout or while sick may help keep minerals and electrolytes balanced and prevent dehydration [1].

Keywords: Alkaline water; doob grass; acidity; pH; side effects; problems.

Abbreviations: FEC: Electrical conductivity; TDS: Total Dissolve Solids.

Introduction

Water is one of the most important elements in life. In earth water is available in various forms like river water, ground water ocean water soil moisture and in form of vapors. It has the important ability to dissolve many other substances. Water contains various types of parameters which create the water basic characteristics of water. Physical, Chemical, and biological properties of water set the water quality. Drinking water and other water-based drinks of varying pH levels may play a role in a few different health factors. Alkaline drinks may offer some health benefits compared to acidic drinks. The body strictly regulates its pH levels. Changes in the body's internal pH, such as blood pH, can cause serious problems in the organs and tissues. So, if it were possible to change the body's pH using food and drink, it would be dangerous to do so. The pH of water for drinking or for use in the home is very important. Water that is too alkaline or too acidic can damage pipes and appliances, and it is generally unhealthful to drink. Water naturally varies between about 6.5 and 8.5 on the pH scale, and this is normal. Water that is too far outside this scale may not be safe to drink. Some people may find it helpful to drink alkaline water with a pH higher than 8.5 [2].

Impacts of acidic water

It's not recommended to drink acidic water, as its high acidity

and concentration of heavy metals can have several negative health consequences like

May contain heavy metals

One of the main concerns with acidic water is that it often contains high amounts of heavy metals. Acidic water can be high in lead, arsenic, copper, nickel, cadmium, chromium, and zinc. This is concerning, as exposure to heavy metals can be dangerous, potentially leading to heavy metal poisoning and toxicity, symptoms of which include the following:

- Nausea And Vomiting
- Diarrhea
- Abdominal Pain
- Chills
- Weakness
- Shortness of Breath
- Suppression of the Immune System
- Organ Damage

The severity of these side effects depends on several factors, including age, sex, individual susceptibility, and the route, dose,

and frequency of exposure. Children have been shown to have more severe side effects from heavy metal exposure, including an increased risk of developmental delays, respiratory issues, behavioral disorders, certain forms of cancer, and heart disease [3].

Effects on teeth

The pH of food and beverages plays an important role in your overall dental health. Tooth enamel-the hard, outer surface of your teeth that protects it against decay-is susceptible to damage from acidic beverages. While acidic groundwater hasn't been studied specifically, beverages with a pH of 4.5 or less have been shown to increase the risk of tooth decay. As such, regularly drinking acidic water may slowly erode your tooth enamel, causing cavities.

Effects on bone health

Consuming acidic water has been claimed to prevent calcium absorption and lead to bone loss over time. Yet, research hasn't shown that the pH of your diet significantly affects our risk of bone loss, nor has it consistently shown that drinking alkalized water has a protective effect. However, exposure to certain heavy metals, including lead, cadmium, arsenic, and chromium, has been linked to negative side effects for bone health. Therefore, regular exposure to acidic water that's high in these heavy metals may have negative effects on bone health over time.

Damage the plumbing in the houses

In addition to harming the human body, acidic water can

corrode pipes. Due to its high acidity, water with a low pH can start to dissolve metal pipes over time, causing leaks and further increasing the presence of heavy metals in drinking supply. Pipes may be experiencing corrosion due to acidic water include blue-green stains on faucets or in sink, metallic-tasting water, and pinhole leaks in plumbing.

Methodology

In the study samples have been collected from printing and dyes industry at different stages adjoining residential area at Govindpura, Sanganer, Jaipur. Various physical and chemical analyses like PH, EC, Total Dissolve Solids (TDS) and Hardness have been done. Samples were treated with 1 % (1gm fresh grass in 100 ml of sample water) doob grass till 24hrs in first phase. In the second phase samples were treated with 1 % (1gm fresh grass in 100 ml of sample water) barley grass till 24hrs. All observations were taken at the room temperature 28.4.C [5].

