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The impact of agriculture on ground water quality of Canal area, Bikaner

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ABSTRACT

This paper is aimed at the assesment of nitrate in ground water by various pollution sources such as fertilizer, pesticide and insceticide. 16 water samples were obtained from tube well and hand pumps situtaed at cultivated farms and near villages from Khajuwala (located at canal project area in Bikaner distric of Rajastan state). Water samples were collected in July, Oct (2005) and Jan (2006) and were analyzed for nitrate. Some samples were found to contain nitrate above the permissible limit prescribed by WHO, IS and other organizations. Nitrate concentration in samples of well water situated in cultivated area is found higher than in village area. It was also found to be more in handpump samples than in tube well water sample.

This result indicates that nitrate concentration has positive correlation with the use of fertilizers & negative correlation with depth of water table. Nitrate concentration was found to enhance after the monsoon period in the month of Oct (2005), which proves the phenomenon of agricultural leaching of nitrate.

Key words: Ground water quality, nitrate, agricultural leaching.

INTRODUCITON

Water is one of the foremost essential components of all living ofranisms[1]. Availability of good quality water for drinking purpose is very essential for healthy human society[2]. One time, surface water was the major source to fulfill water requirement but now a days, both sufrace water and ground water are used for drinking, agriculutre, industrial and domestic purpose.

Ground water is sustainable source of fresh water, and as vital source for drinking and domestic use, it has to meet all physical and chemical parameters for safe use. Although most of the ground water sources are still supposed to be safe but once, source is contaminated, then practically it would be very difficult to clean that up.

Gound water is liable to contamination through different sources like different land compositiond, different rain conditions, use of different chemical fertilizers, pesticides & insecticies and different depths of bore wells. The present paper has been carried out to evaluate the physico-chemical characteristics in reference to nitrate of ground water of Khajuwla area of Bikaner district.

Description of studly area

Khajuwala is located in Bikaner District of Rajasthan state. The position of Khajuwala in Inira Gandhi Canal Project are is at 8 K J D. This area is surrounded by main canal and Distributary's canal. There is huge farming with maximum utilization fertilizers pesticides & insectidies. Area is having large number of tube wells and hand pumps 16 tube well and hand pump water samples were collected form this region from area, situated in 8-KJD, 13 KJD, 15 KJD, 19-KYD, 20-KYD, 32-head, Madho diggi etc.

EXPERIMENTAL

In the present work, 16 ground water samples were collected form the different stations of Khajuwala and surroundign area. The samples

were collected during the month of July, Oct(2005) & Jan (2006). Samples were collected in sterilized bottles using standard method[3]. Spectorphotometric method has been used to determine nitrate in water samples[4-5].

Water analysis result

The analytical results of ground water samples from Khajuwala are shown in Table - 1 and Fig -1.

RESULTS AND DISCUSSION

Permissible limit of nitrate for drinking water are given in Table - 2.

It was found for sample No 2, 4, 6, 7,10 & 11 that nitrate concentration is greater in comparison to sample No 3,5,8,9 & 12. Concentration of nitrate has been found to increase after rainy season in sample No 1,2 4,6,7,10 & 11 but now much variation was found for sample No 3,5,8,9 & 12 in this period.

The Sample No 1,2,4,6,7, 10,11,13, 14,15 & 16 are hand pump water samples while sample No 3,5,8,9&12 are tube well water samples. This indicates that leaching of nitrate has occured, which in rainy season. Hand pump water samples were found more contaminated thant tube well water samples. The reason for this may be assigned to variation in depth of wells.

Table -1: Quarterly variation of concentration of nitrate in different ground water samples

Months	Water samples															
	1**	2**	3*	4**	5*	6**	7**	8*	9*	10**	11**	12*	13**	14**	15**	16**
Jul-05	31	138	2.4	125	12	142	50	47	14	98	110	22	31	40	19	35
Oct-05	36	142	2.5	129	13	145	59	49	16	105	108	26	35	44	20	37
Jan-06	37	140	2.5	127	11	144	60	48	14	105	119	24	36	44	21	35

** tube-well water sample* *** hand-pump water sample*

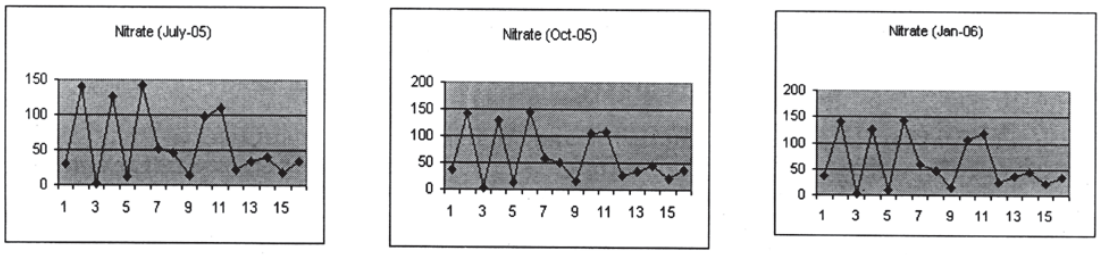

Fig. -1: Graphical representation of concentration of nitrate in different ground water samples

Table -2

Instituiton	Desirable limit	Maximum permissible limit
WHO	45	-
BIS(IS-10500-92)	45	100
ICMR (Indian council of medical research	20	100
Union Health Ministry followed by APHED	45	45 (causes for rejection)

Sample no 13, 14 , 15 & 16 are found to be far from cultivated area *i.e.* present in villages wher fertilizers and pesticides are not used, so nitrate concentration did not increase appreciably. Nitrate can cause diease in babies called methaemoglobinaemia, which reduces the amount of oxygen in the blood of babies. In extreme cases this causes blue baby syndrome. Nitrate conentration can reduces by using bio-fertilizers, in place of chemical fertilizers in cultivated area, for which proper marketing and proper education is necessary and it will be a great step towards eco-friendly agriculture.

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REFERENCES

1. Paliwali, B.S. and Vyas, A. Advances in Resources Management of Indian Desert, Madhu Publication.
2. Mula, M B and Patil, P K *Indian J. Env. Prot* **21:** 55, (2001).
3. APHA, Standard method for examination of water and waste water including bottom sediment and sludge, 19thed., New York (1989).
4. Analysis of Raw, Potable and Waste waters, Departmant of the Enviroment, London, (1972).
5. Vogel, A. I., Textbook of Quantitative Inorganic Analysis, 4th ed. (1978).