

## ASSESSMENT OF SEASONAL VARIATIONS IN CALCIUM, MAGNESIUM AND HARDNESS OF LENDI RIVER, DISTRICT NANDED, MAHARASHTRA, INDIA

B. D. WAGHMARE<sup>1</sup> AND A. N. KULKARNI<sup>b</sup>

<sup>ab</sup>Department of Fishery Science, N.E.S. Science College, Nanded, M.S., India

### ABSTRACT

Lendi River is one of the tributary of river Manar, originates at Malkapur dist. Latur and joins to river Manar at Degloor, dist. Nanded. Water of this Semi-perennial river is used to perform various activities such as industrial, irrigation, fisheries and human activities. Elements like Calcium, Magnesium are very important in aquatic ecosystem. They act as micronutrients for the growth and development of phytoplankton. Hardness of water is also important in potable water. Hence content of calcium, magnesium and hardness were estimated from July 2011 to June 2012. Average estimated value of Calcium, Magnesium and Hardness at Station No.-I is 33.7 mg/l, 15.9 mg/l, 182mg/l and Station No.-II is 35.1 mg/l, 17.5 mg/l and 184 mg/l respectively. Details of estimation of Calcium, Magnesium and Hardness are discussed in the text.

**KEYWORDS :** Seasonal Variations, Calcium, Magnesium and Hardness, River Lendi

Usually rivers are fresh and natural water resources, flowing towards an ocean, a lake or another river and are the one of the part of the hydrological cycle. Water within a river is generally collected from precipitation through drainage basin from surface runoff and other sources such as ground water. The chemistry of river water is a complex and it depends upon inputs from the atmosphere, geology through which it travels and the man's activities. It has a large impact on the ecology of both plants and animals including human being.

Lendi River flows in two district of Maharashtra, Latur and Nanded. It originates at village Malkapur in Taluka Udgir and Latur district. The total length of Lendi River from its origin to drain is 125 km. In Nanded District River Lendi starts near village Bamni in Mukhed taluka, and it covers total length in Nanded district is about 65 km. and a major project is under construction at Gonegao. In its course it receives a variety of domestic and agricultural waste which pollutes the river.

Researchers have studied various aspects of river such as (Saksena et al., 2008) analysed water quality and pollution status of Chambal River. (Garg et al., 2010) studied seasonal variation in water quality and major threats. Determined hardness of water. (Muniyan et al., 2011; Gari et al., 2011; Krishna et al., 2012 and Shetty et al. 2013) studied seasonal variations in physico-chemical parameters of river water. (Annalakshmi and Amsath, 2012) worked on nutrient status of Arasalar River. Reports on study of Calcium, Magnesium and Hardness content of

river Lendi are not available hence present work was under taken to study Calcium, Magnesium and Hardness content of River Lendi.

### MATERIALS AND METHODS

Water sample were collected in polythene bottles at morning hours from two stations (Mukramabad S1 & Bahegao Road S2) at regular interval of one month from July 2011 to June 2012, for the estimation of Calcium, Magnesium and Hardness brought to the laboratory. Calcium was analysed by using titrimetric method with EDTA titrate and indicator Murexide. Hardness was analysed by EDTA titrimetric method and indicator Erichrome Black-T. Magnesium was estimated by using method suggested by (Trivedy and Goel, 1984).

