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Bacteriological investigation of *Kaliasot* dam water of Bhopal city, M.P., India.

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ABSTRACT

It is notable to have an idea of the present and future demands of water for various purposes e.g. irrigational, domestic and industrial related to public health and hygiene. Faecal or bacterial pollution of drinking or irrigational water can introduce a variety of intestinal pathogens e.g. bacteria viruses and some other parasite. In public interest systematic monitoring and bacteriological analysis becomes important to health and hygienic point of view, water of *Kaliasot* dam i.e. used for fishing, bathing and irrigational purposes. MPN should not be more than 10/100 ml for human consumption is recommended by WHO (1978). In this study the coliform is observed in summer up to 1100/100 ml and dropped to minimum of 10/100 ml during monsoon. In general water quality assessment in tropical countries is overlooked. Hence this study has utmost importance and valuable for water management of aquatic eco system.

Key words: *Kaliasot* dam, MPN, Faecal Pollution, Season, Bacterial, Contamination.

INTRODUCTION

The mineral components present in water are directly related to agricultural utilization and values decide the suitability of water for agricultural use. To control the water quality for health and hygienic point of view, the present bacteriological study has been done during 2007-08. The Kaliasot dam based on Kaliasot River i.e. a tributary of river Betwa. Kaliasot dam is situated at Bhopal, Co-ordinates it's latitude 23^0 12"3' N and longitude 77^0 24"29' E. The dam is near Chuna Bhatti village, it irrigates about 10425 h areas annually of Bhopal and Raisen district of M.P. Dam height is 34.25 m, length 1080 m, top width 6.30 m, FRL (Full Reservoir Level) is 505.67 m, and MWL (Maximum Water Level) is 505.67 m, having gross storage capacity of 35.387 m cum; live storage 34.41 m cum, discharging capacity is 1355 cumeces with 13 radial gates of size 6.40 x 4.57 m.

Kaliasot dam is under environmental stress due to siltation, human encroachment, high macrophytic population and sewage input from various resources. The soil inflow from the catchments areas and basis affects the water quality of a reservoir.

Sampling Stations

1. North east of dam near guest house.
2. Near pump house.
3. Near office of Jalbhumi Sarankshan Snsthan.
4. Near Shiv Temple.
5. Near exit gate of Dam.
6. Near Sanskar Valley School.
7. Near Mendara Village.
8. Near Law College and Research Centre.

The most common and wide spread danger associated with drinking water is bacterial contamination by sewage and other organic wastes,

human and animal excrement. Coliforms survive only a few hours or days outside their hosts. Escherichia coli (E.Coli) are excreted by healthy individual are the only organism used as indicator of faecal contamination, Cholera is water borne disease caused by Vibrio-Cholerae.

Salmonella typhi cause typhoid fever, parva viruses causes different viral diseases in human by consumption of polluted water.

A fairly good number of contributors have carried out bacteriological examination pertaining to most probable number (MPN), Notable studies are those of Taylor (1941), Kelly, P. (1960) Clark, J.A (1973), Rai H. and Hill, G. (1978), Iqbal and Kataria (1995, 1997), Kataria (1998 and 2005) and Kataria *et al* (2006).

MATERIAL AND METHODS

Dam water samples collected in 250 ml sterile glass bottles by lowering into dam upto 6" to 8" depth, and after collection of water were hauled up and tied with stopper and samples were immediately taken to laboratory for examination and were inoculated within 1-2 hours in a series of fermentation tubes. 3 tubes for each dilution varying sample medium ratio (10 ml : 10 ml medium, 1 ml sample 10 ml medium and 0.1 ml sample: 10 ml medium lactose broth) medium was used for presumptive test. All these tubes which produced acid and gas in the Durham's fermentation tubes were recorded as the (+) ve tubes that incubated again for 48 hrs. at 355°C Tubes showing gas bubbles were regarded to indicate confirmed (+)ve test as prescribed by APHA (1986).

RESULTS AND DISCUSSION

By determining MPN of coliform bacteria, sanitary quality of water of Kaliasot Dam can be determined. The dam water was found to have significantly higher coliform count. sampling stations 8 registered with higher number of coliforms.

