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Physicochemical analysis of Mohan Ram Talab of Shahdol (M.P.)

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Abstract
This paper deals with the study of physico-chemical parameters of Mohan Ram Talab in Shahdol district, Madhya Pradesh, India. Monthly changes in physical and chemical parameters such as Water temp, pH, CO_3^{-2}, HCO_3^-, Cl, DO, BOD, COD, O.M., T.H., Ca^{++}, Mg^{++}, SO_4^{-2}, PO_4^{-3}, NO_3^-, NO_2^-, T.S., D.S., S.S., Na^+, K^+ were analyzed for a period of one year from April 2021 to March 2022. According to APHA standard methods. The result of analysis point out the fact that all the parameters are under permissible limits. The result indicates the pond is good and can be used for domestic and irrigation purpose.

Keywords: Physico-chemical analysis, Ground water, Mohan Ram Talab, Monthly changes, APHA

Introductions
Water is one of the most important and inexhaustible compounds of the ecosystem. Every single living organisms form on the earth need water for their survival and growth. As of now only earth is the planet having about 70% water. In any case, because of increased industrialization, human populations, Use of fertilizers in the agriculture and man-made movement it is profoundly polluted with various different harmfull plants (Patil *et al*., 2012) [1]. The nature of water is fundamental worry for humankind since it legitimately connected with human health. Presently a day, the hazard of water borne diseases pandemics despite everything poses a potential threat on the skylines of developed and developing countries. The polluted water is the offender in every single such case. (Kalwale *et al*., 2012) [2]. The generally concealed nature of groundwater can result being developed that is uncontrolled and not incorporated into river basin management, which can result in overexploitation and pollution of groundwater. Indeed, even without considering climate change, groundwater maintainability is a significant test on the grounds that groundwater is a broadly disseminated asset that is affected by local users and pollution (Alley *et al.* 1999; Brekke *et al*., 2009; Begum, 2016, Shukla, Bramhanand and Upadhyay, 2017 and Rana, 2018) [3-7]. Several sources add to the broke down substance of groundwater the significant components released via various sources are used as intermediaries for enduring rates for which the ID of their various inceptions is required (Drever, 2005) [8]. In this way it is essential that the nature of drinking water ought to be checked at regular time interval, in light of the fact that because of utilization of debased drinking water, human population suffered from varied of water borne diseases. It is difficult to understand the biological phenomenon fully because the chemistry of water revels much about the metabolism of the ecosystem and explain the general hydro - biological relationship (Basavaraja Simpi *et al*. 2011) [9]. The accessibility of good quality water is a indispensable feature for preventing diseases and improving quality of life. Natural water contains various kinds of impurities are introduced into aquatic system by different ways, for example, enduring of rocks and draining of soils, disintegration of airborne particles from the environment and from a few human exercises, including mining, processing and the utilization of metal based materials. The expanded utilization of metal-based fertilizer in agriculture revolution of the government could result in continued rise in concentration of metal pollutants in freshwater reservoir due to the water run-off. Likewise faucal pollution of drinking water causes water borne diseases which hassled to the death of millions of people (Adefemi and Awokunmi, 2010) [10].
Temples are centers of worship for Hindus. Hindu temples in Madhya Pradesh and other states of India have in their vicinity certain ponds which are holy and called temple ponds. Mohan Ram Talab is found inside the temples.

Temple management imposes restrictions over misuse of this holy ponds, therefore it remain comparatively clean. Temple devotees use the holy water for washing their limbs, sometimes they make a holy dip into the water, people believe that it can wash all their sins away. Some times this talab is used by people for bathing and even washing cloths. Physicochemical features of one such talab, were undertaken in the present study.

Materials and Methods

One year samples were analyzed from April 2021 to March 2022. The pH was measured by using Elico-pH meter. Total hardness, calcium, magnesium were measured by EDTA titration methods. Total alkalinity was determined by volumetrically by silver nitrate titrimetric methods using potassium chromate as indicator. Fluoride content in water was measured by Shimadzu-Spectrophotometer. The remaining Physico-Chemical analysis was carried out according to APHA (1995) [11] standard methods.

