

Seasonal Variation in the Quality of Canal Water in North-West Rajasthan Command Area

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Abstract

In order to study the seasonal variation in the quality of different canal water, the water samples during Summer, Monsoon and winter season at different location are analyzed for different quality parameters like PH, EC, Ca, Mg, Na Content and microelement composition canal water of Gang, Bhakara, Indira Gandhi canals were found suitable for both irrigation and drinking purpose. The PH of Water collected from different Canals during summer monsoon and winter season did not show much variation and the values ranged between 7.1 to 7.3. EC of water collected from different canals during different seasons ranged between .21 to .35. As regards to Cationic composition the calcium content in water collected from different canals during different seasons was higher than magnesium content. Potassium Concentration was very low in water collected from different canals during different seasons. Sodium was the next dominating ion to calcium in all canals water irrespective of the season. Among anions chloride was the major dominating ion followed by bicarbonate and sulphate. SAR value in different canals was found between range 1.00 to 1.25. Trace elements Cu, Fe, Mn and Zn were present in Canal water but their concentration was low. Fluoride content showing no appreciable difference during different seasons and source of water.

Keywords: PH of Water, EC of Water, Calcium Concentration, Potassium Concentration, Trace Elements, Monsoon Season, Summer Season, Winter Season

Introduction

In order to study the seasonal variation in the quality of canal water, the water samples from Gang, Bhakra and Indira Gandhi canal, at the location of Sadhuwali, Sangaria and Birdhwal head, respectively were collected during Monsoon (July-Aug), Winter (Dec.-Jan.) and Summer (May-June) season of the year and analyzed for different quality parameters.

Data given in table 1 revealed that the pH of water collected from different canals during different seasons did not show much variation and the values ranged between 7.1 to 7.3 with a total mean of 7.19.

EC of water collected from Gang, Bhakra and Indira Gandhi canal, during different seasons ranged between 0.21 to 0.31, 0.22 to 0.35 and 0.21 to 0.29 dSm⁻¹, respectively and the values were slightly higher in monsoon season. The mean EC value for Gang, Bhakra and Indira Gandhi canal water was 0.26, 0.27 and 0.25 dSm⁻¹, respectively.

As regards to cationic composition, the calcium content in the water collected from different canals during different seasons was higher than magnesium content. It varied between 1.15 to 1.30, 1.20 to 1.35 and 1.21 to 1.36 meL⁻¹ in the Gang, Bhakra and Indira Gandhi canal water, respectively during different seasons. Potassium concentration was very low which varied from 0.02 to 0.05 meL⁻¹. Sodium was the next dominating ion to Ca in all the canal waters irrespective of the season. It was found between 1.00 to 1.10, 1.05 to 1.20 and 1.05 to 1.20

meL⁻¹ in the Gang, Bhakra and Indira Gandhi canal water, respectively.

Among anions, chloride was the major dominating ion followed by bicarbonate and sulphate. It varied between 1.20 to 2.00 meL⁻¹ in Gang, 1.50 to 2.10 meL⁻¹ in Bhakra and 1.30 to 1.90 meL⁻¹ in Indira Gandhi canal during different season. Carbonate was absent whereas, bicarbonate content during different seasons varied between 0.75 to 0.89, 0.60 to 1.0 and 0.65 to 1.0 meL⁻¹ in the water of Gang, Bhakra and Indira Gandhi canal, respectively. The Sulphate concentration was found between 0.21 to 0.35 meL⁻¹ during seasons in different canal waters.

SAR value in Gang canal water was found between 1.00 to 1.14 during different seasons. Whereas values for Bhakra and Indira Gandhi canal water was between 1.06 to 1.20 and 1.13 to 1.25, respectively. Since bicarbonate concentration as compared to Ca⁺² + Mg⁺² was lower hence, canal water had no RSC.