The minimum of 12/100 ml was recorded on 4, while the maximum of 1800/100 ml was observed on some occasions at SS No. 1,4 8th in summer. Bacteriological examinations of Dam water have a significant in pollution study, measures deleterious effects of pollution on human health. The pathogenic bacteria contaminated into water bodies by domestic sewage and other pollutants boating, bathing and immersion of idols and domestic sewage. Bacterial populations are after considered as important indicator of pollution and eutrophication in the aquatic ecosystem. Faecal pollution of drinking water may introduce a variety of industrial pathogens water may introduce a

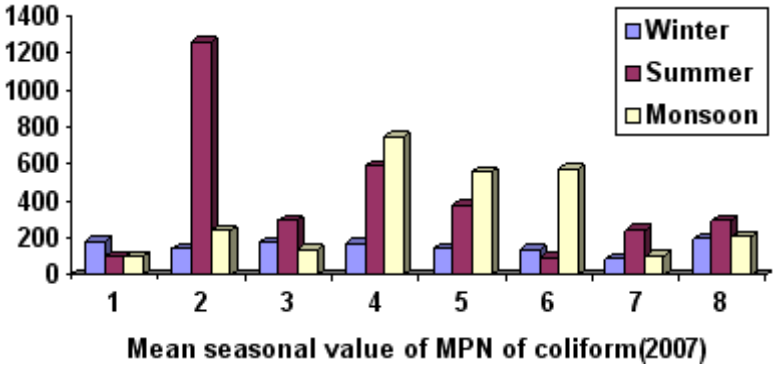
Table 1: Mean seasonal values of MPN (Most Probable Number) of Coliform in this study during 2007-08

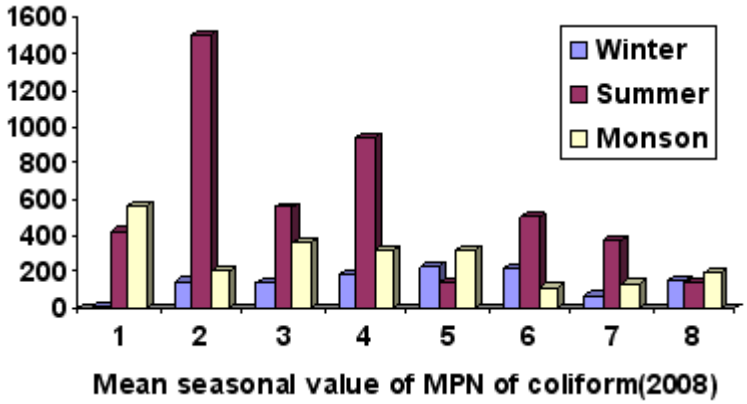
2007	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
W	184	144	178	174	142.2	139.6	92.4	198
S	102.0	1260.0	297.4	590*	380	96.0	250.4	298.8
M	100.0	240.0	138.0	750*	558.2	576.0	108.0	210.0
2008	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
W	10.5	142.0	138.2	180.0	228*	212.5	68.8	148.6
S	420.0	1504.0*	554.0	942.0	134.6	498.4	370.0	136.6
M	562.0*	202.0	362.0	318	316	112	130	188.0

* Higher mean seasonal values.

W = winter (Nov to Feb), S = summer (March to June), M = Monsoon (In 2007 from July to October & 2008 from July to September).

variety of industrial pathogens i.e. bacteria, viruses and other parasites. According to WHO (1978) water having MPN more than 10/100 ml is unfit for human use. Bacterial analysis directly shows the potability of water Narayana studied warangal well water MPN count and faecal coliforms noted more than 10/100 M. Rao *et al*. (1986) noted nil to 1600/100 ml MPN in borewells of Nuzvid town of A.P. The total of coliform bacteria indicates degree of pollution Kumar and Saha (1989), Clark *et al*. (1977), Bagde and Verma (1982) observed maximum number of bacteria in summer followed by monsoon and winter. Increase after rain in bacterial number is due to the accumulation of run-off water from nearby areas and due to stirring of the decomposed organic matter at the bottom that spreads and distributes throughout the Dam observed by Taylor (1941). All bacteria require inorganic phosphate for growing (Rai and Hill 1978). Kataria (1998), Kataria *et al.* (2005) noted MPN count of 10 to 2400/100 ml in





As cited in introduction

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Fig. 1: Sampling Stations

ground water of Bhopal and 10-395/100 ml in Halali River water of Vidisha (M.P.), Kataria *et al* (2006), recorded 13-1200/100 ml MPN in lower lake water.

Hence water of Kaliasot Dam may require proper treatment before use of irrigational and drinking purpose with hygienic point of view in public interest and dumping of raw religious matter and domestic sewage should be checked.

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