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PLANT GROWTH RELATED TO WATER QUALITY WITH REFERENCES TO MAKODA AREAS, GWALIOR, M.P. (INDIA)

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Abstract

Water pollution is an issue that involves every living thing, for we are all dependent on water to survive. Pollution can have the strongest effects on plant life; Pollution can also alter the pH of water, making it more acidic or more alkaline. Many species of plants thrive only in certain conditions, and a large shift in pH can kill them off or stunt their growth.

Keywords: *leaf chlorosis, reduced root growth and decay, stunted shoot growth and translocation of carbohydrates*

Introduction

Pollution to the water, air and soil is harmful to plants and animals. It causes injury and inhibits the growth of plant species. The benefits of plants inside are more than aesthetic. They bring oxygen, take in chemicals and just plain make the air better to breathe. Plants have been proven to remove harmful airborne harmful contaminants and increase oxygen level which can lead to increased concentration and productivity levels. So, to reap the benefits, we must learn first how to water these greens. The number one killer of houseplants is over-watering. Poor water quality can also be dangerous. City water is filtered for the safety of humans; however, plants do not agree with many of the chemicals used in that process. Some plants are more sensitive than others; palms, spider plants and dracaenas are quite sensitive to fluoride. The fluoride acceptable in tap water is still more than plants can handle. Additionally, tap water can also contain salts for softening which can be harmful. A build-up of a white film crust forms on soil, this is a sign water has too much sodium- a nutrient plants despise. Finally, water that has the wrong pH level can damage plants. Some plants cannot tolerate chlorinated tap water, while other plants have a difficult time with soft water. Use the cleanest water possible, such as rainwater or reverse osmosis water

Materials and Methods

The samples were collected during the month November 2010 to December2010. Samples for analysis were collected in sterilized bottles (plastic with acid washed).pH –systronic pH meter Type 361.The total hardness of the water samples were determined by complexometric titration with EDTA using eriochrome black-T as an indicator. Chloride-Argentometric titration Sodium and potassium - flame photometer (128) technique. .

Results and Discussion

The pH required for the optimum growth of plant is 5.4 to 7.0 leaf chlorosis, reduced root growth and decay, stunted shoot growth. Poor flower development are seen in plant/crops to high pH .Appearance of these symptoms is due to influence of pH on the solubility of ions such as Iron. Due to reaction with hydroxyl ions at high pH conditions ferrous form (Fe^{2+}) of iron is transformed in ferric form (Fe^{3+}),which is inactive in plant tissues. pH ground water samples were varied from 7.7 to 8.4

Hardness of water is due to presence of calcium ion and magnesium ion .Plants require 150 ppm hardness in water, but samples had hardness range from (90-200) ppm; which disturb the calcium and magnesium ratio in water which should be 3:5 .If calcium is excess it blocks the ability of Plants to uptake magnesium which cause .Magnesium deficiency ,whose sign are yellowish green patch near the base of the leaf between the midrib and the outer –edge; with acute deficiency leaves may become entirely yellow –bronze and eventually drops and if in hard water magnesium is excess ,it will cause calcium deficiency in plants ,whose sing are young leaves are affected first and become small and disorted or chlorotic with irregular margins. Spotting or necrotic areas, bud development is inhibited blossom end root and internal decay may also occur and root may be developed.

Sodium and potassium are termed, as alkali metals sodium is abundant in water, because of its compound are readily soluble. In ground water it is generally found to be >5mg per liter .Ground water pollution by sodium salt is an unavoidable phenomenon caused form the return flow of irrigation and disposal of industrial and urban wastes. Sodium water samples were varied from 23.3 mg/L to 48.2 mg/L **.**

Potassium is involved in maintaining the water status of the plant and the turgor pressure of its cell wall and the opening and closing of the stomata .Potassium is required in the accumulation and translocation of carbohydrates. Plants require 0.26 meq /L .Potassium water samples were varied from 1.8 mg/L to 20 mg/L.

Chloride in the form of chloride ion is one of the major inorganic anions in water and wastewater. The salty tasted produced by chloride concentrations is variable and dependent on the chemical composition of water some water containing 250mg chloride per liter may have a detectable salty taste . The values of chloride ground water samples were varied from 31.9 mg/L to 85.1 mg/L. The chloride is troublesome in irrigation water and harmful for aquatic life.

Parameter	**pH**	**T.H.**	**Ca^{H}**	**Na^{+}**	**K^{+}**	**Cl^{-}**
Point-1	7.7	125	65	29.2	2.7	49.1
Point-2	7.7	90	40	33.1	2.3	63.8
Point-3	8.0	110	55	44.3	1.8	63.1
Point-4	8.1	200	90	48.2	20	74.2
Point-5	7.4	95	35	23.3	3.1	31.9
Point-6	8.4	155	75	36.7	2.2	66.4
Point-7	8.1	132	45	44.3	2.2	85.1

All the value are expressed in mg/L except pH, T.H. = Total hardness, Ca^{H} =Calcium Hardness,

Conclusion

On the analysis basis it can be concluded that all the tested ground water samples are within permissible limit and ground water are suitable for Irrigation purpose and Plant uses. Reducing the amount of chemical pollution released into the water, soil and air is the easiest way to prevent harm to plants and citizens take steps such as contacting local recycling centers to dispose of toxic chemicals, and using biological methods such as ladybugs, instead of traditional pesticides, to control pests in the yard or garden.

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