Details of Samples

- Sample No-1 (Printing Unit, Govindpura- drainage I)
- Sample No-2 (Printing Unit, Govindpura- drainage II)
- Sample No-3 (Printing Unit, Govindpura- drainage III)
- Sample No-4 (Dye Unit, drainage Govindpura- drainage IV)

All samples have been collected during August-September month 2022.

Observation Table:

Table 1-4, Figure 1-4,

Table 1: P^H Value

	Value before Treatment	Value after Treatment in 1% Grass for 24 hrs.	Value after Treatment in 1% Barley Grass for 24 hrs.
Sample No 1	1.15	1.15	1.15
Sample No 2	1.74	1.74	1.75
Sample No 3	6.04	7.37	7.35
Sample No 4	12.07	10.61	11.25

Table 2: TDS (ppm)

	Value before Treatment	Value after Treatment in 1% Grass for 24 hrs.	Value after Treatment in 1% Barley Grass for 24 hrs.
Sample No 1	5689	5689	5776
Sample No 2	5343	5171	5171
Sample No 3	839	819	839
Sample No 4	5171	2900	5171

Table 3: EC ($\mu\text{s}/\text{cm}$)

	Value before Treatment	Value after Treatment in 1% Grass for 24 hrs.	Value after Treatment in 1% Barley Grass for 24 hrs.
Sample No 1	20760	13780	15520
Sample No 2	5140	1700	3420
Sample No 3	1678	1638	1678
Sample No 4	3410	5800	5966

Table 4: Hardness (ppm)

	Value before Treatment	Value after Treatment in 1% Grass for 24 hrs.	Value after Treatment in 1% Barley Grass for 24 hrs.
Sample No 1	843.14	950.98	921.57
Sample No 2	529.41	617.65	549.02
Sample No 3	264.7	323.53	294.12
Sample No 4	431.37	147.06	313.73

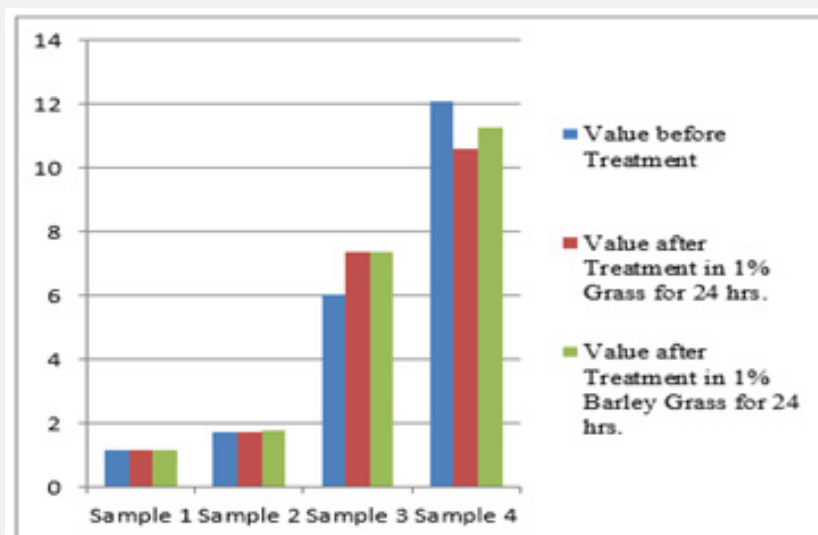


Figure 1: PH Value

Result and Discussion

The study shows the various parameters of water have found different results after treatment with grass and barley grass during 24 hrs. It has been observed that the high pH cannot be affected by doob grass although grass burns due to the higher acidic water but when pH exists at scale of 5-6. It can decrease the acidity and if water is alkaline, it also increases the acidity of water. Similar results were found with barley grass. TDS cannot be found in change after treatment from both grasses. Only drastic change observed in alkaline water sample 4 for TDS measurement. In observation Electrical conductivity (EC) sample 1 and 2 found

the reduction after treatment. No change in sample 3 and sample 4 increases the E.C. similarly in case of hardness sample 1, 2 and 3 increases the hardness in water after treatment but sample 4 decreases the hardness in water after treatment [6,7].

