Available online at **www.joac.info**

ISSN: 2278-1862

Journal of Applicable Chemistry, 2012, 1 (2):212-217

(International Peer Reviewed Journal)

Physio-Chemical Analysis and Management of Old Water Bodies of Jodhpur Town. "A Survey and Classification of Old Wells and Ponds"

Dr. Deepshikha Sharma

Associate Professor, Department of Engineering Chemistry, Jodhpur Institute of Engineering and Technology, Jodhpur.

E-mail: **d18shikha@rediffmail.com, deepshikha.sharma@jietjodhpur.com**

ABSTRACT

In the present work six water resources from different areas of Jodhpur city were carefully selected and studied. On the basis of their physical and chemical parameters, these water resources were classified into three categories-Mild contaminated water resources - which required only physical (filtration) process to remove insoluble impurities before using for domestic purposes, contaminated water resources, these resources required physical and chemical treatment processes to remove insoluble and soluble impurities before using for domestic purposes and highly contaminated water resources. Treatment process for water from highly contaminated water resources are not economically viable so water from these resources can be used for pressure washing purpose etc. after removing insoluble impurities by physical methods. The present study reports the maximum utilization of natural water resources of Jodhpur city in different fields.

Keywords: Water quality parameters, contaminated water resources, physical and chemical treatment processes, pressure washing.

INTRODUCTION

The need of proper management and conservation of water resources is essential to avoid future water problems.Due to rapid increase in population, industrialisation and human activities,

deterioration in water quality is observing now a days. The lakes, wells and bawaries in city which were constructed for meeting the drinking water supply are being used as dumping places for waste and waste water. The old civic discipline to avoid the contamination has now disappeared.

MATERIALS AND METHODS

The selection criteria of water resources in the present study are based on their environment and usefulness to fulfill the daily needs of Jodhpur city people. The following water bodies are selected for study.

1. Kailana lake- A storage and settling tank of Himalayan water coming through "Indira Gandhi Nagar"and its water is distributed in Jodhpur by water works.
2. Jai bera and Navchowkiyon ka bera-Water sources, using by local people to fulfill their daily needs.
3. Ranisar and Padamsar- Artificial ponds situated in city area of Jodhpur.
4. Janana Bawari, Umaid Garden and Nageshrwar Temple Nadi ,Fort Road- using as dumping places for waste and waste water.

The water samples collected for the study and numbers are given in Table 1. The physical parameters determined are presented in Table 2 and the Chemical parameters, alkalinity(Alk M),total hardness (TH), calcium hardness (CaH), magnesium hardness (MgH), bicarbonate (HCO_3^-), chloride, nitrate, fluoride and total dissolved solids (TDS) are tabulated in Table 3. The standard methods are followed [1,2,4-6].

Table-1Samples- Codes

S.No.	Samples	Coding	S.No.	Samples	Coding
1.	Jai bera	S-1	5.	Ranisar	S-5
2.	Navchowkiyon ka bera	S-2	6.	Janana Bawri,Umaid Garden	S-6
3.	Kailana	S-3	7.	Nageshwar Temple,Fort Rd.	S-7
4.	Padamsar	S-4			

Table-2.Physical Parameters of samples:

Samples→ Parameters ↓	S-1(ppm)	S-2(ppm)	S-3(ppm)	S-4(ppm)	S-5(ppm)	S-6(ppm)	S-7(ppm)
pH	6.9	8.2	8.8	7.0	7.6	7.2	7.5
Turbidity	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.
Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable

Table-3 Chemical Parameters of samples:

Samples→ Parameters ↓	WHO Desirable limit	WHO Permissible limit	S-1 (ppm)	S-2 (ppm)	S-3 (ppm)	S-4 (ppm)	S-5 (ppm)	S-6 (ppm)	S-7 (ppm)
ALK(M)	200	600	270	180	120	310	530	540	470
TH	300	600	220	160	130	200	300	1020	430
CaH	75	200	210	100	100	100	150	500	210
MgH	30	100	10	60	30	100	150	520	220
HCO_3^-	200	0	220	160	120	200	300	540	430
$NonHCO_3^-$	100	0	0	0	10	0	130	480	0
Cl^-	250	1000	90	70	30	220	130	830	220
NO_3^-	45	45	19	23	150	08	30	450	36
F^-	1.0	1.5	0.2	0.15	0.3	0.5	0.6	1.4	0.5
TDS	500	2000	343	270	184	620	877	3445	640
Total	**1701**	**4546.5**	**1382.2**	**1023.15**	**874.3**	**1758.5**	**2597.6**	**8326.4**	**2656.5**

Comparative study of all chemical parameters determined are depicted in Figures 1- 4.