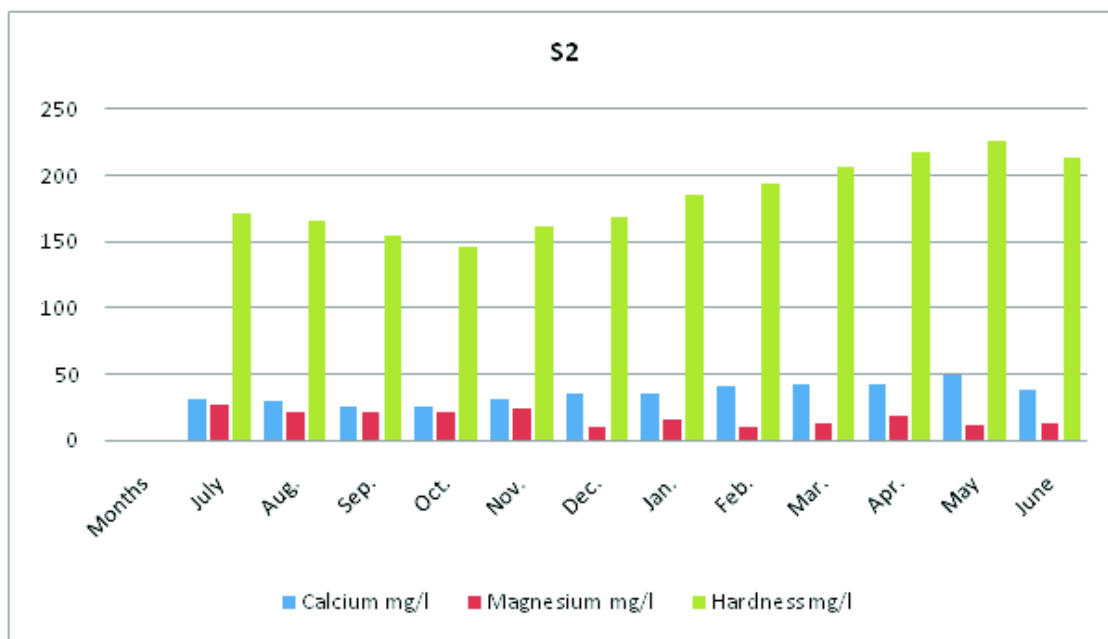
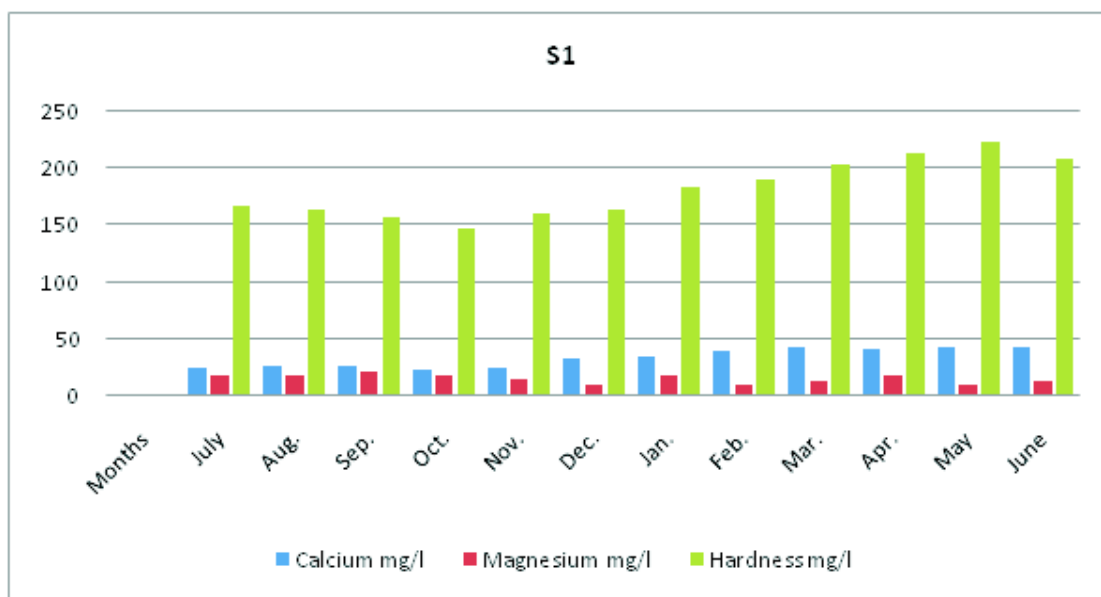
### RESULTS AND DISCUSSION

Calcium is an important micronutrient in an aquatic environment and this environment is affected by adsorption of calcium ion on the metallic oxides. In addition to this it has effect of microorganisms, which play an important role in Calcium exchange between sediments and overlying water (Annalakshmi and Amsath, 2012). Calcium content of water samples ranged between 22.9 mg/L to 49.2 mg/L. The minimum value of calcium in the river was 22.9 mg/L at S1 in the month of October and Maximum was 49.2 mg/L at S2 in the month of May. The average calcium concentration in the study area varied from 33.7 mg/L and 35.1 mg/L for S1 and S2 respectively. (Table, 1 & Figure, 1)

<sup>1</sup>Corresponding author

**Table 1 : Shows Range value, Mean value and Standard Deviation of Calcium, Magnesium & Hardness**

Water quality parameters (Mg/L)	Range Value of S1 & S2		Mean Value & Standard Deviation	
	Min.	Max.	S1	S2
Calcium	22.9	49.2	33.7±7.87	35.1±7.23
Magnesium	9.6	26.4	15.9±3.62	17.5±5.49
Hardness	146	226	182±24.28	184±25.75



