

The Impact of Waste Water from a Common Slaughter House at Dindigul and its Impact on the Ground Water in the Adjacent Residential area.

Dr. A. PANDIA RAJAN

Assistant Professor and Head, P.G. and Research Department of Chemistry, G.T.N Arts College, Dindigul,
Tamilnadu, India.

Email - chempandian@gmail.com

Abstract: The present study is attempted to evaluate the extent of pollution of ground water Mettupatti located in the north side of the Dindigul. The ground water quality is very much affected due to discharge of slaughter house waste from the slaughter house waste water located near the study area for the past twenty five years. The slaughter house waste water is discharging from the slaughter house with a range of 5000 to 10,000 liters per day into nearby water resources. Since the ground water becomes unfit for human consumption sincere attempt was made to find the extent of water by analyzing various water quality parameters in six sites water samples were analyzed and compared with standards for drinking water. Investigations of Physico-chemical characteristics of water are undertaken. The water is found to be very hard with high, hardness and salinity. People are not able to drink the water due to poor taste and colour. From the water samples collected the water quality parameters like pH, conductivity, chloride, fluoride, nitrate, phosphate, calcium, turbidity were analysed. The study reveals the high degree of water pollution by comparing the various water quality parameters with permissible limits. Hence the polluted water is subjected to water treatment; contaminated water is treated using reverse osmosis system.

Key Words: Slaughter House, Waste Water, Mettupatti, water quality parameters, BIS, WHO, R O System.

1. INTRODUCTION:

As per 1989 survey, India has the world's largest population of livestock, with nearly 191 million cattle. 70 million Buffaloes, 139 million Sheep and Goat, 10 million Pigs and over 200 million poultry.(1) About 36.5% of Goat, 32.5% of Sheep, 28% of Pigs, 1.9% of Buffaloes and 0.9% cattle are slaughtered every year. The reported per capita availability of meat in India is about 1.4 kg per annum, which is rather low compared to 60-90 kg in European countries. As reported by the Ministry of Food Processing, as of 1989, a total of 3616 recognized slaughter houses slaughter over 2 million cattle and buffaloes, 50 million sheep and goat, 1.5 million pigs and 150 million poultry annually, for domestic consumption as well as for export purposes.(2).

2. MAGNITUDE OF THE PROBLEM:

With growing annual per capita meat consumption, high meat export potential, large non-utilisation of potential meat animals, the development of meat industry in India is controlled not by the Government but the existing market forces. The unorganized nature of this trade is the main feature in this industry that has not been able to use state of the art of technology available in global meat market.(3) This sector is facing many problems and constraints while going for modernization as under-mentioned:

- Subjects of slaughtering of animals and related activities are governed as State subjects under the provisions of Article 48 of the Constitution of India.
- The Government's policies do not permit slaughtering of younger animals. Therefore, illegal slaughtering of calves is done in every city. (4).
- Moreover the introduction of humane slaughter methods have proved unsuccessful due to certain religion constraints, whereas existence of powerful religious concern over cruelty to animals cannot be ignored.
- Due to Government control, religious beliefs and some of the constraints as explained above the ante-mortem and post-mortem inspections cannot be done at inadequately equipped slaughter houses and also it leads to illegal slaughtering of animals at a very high level. (5).

3. SCOPE AND OBJECTIVE OF THE STUDY:

Many Slaughter house waste water are in and around the Mettupatti area. The discharge of waste water from the slaughter house waste water flow into the low lying areas are lagooned or collected in ponds and lakes. The slaughter house waste water of high polluting nature affects the ground water and soil in the study area by percolation at a distance of about 5 km in and around. Water is highly saline and becomes unsuitable for drinking and for irrigation purposes. The investigator visited-the entire Mettupatti slaughter house area and found that the water is unfit for drinking purposes.

The ground water level is very low. All the lands near the Mettupatti area are mostly barren the ground water quality affects the health of the people. Due to high total dissolved solids, people in the study area have to buy the after, for drinking purpose. Hence in order to study the water quality, water samples were collected from two different locations in different direction at a distance of 5km. In all the places visited, the investigator observed that the people had a sweet drinking water before three decades. The people had good yield when-irrigated with good water. In order to find the effect of polluted water in water quality water and soil samples were collected for analysis. The analysis of ground water quality are immensely valuable because it help hydrologist to chalk out strategies for proper treatment for drinking and irrigation purposes.

4. OBJECTIVES:

- ❖ To study the physico-chemical constituents of the ground water in the residential area in and around Mettupatti.
- ❖ To find the ground water quality in the wells and bore wells in the study area adjacent to slaughter house waste water discharge.
- ❖ To find the soil quality in the residential Mettupatti area.
- ❖ To treat the polluted water using Reverse osmosis technology in order to reduce the various physical and chemical parameters, (ISI level) so that the water can be used for domestic purpose, in the Mettupatti residential area.