Fig.1 Compartive study of ALK,TH,CaH & MgH

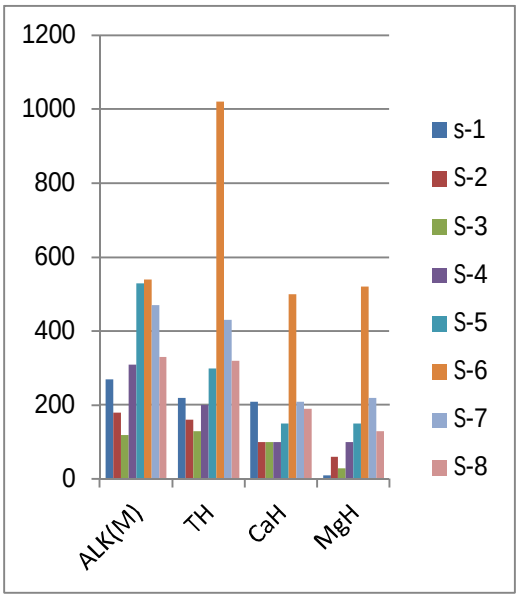


Fig. 2 Comparative study of HCO_3,$nonHCO_3$,Cl & NO_3

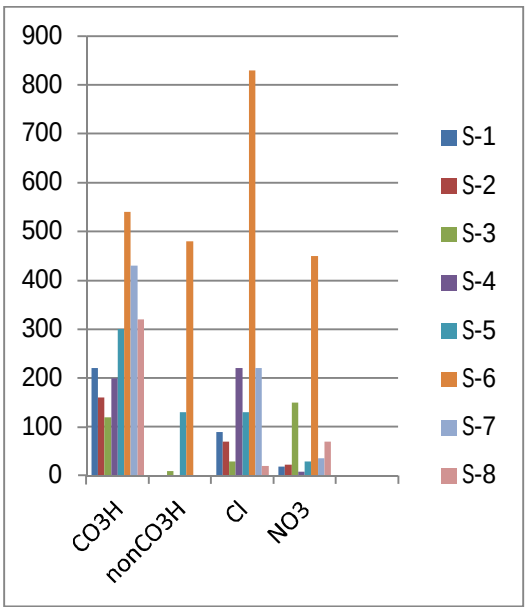


Fig. 3 Comparative study of Fluoride

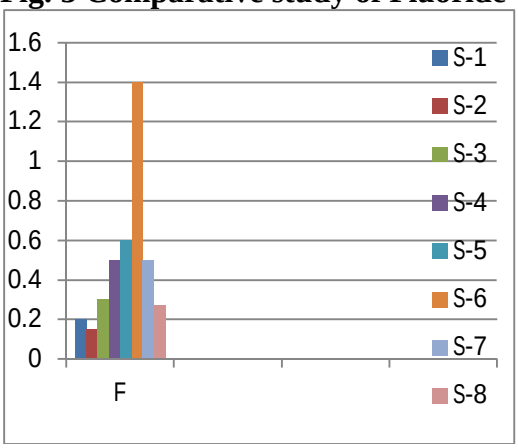
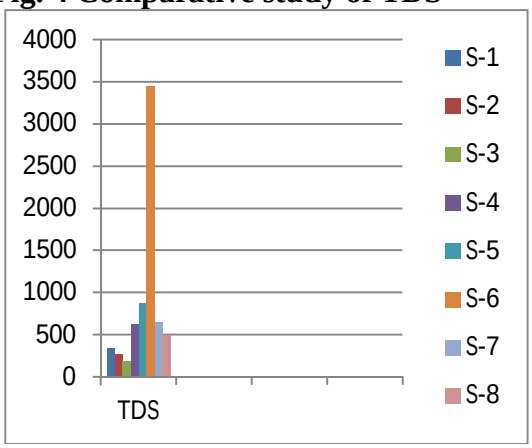