**Figure 1 : Shows Seasonal Variations of Calcium, Magnesium and Hardness of Lendi River from July 2011 to June 2012**

The Magnesium content was ranging from 9.6 mg/L to 26.4 mg/L (Table No.1 & Figure No.1). The minimum Magnesium (9.6 mg/L) was observed in Dec. & May at S1 and maximum (26.4 mg/L) was observed in July at S2. The average value of Magnesium content was 15.9 mg/L & 17.5 mg/L at station No I & II respectively. Magnesium is essential for chlorophyll and acts as a limiting factor for the growth of phytoplankton. Therefore, depletion of magnesium reduces the phytoplankton population (Garg et al.,2010). Magnesium is required as an essential nutrient for aquatic plants. Concentration of magnesium up to 30 ppm is recommended for drinking waters (Khaiwal et al., 2003).

Similarly the Hardness of water was ranging from 146 mg/L to 226 mg/L. The minimum hardness (146 mg/L) was observed in Oct. at S2 and maximum (226 mg/L) was observed in May at S2. Water with 50 ppm of Hardness is considered as a soft water. Hardness of 300 ppm is however permissible for domestic and agriculture use. An upper limit of 150 ppm is usually recommended (Khaiwal et al., 2003). Hardness of water is also depends upon ions of Calcium and Magnesium in water. From fisheries point of view hard waters are more productive than the soft. (Saksena et al., 2008). The Calcium, Magnesium and Hardness concentration (Table,1 and Figure,1) in the present study was found to be well within the permissible limits as suggested by WHO.

The study reveals that the water in Lendi River shows seasonal variations in Calcium, Magnesium and Hardness which may be attributed to the local climatic conditions and water exchange mechanism.

#### ACKNOWLEDGEMENT

The authors are thankful to Principal, N.E.S. Science College, Nanded (M.S.) for providing laboratory & library facilities. The first author is thankful to UGC for financial support and encouragement through awarding Maulana Azad National Fellowship for Minority Candidates (2009).

#### REFERENCES

- Annalakshmi G. and Amsath A., 2012. Nutrient status of Arasalar River, A Tributary of Cauvery River at Tanjore District of Tamil Nadu, India. *Int. Jour. Of Plant, Animal Environmental Sciences*, **2**(2): 214-222.
- Garg R.K., Rao R.J., Uchchariya D., Shukla G. and Saksena D.N. ,2010. Seasonal variations in water quality and major threats to Ramsagar reservoir, India. *Africa Journal of Env. Sci. & Tech.*, **4**(2): 061-076.
- Garizi A. Zare, Sheikh U., and Sadoddin A., 2011. Assessment of seasonal variations of chemical characteristics in surface water using multivariate statistical methods. *Int. Jour. Env. Sci. Tech.*, **8**(3): 581-592.
- Khaiwal Ravindra, Ameena, Meenakshi, Monica, Rani and Kaushik A., 2003. Seasonal variations in physico-chemical characteristic of River Yamuna in Hariyana and its ecological best-designated use. *Journal of Env. Monitoring*, **5**:419-426.
- Krishna, Hosmani Shankar and Jayashankar M., 2012. Physico-chemical and Bacteriological parameters of Kaveri River at Talakaveri region- A Comparative Study. *Abhinav Journal of Research in Sci. & Tech.*, **1**(6): 1-15.
- Muniyan M. And Ambedkar G., 2011. Seasonal variations in physicochemical parameters of water collected from Kedilam River, at visor Cuddalore District, Tamil Nadu, India. *Int. J. Env. Bio.*, **1**(6): 15-18.
- Shetty Sowmyashree, Tharavathy N.C., Lobo Reema Orison and Shafakatullah Nannu., 2013. Seasonal variation in the physico-chemical characteristic along the upstream of Tungabhadra River, Western Ghats, India. *Int. J. Plant, Ani and Env. Sci.*, **3**(1): 242-246.
- Saksena D.N., Garg R.K. and Rao R.J., 2008. Water quality and pollution status of Chambal River in National Chambal sanctuary, Madhya Pradesh. *J. Env. Bio.*, **29**(5): 701-710.
- Trivedy R.K. and Goel P.K.,1984. *Chemical and Biological Methods for Water Pollution Studies*, 73-76, India. Karad Publication.