Conclusion

We can conclude after the result and observation grass can reduce the concentration of pH at one limit but if more acidic water treatments with grass it cannot be change the activity. Similar other parameters like hardness, TDS or EC of water cannot treated by grass.

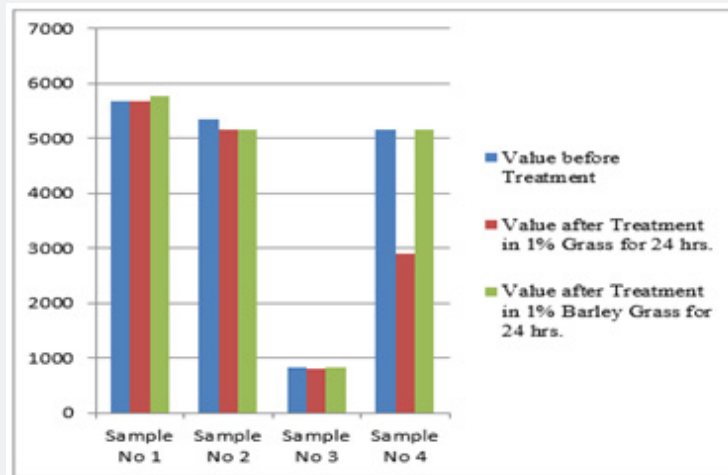


Figure 2: TDS (ppm)

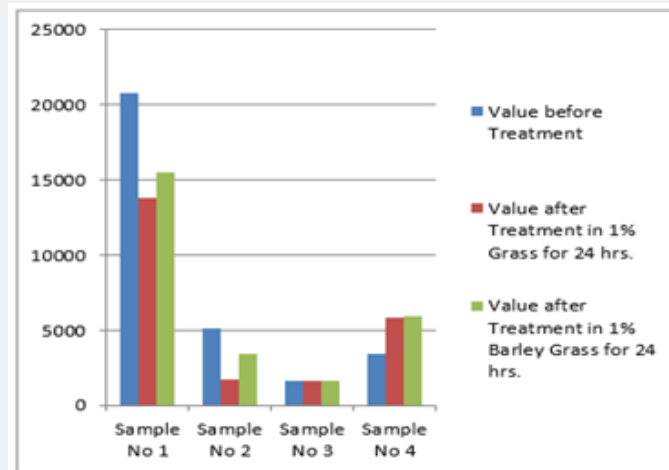


Figure 3: EC (µs/cm)

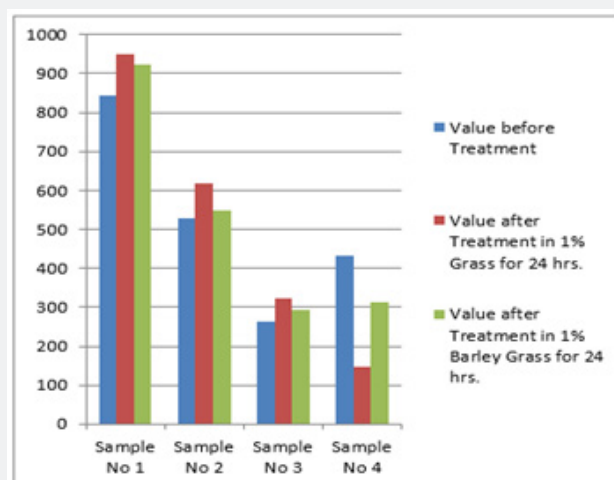


Figure 4: Hardness (ppm)

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