Trace element viz, Cu, Fe, Mn and Zn were present in canal waters but their concentration was low (table-2). Fluoride content was found between 0.02 to 0.40 mgL⁻¹ showing no appreciable difference during different seasons and source of water. The Cu content in Gang, Bhakra and Indira Gandhi canal water during different seasons varied between 0.12 to 0.13, 0.11 to 0.17 and 0.11 to 0.16 mgL⁻¹ respectively. Whereas respective, Fe content was found between 0.15 to 0.17, 0.17 to 0.18 and 0.11 to 0.16 mgL⁻¹. As regards Mn and Zn, their concentration ranged between 0.02 to 0.03 and 0.11

to 0.18 mgL⁻¹, respectively during different season in Gang canal water, whereas they were present between 0.01 to 0.03 and 0.08 to 0.16 in Bhakra canal and 0.03 to 0.04 and 10.09 to

0.15 in Indira Gandhi canal during different seasons, respectively.

Table 1: Chemical Characteristics of canal water collected

Parameters	Gang Canal				Bhakra Canal				Indira Gandhi Canal				Total Mean
	Monsoon	Winter	Summer	Mean	Monsoon	Winter	Summer	Mean	Monsoon	Winter	Summer	Mean	
pH	7.15	7.10	7.20	7.15	7.15	7.30	7.25	7.23	7.25	7.20	7.10	7.18	7.19
EC (dSm-1)	0.31	0.21	0.25	0.25	0.35	0.22	0.25	0.27	0.29	0.21	0.25	0.25	0.256
Ca (meL-1)	1.30	1.25	1.15	1.23	1.35	1.20	1.27	1.273	1.36	1.21	1.26	1.27	1.25
Mg+2 (meL-1)	0.80	0.75	0.70	0.75	1.00	0.80	0.70	0.83	0.90	0.65	0.70	0.75	0.77
Na +1(meL-1)	1.10	1.00	1.10	1.06	1.20	1.20	1.05	1.15	1.20	1.05	1.00	1.08	0.09
K+1 (meL-1)	0.04	0.04	0.05	0.043	0.05	0.03	0.04	0.04	0.03	0.02	0.02	0.023	0.03
Co3-2 (meL-1)													
HCO3-1(meL-1)	0.80	0.75	0.89	0.81	1.00	0.60	0.73	0.73	0.70	0.65	1.00	0.78	0.77
C-1(meL-1)	2.00	1.20	1.30	1.5	2.10	1.50	1.73	1.73	1.90	1.30	1.40	1.53	1.58
SO4-2(meL-1)	0.25	0.30	0.31	0.286	0.30	0.21	0.27	0.27	0.3	0.3	0.35	0.31	0.288
SAR	1.07	1.00	1.14	1.07	1.11	1.20	1.12	1.12	1.13	1.25	1.15	1.71	1.31
RSC(meL-1)													

Table 2: Micro element composition (mgL-1) of canal water

Parameters	Gang Canal				Bhakra Canal				Indira Gandhi Canal				Total Mean
	Monsoon	Winter	Summer	Mean	Monsoon	Winter	Summer	Mean	Monsoon	Winter	Summer	Mean	
Cu	0.13	0.12	0.12	0.12	0.11	0.14	0.17	0.14	0.14	0.16	0.11	0.136	0.132
Fe	0.16	0.17	0.15	0.16	0.18	0.17	0.18	0.17	0.11	0.13	0.16	0.13	0.153
Mn	0.03	0.03	0.02	0.02	0.01	0.03	0.02	0.02	0.03	0.03	0.04	0.03	0.023
Zn	0.18	0.18	0.11	0.156	0.14	0.16	0.08	0.126	0.15	0.09	0.11	0.116	0.132
F	0.3	0.2	0.2	0.23	0.40	0.35	0.30	0.35	0.30	0.25	0.29	0.28	0.286

Conclusion

Canal water of Gang, Bhakra and Indira Gandhi canals were found quit suitable both for irrigation and drinking purposes. They were free from any harmful contamination. Not much difference in the quality of Gang, Bhakra and Indira Gandhi canal waters was recorded. The pH and EC ranged from 7.1 to 7.3 and 0.21 to 0.35 dSm-1, respectively. Fluoride content varied from 0.2 to 0.4 mgL-1 within the season during both the year, which is below the desirable levels (0.6 mgL-1) as low fluoride level below 0.6 mgL-1 are linked with dental carries.

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