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"Physical Properties of Portable Water – A Case Study"

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Abstract: In most urban areas, pollution is increasing rapidly and the issue of supply of clean water to meet societal needs is very difficult task. A water quality standard is a rule or law comprised of the uses to be made of a water body or segment and the water quality criteria necessary to protect that uses. The concentration of pH, TDS (Total Dissolved Solids), chlorine, conductivity respectively.6.5-8.5mole\liter, 500-2000ppm, 0.5-1mg\l, 200-800µS. The results obtained from the water quality criteria parameter are within the drinking water standard.(IS:10500).The Portable Water Purification System is designed to address the difficulty of accessing clean and safe water, especially for flood disaster victims and this is a challenge to get clean water that free from contaminants such as bacteria and viruses. The aim of this project is to discover whether a portable water filter using human powered is a viable option for producing potable water at 0.5 liter per minute for flood disaster victims. The objectives of this study are to investigate which portable water system is suitable for human powered operation and to design a portable water system for flood disaster management, which capable to provide drinking water at 0.5 Liter Per Minutes (LPM) using human powered.

Keywords: Portable Water, ph Meter, Tds Meter, Chlorine Meter, Conductivity Meter

I. INTRODUCTION

This Project on water treatment focuses on the reasons for treatment, the basic processes associated with treatment, and the application of these processes to surface water, groundwater, and some specialized water treatment applications. The water which is fit for drinking by human beings is called portable water.Are generally at risk of waterborne illness may need to take additional steps to protect themselves against exposure to waterborne pathogens, such as boiling their drinking-water. Safe drinking-water is required for all usual domestic purposes, including drinking, food preparation and personal hygiene. The Guidelines are applicable to packaged water and ice intended for human consumption. However, water of higher quality may be required for some special purposes, such as renal dialysis and cleaning of contact lenses, or for certain purposes in food production and pharmaceutical use. The Guidelines may not be suitable for the protection of aquatic life or for some industries .The Guidelines are intended to support the development and implementation of risk management strategies that will ensure the safety of drinking-water supplies through the control of hazardous constituents of water. These strategies may include national or regional standards developed from the scientific basis provided in the Guidelines. The Guidelines describe reasonable minimum requirements of safe practice to protect the health of consumers and derive numerical "guideline values" for constituents of water or indicators of water quality. When defining mandatory limits, it is preferable to consider the Guidelines in the context of local or national environmental, social, economic and cultural conditions. The Guidelines should also be part of an overall health protection strategy that includes sanitation and other strategies, such as managing food contamination.

The study was conducted to achieve the following objectives:-

1. Basis of planning decentralized water supply system portability; reliability; sustainability; convenience; equity; and consumers preference
2. Reducing risks from bacteria, protozoa, and viruses by disinfection of ground water at risk of containing pathogens To provide guidance for establishing microbiological treatment objectives for drinking water systems drawing from ground water sources
3. Ensuring permanent drinking water security in rural India.
4. All Aanganwadi and schools of village to have access safe drinking water.
5. To increase the efficiency of water use in agriculture.

Parameter kept in mind for drinking water: - Various parameter we have to keep in mind for drinking water are Dissolve solids, Suspended solids, Order, Taste.

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II. METHODOLOGY

The aim of this study is to investigate the efficiency of purification of portable water. The assessment of systems should be reviewed periodically. The system assessment needs to take into consideration the behaviour of selected constituents or groups of constituents that may influence water quality. There are various steps for investigate the efficiency of purification of portable water.

Research design:

This study was conducted to know about the amount of people drinking portable water. As this study shows different steps with the help of which we check whether the water is drinkable or not. In this paper we consider the Chandigarh and kharar in our consideration. And for showing the impact of dirty in our cities.

Nature and sources of data:

This study was conducted mainly on the basis of primary data. Primary data was taken from various sources such as books, magazines, published and unpublished documents, newspaper, magazine and websites related to our study.

Data Collection Techniques:

We know to make the research fruitful and successful data collection technique plays a very important role. The necessary data for this research were collected by using following techniques.