Water sampling

In present investigation the water samples were collected in polythene bottles which were cleaned with acid water, followed by rinsing twice with distilled water. The water samples are chemically analyzed (Karunakaran *et al.* 2009) [12]. The analysis of water was done using procedure of standard methods.

Results and Discussion

Table 1: Physico chemical parameters at Mohan Ram Talab for the year 2021-2022

Para-meters	Months												Avg.
	Apr. 21	May 21	Jun. 21	Jul. 21	Aug. 21	Sept. 21	Oct. 21	Nov. 21	Dec. 21	Jan. 22	Feb. 22	Mar. 22	
Water Temp.	28	30	29	27	24	26	25	23	20	21	18	20	24.25
pH	7.3	8.1	6.5	7.2	8.1	8.0	7.4	7.9	7.6	8.2	7.5	7.2	7.58
CO_3^{-2}	20	16	18	21	18	16	19	24	29	26	30	27	22.00
HCO_3^-	280	286	256	154	190	130	132	156	125	154	167	186	184.67
Cl	28.2	30.6	26.2	25.1	18.3	18.1	15.6	22.4	20.8	21.9	22.4	21.8	22.62
DO	9.5	8.4	8.2	9.8	9.2	9.5	8.9	10.2	10.9	10.8	10.5	10.7	9.72
BOD	2.6	2.8	2.7	2.9	3.2	3.5	3.8	4.1	4.6	2.8	2.9	3.1	3.25
COD	118	122	131	38	25	65	57	18	20	19	212	257	90.17
OM	5.3	4.8	3.6	2.7	2.9	2.1	2.8	3.4	3.7	3.4	3.8	4.2	3.56
TH	102	104	98	97	96	92	100	102	122	126	124	99	105.17
Ca^{++}	36	40	30	18	21	26	20	25	29	28	37	35	28.75
Mg^{++}	23.9	24.8	10.2	11.5	18.9	18.6	27.8	31.2	32.5	31.4	32.9	30.7	24.53
SO_4^{-2}	0.06	0.04	0.06	0.05	0.08	0.05	0.07	0.09	0.04	0.08	0.07	0.05	0.06
PO_4^{-3}	0.15	0.16	0.17	0.06	0.03	0.07	0.08	0.09	0.05	0.11	0.12	0.11	0.10
NO_3^-	0.005	0.007	0.004	0.004	0.006	0.004	0.009	0.008	0.006	0.005	0.006	0.008	0.01
NO_2^-	0.004	0.002	0.01	0.003	0.001	0.005	0.008	0.005	0.006	0.004	0.008	0.006	0.01
TS	598	545	554	560	603	608	614	502	388	365	344	352	502.75
DS	344	295	118	290	156	164	134	233	290	264	300	347	244.58
SS	177	350	228	154	160	235	188	162	169	105	124	112	180.33
Na^+	15.8	16.2	18.7	15.6	12.4	11.9	10.8	13.5	13.7	14.2	15.8	14.3	14.41
K^+	4.2	3.6	3.8	3.4	4.2	4.4	3.6	2.8	3.1	3.1	3.3	3.5	3.58

CO_3^{-2} =Carbonates; HCO_3^-= Bicarbonates; Cl = Chloride, DO = Dissolved oxygen, BOD = Biological Oxygen Demand, COD = Chemical Oxygen Demand, O.M. = Organic matter, T.H.= Total Hardness, Ca^{++}= Calcium, Mg^{++}= Magnesium, SO_4^{-2}= Sulphate, PO_4^{-3}= phosphate, NO_3^-= Nitrate, NO_2^- =Nitrite, T.S. = Total solids, D.S= Dissolved Solid, S.S = Suspended solid, Na^+ = Sodium and K^+ = Potassium.

The result of analysis point out the fact that all the parameters are under permissible limits. The result indicates that Mohan Ram Talab is good and can be used for domestic and irrigation purpose.

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