5. MATERIALS AND METHODS:

Near Mettupatti there is a canal coming from a river. During rainy seasons water flows from the hills to the river and ponds. During monsoon there is a flow in the river and hence the ground water level in the bore wells and wells in the Mettupatti will improve. During the monsoon and pre monsoon seasons the effluent from the various slaughter house waste water based slaughter house waste water discharges the industrial effluent without any treatment into the river and the other water resources like ponds. The polluted water percolates in to the ground water due to seepage and thus affects the quality of ground water in the study area. The ground water is very salty and unfit for drinking purpose. Yet the people have to depend on the ground water. Some people collect water from Municipal supply at a distance of 4 KM from the study area. On hearing the sufferings of the people, sincere and serious attempt were made to find the ground water quality and to suggest a suitable remedy for water treatment of reverse osmosis plant

Table:1- Methods and instruments used for analysis of ground water:

S.No	Parameters Analysed	Analytical Methods
1	pH	pH meter
2	Electrical Conductivity	Conductivity meter
3	Turbidity	Turbidity meter
4	Total Dissolved solids	Weight loss method
5	Hardness, calcium	EDTA Titration
6	Magnesium	Calculation from hardness and calcium
7	Iron	Spectrophotometry method at 510 nm
8	Sulphate	Turbidity meter
9	Nitrate	Brucinesulphate method at 410 nm
10	Phosphate	Spectrophotometric method at 690 nm
11	Fluoride	Colour comparison method
12	BOD	Using BOD incubator

6. RESULTS AND DISCUSSION:

Table:2 Analysis of various Physico-Chemical Parameters of water samples by different methods:

	S1	S2	S3	S4	S5
Date of Collection	12.06.19	12.06.19	12.06.19	12.06.19	12.06.19
Date of Receipt	12.06.19	12.06.19	12.06.19	12.06.19	12.06.19
Scheme	Research	Research	Research	Research	Research
Location of Sampling	North side of slaughter house	Back side of slaughter house			

Habitation	Mettupatti	Mettupatti	Mettupatti	Mettupatti	Mettupatti
Panchayat	Mettupatti	Mettupatti	Mettupatti	Mettupatti	Mettupatti
Union	Mettupatti	Mettupatti	Mettupatti	Mettupatti	Mettupatti
Source	Pond water well water	Open well	Open well	Open well	Open well
PHYSICAL EXAMINATION					
Appearance	Brownish	Brownish	Brownish	Brownish	Brownish
Odour	Bad smell	Bad smell	Bad smell	Bad smell	Bad smell
Turbidity NT units	12	24	26	28	30
Total dissolved solids mg/L	1147	1230	1250	1235	1250
Electrical conductivity micS/cm	1687	1810	1850	1815	1830
CHEMICAL EXAMINATION					
pH	7.71	7.47	7.8	7.9	7.49
Alkalinity- Ph as C_aCO_3 mg/Lit	0	0	0	0	0
Alkalinity Total as C_aCO_3	380	340	360	370	390
Total Hardness as $CaCO_3$	460	487	480	490	490
Calcium as Ca	94	160	170	180	190
Magnesium as Mg	54	60	70	75	90
Sodium as Na	154	168	160	175	180
Potassium	82	34	38	38	39
Iron Total as Fe	1.04	1.8	1.9	1.2	2.2
Manganese as Mn	0	0	0	0	0
Free Ammonia as NH_3	.28	0.12	0.15	0.11	0.18
Nitrate as NO_3	9	11	12	13	11
Chloride as Cl	244	304	305	310	320
Fluoride as F	1.0	1.2	1.5	1.15	1.6
Sulphate as SO_4	149	158	159	160	170
Phosphate as PO_4	0.08	0.11	0.12	0.15	0.15
Tidy's Test 4hrs as O_2	0.94	0.81	0.51	0.85	0.91
Res Chlorine	0	0	0	0	0

7. CONCLUSION :

The present study is attempted to evaluate the extent of pollution of ground water Mettupatti located in the north side of the Dindigul. The ground water quality is very much affected due to discharge of slaughter house waste from the slaughter house waste water located near the study area for the past twenty five years. The slaughter house waste water is discharging from the slaughter house with a range of 5000 to 10,000 liters per day into nearby water resources. Since the ground water becomes unfit for human consumption sincere attempt was made to find the extent of water by analyzing various water quality parameters in six sites water samples were analyzed and compared with standards for drinking water. Investigations of physico-chemical characteristics of water are undertaken. The water is found to be very hard with high, hardness and salinity. People are not able to drink the water due to poor taste and colour. From the water samples collected the water quality parameters like pH, conductivity, chloride, fluoride, nitrate, phosphate, calcium, turbidity were analysed. The study reveals the high degree of water pollution by comparing the various water quality parameter with permissible limits. Soil becomes unfit for cultivation due to high conductivity. Most of the lands are unfit for cultivation and barren with a desert look. Most of the ends are converted in house plots in and around mettupatti. Hence the polluted water is subjected to water treatment; contaminated water is treated using reverse osmosis system. Domestic reverse osmosis plant with 10 liters per hour is used for water treatment. Impost all the samples collected from various sampling sites from S1 to S5 subjected to water treatment using reverse osmosis plant. The treated after collected from reverse osmosis plant after treatment is analysed as per procedure for drinking water standard. The water becomes suitable for inking purpose with a low TDS of 50 mg /1 People in the residential Mettupatti are advised to go for R.O. treatment plant to convert the well water and bore water for domestic use.

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