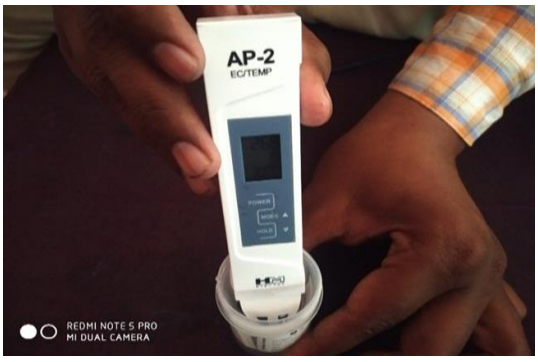
Observation method:

Observation helps the researchers to catch all such activities in front of his eyes. I travelling on foot to cover as much area as possible to capture the real scenario of dirty water. Places like temples, shopping complex, bus station, Hospitals, house, schools, restaurants, small offices.

In this we check the following parameter which we mostly ignore while drinking water. These parameter is very essential for drinking water.

a. **Ph:** pH of solution is taken as –ve logarithm of H2 ions for many practical practices. Drinking water pH lies from 4.4 to 8.5. The pH scale commonly ranges from 0 to 14.

b. **Conductivity:** Conductivity of water is mainly due to presence of ionizable inorganic compounds. Pure water has very low conductance. For example 1µ mho for distilled water. Therefore conductivity measurement indicates amount of ionizable inorganic compounds in water.



c. **Total dissolved solid**: If water is filtered to remove suspended solid, the remaining solid in water indicates total dissolved solid. Dissolved solid may be organic or inorganic compounds. These compounds give variety of effects like hardness, taste, odor etc. depending on nature of dissolved solid. If the dissolved solid in water exceeds 300 mg/liter

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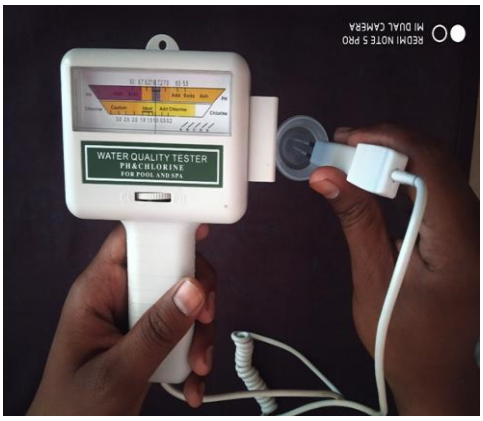
d. **Chlorine:** we use chlorine to kill pathogens which is harmful to our life. Proper amount of chlorine is needed if the chlorine is in excess it boils the water. Range of chlorine varies from 0.5-1.0 mg/l.



For check the quality of water sample and the impurity present in water sample, we collect the different sample from different places. List of that places from where we collect the water sample given below:-

Urban Area Survey

- **KHARAR**
- **KURALI**
- **ROPAR**

Rural Area Survey

- **MAJARI**
- **BAKAPUR**
- **THALIWAL**
- **SHADRA**
- **DHAMAI**
- **CHAURPUR**
- **BALACHAUR**
- **BHAGWANTPURA**
- **KHANPUR**

III. RESULT

Rural Area:-

S.No.	Place	PH moles /litre	TDS ppm	CHLORINE mg/litre	CONDUCTIVITY
0	(limits)	6.5-8.5	100-500	0.5-1.0	200-800 µS
1	Majari	7.3	223	1.5	1067
2	Bakapur	7.8	270	2.75	807
3	Bakapur	7.6	283	2.25	634
4	Bakapur	7.5	268	2.75	606

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5	Thaliwal	7.4	280	2.75	624
6	Thaliwal	7.6	298	2.25	704
7	Shadra	8	317	2.75	800
8	Shadra	8	283	1.25	716
9	Shadra	7.6	302	1.5	688
10	Shadra	7.8	306	2.25	696
11	Dhamai	7.6	162	2.25	363
12	Dhamai	7.8	298	1.9	697
13	Chaurpur	7.8	286	2.25	656
14	Bhagwantpura	6.4	812	1.25	938
15	Khanpur	7.7	258	1.25	567
16	Balachaur	7.8	234	2.25	552

Urban Area:

FUTURE SCOPE

S.No.	Place	PH moles /litre	TDS ppm	CHLORINE mg/litre	CONDUCTIVITTY
0	(limits)	6.5-8.5	500-2000 (ppm)	0.5-1.0	200-800 µS
1	Sunny Enclave Market	7.8	255	1.25	629
2	Sunny Enclave	7.9	227	1	520
3	Kharar market	7.8	220	1.25	493
4	Dhaba kharar	8	243	1.25	557
5	kharar old market	7.6	221	1	530
6	kharar bus stand	8	269	1.5	600
7	Civil Hospital Kharar	7.7	295	1.5	655
8	Nirwana	7.3	329	1.5	768
9	GBM	6.7	19	1.5	51
10	GBM Gracia	6.6	28	1	64
11	Nirwana 2	7.1	298	1.5	702
12	Nature hut	7.6	326	1.5	768
13	Hollywood Enclave	7.8	317	1.5	737
14	Toll tax Kurali	8.1	219	1.5	498
15	Kurali Petrol pump	7.3	29	1.5	72
16	Bajaj Agency Ropar	6.7	351	1.5	826
17	Ropar Bus stand	7.4	242	1.5	564
18	Ropar post office	7.4	378	1.5	878
19	Ropar market	7.6	172	1.65	378

- From the above result we have seen that the pH value of survey area would be acceptable i.e because it is lies between 6.5 to 8.5.
- As we can see that the value of chlorine is more in water hence it would be non-acceptable for future.
- If the Chlorine is increase lot of disease are held in human body like cancer, difficulty in breathing, cough etc.
- As the TDS (total dissolved solids) is less than 500, hence it is ok for drinking purpose.
- From above result it is shown that the conductive value is less than 800 µS except some region. Hence it would be good for more projective areas except some others.

IV. CONCLUSION

The water sample is also collected from rural areas namely- Majari, Bakapur, Thaliwal, Shadra, Dhamai, Chaurpur, Bhagwantpura, Khanpur, Balachaur.

The water sample is also collected from urban areas namely Kharar, Sunny Enclave market, Sunny Enclave ,Kharar market, Dhaba kharar, kharar old market, kharar bus stand, Civil Hospital Kharar, Nirvana, GBM, GBM Garcia,

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Nirvana 2,Nature hut, Hollywood Enclave, Toll tax Kurali, Kurali Patrol pump, Bajaj Agency Ropar, Ropar Bus stand, Ropar post office, Ropar market.

The pH value of water sample collected from rural area is found between 6.4 to 8.0 and from urban area is found between 6.6 to 8.1. The average pH value from rural area is 7.6 and urban area is 7.4. The value found in rural area is more than pH value of water sample collected from urban area. The pH value of water sample should be ranges, from 6.5 to 8.5 which is permissible limit.
The Chlorine value of water sample collected from rural area is found average value 1.5 to 2.75 and from urban area is found average value 1 to 1.65. The value found in rural area is more than Chlorine value of water sample collected from urban area. The Chlorine value of water sample should be ranges from 0.5-1.0 which is permissible limit.
The TDS value of water sample collected from rural area is found between 162 to 812 and from urban area is found between 19 to 378. The average TDS value from rural area is 305 and urban area is 233. The value found in rural area is more than TDS value of water sample collected from and urban area. The TDS value of water sample should be ranges from 500-2000 ppm, which is permissible limit.
The Conductivity value of water sample collected from rural area is found between 552 to 1067 and from urban area is found between51 to 878. The average Conductivity value from area is and rural area is 695 and urban area is 541. The value found in rural area is more than Conductivity value of water sample collected from urban area. The Conductivity value of water sample should be ranges, from 200-800 µS which is permissible limit.

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Urban Area:-

S.No.	Place	PH moles /litre	TDS ppm	CHLORINE mg/litre	CONDUCTIVITTY
0	(limits)	6.5-8.5	500-2000	0.5-1.0	200-800 µS
1	Sunny Enclave Market	7.8	255	1.0-1.5	629
2	Sunny Enclave	7.9	227	0.5-1.5	520
3	Kharar market	7.8	220	1.0-1.5	493
4	Dhaba kharar	8	243	1.0-1.5	557
5	kharar old market	7.6	221	0.5-1.0	530
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18	Ropar post office	7.4	378	1.0-1.5	878
19	Ropar market	7.6	172	1.5-1.8	378