Fig. 4 Comparative study of TDS



RESULTS AND DISCUSSION

Physical parameters of all seven water samples are quite satisfactory. Chemical parameters in blue colour in figures are above desirable limit and in red colour are above permissible limit declared by World Health Organisation [3]and are alarming values. Of the samples, Samples S-1,S-2 and S-3 are found least or mild contaminated. Out of these three samples S-3 is found least contaminated. In S-3 CaH value is above desirable limit. The World Health Organization says that "There does not appear to be any convincing evidence that water hardness causes adverse health effects in humans" .Hard water contains lots of calcium which is good for strong bones and healthy teeth. Also hard water can prevent heart disease. This water is not fit for washing purpose. In S-3 nitrate level is very high. High nitrate level is usually due to human activities. Septic tanks can cause bacterial and nitrate pollution. Nitrates cause a health threat in very young infants called “blue baby” syndrome. This condition disrupts oxygen flow in the blood. So it is not fit for drinking purpose required treatment before use. Samples S-4,S-5 and S-7 are contaminated water and Sample S-6 is highly contaminated water. Fluoride content in all the samples is within permissible limit.

Mild contaminated water from Jai bera contains high Ca hardness. People can use this for domestic purposes. For rinsing and washing purpose because with hard water, it is easier to rinse off soap. The chemicals in this hard water make it tasty. These minerals are useful for building and maintaining strong teeth and bones. This water reduces the chances that lead from pipes will enter in drinking supply. This is because of the water's higher pH. Calcium and magnesium are vital minerals needed for good health.

Water from Navchowkiyon ka bera contains mild contamination. After applying simple physical methods like coagulation, sedimentation and filtration for removal of impurities people can use it for drinking purpose.

Water from Kailana lake contains mild contamination and very high nitrate level. So-do not give this water to infants less than 6 months of age and avoid drinking this water on a daily basis during pregnancy. Do not attempt to remove the nitrate by boiling the water. This will only concentrate the nitrate making levels even higher. It requires chemical treatment methods to be removed.

Water from Padamsar and Ranisar can be used by cottage industries and for domestic purposes after treatment by means of ultra-sound technology.The open ponds and baories are contaminated by the unrestricted and indiscriminate pumping of solid and liquid waste dumping.

Water from Umaid Garden Bawari or Janana park and Nageshrwar Mahadev Nadi, Temple Fort Road are highly contaminated and can never be used for any domestic or industrial purposes.Water from these sources should be utilized by- Railways, Parks and Public parks and for development of sewage farms, which require water in large quantity.Water from these sources can be used for pressure washing purpose after removing insoluble impurities by physical methods.

APPLICATIONS

The results are applicable to assess the quality of water when contaminated.

CONCLUSION

Mild contaminated water from Jai bera contains high Ca hardness. People can use this for domestic purposes.. The chemicals in this hard water make it tasty. This water reduces the chances that lead from pipes will enter in drinking supply which is because of the water's higher pH..

Water from Navchowkiyon ka bera contains mild contamination. After applying simple physical methods like coagulation, sedimentation and filtration for removal of impurities people can use it for drinking purpose.

Mild contaminated water from Kailana lake contains very high nitrate level. To remove the nitrate, boiling method is not suitable since it will concentrate the nitrate levels even higher. It requires chemical treatment methods for removal.

Water from Padamsar and Ranisar can be used by cottage industries and for domestic purposes after treatment by means of ultra-sound technology.The contamination is due to unrestricted and indiscriminate pumping of solid and liquid waste dumping.

Water from Umaid Garden Bawari or Janana park and Nageshrwar Mahadev Nadi, Temple Fort Road are highly contaminated and can never be used for any domestic or industrial purposes.

REFERENCES

[1] Theroux/Eldridge/Mallmann (**2006**), "Laboratory Manual of Chemical and Bacterial Analysis of water and sewage" AGROBIOS (India).

[2] Sunita Tatan (**2008**) , "Experiments in Applied Chemistry" S.K. Kataria & Sons, Publishers of Engineering & Computer Books, Delhi.

[3] World Health Organization Hardness in Drinking-Water, **2003**

[4] National Institute of Public Health; Health Significance of Drinking Water Calcium and Magnesium; Frantisek Kozisek, M.D.; **2003**

[5] Bala Krishnmoorthy, second edition, October (**2009**) , "Environmental Management Test and cases", PHI Learning Private Limited.

[6] Soli J Arceivala, Shyam R Asolekar, Third Edition (**2009**) "Waste Water Treatment for Pollution Control and Reuse", Tata MC Grow Hill Education Private Limited, New Delhi.