

*Original Research***Quality of Drinking Water Used for Livestock and Poultry in Karur District of Tamil Nadu****N. Bharathy*, P. Vasanthakumar and G. Vijayakumar**

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Abstract

Water is a vital nutrient needed for sustaining life and to optimize the milk production, growth and reproduction in livestock. Water constitutes about 60 - 80 % of live weight of livestock depending upon the age, fat cover and physiological functions (Schlink et al., 2010). Approximately one third of the world's population use ground water for drinking purpose (UNEP, 1999). The ground water in most areas are polluted due to excessive use of fertilizers and pesticides, increased human activities, rapid growth of industries as well as improper disposal of manure and waste water (Sharada and Yasovardhanm, 2013). Karur district of Tamil Nadu is located at 10°57' N 78° 05' E / 10.95° N 78° 08' E. It has average elevation of 122 m (400ft). Utilization of land area is up to 44.59%. Black soil is the predominant soil type (35.5 %) in this district followed by lateritic soil (23.85%) and alluvium soil (20.31%). Cattle, sheep, goats and poultry are the major livestock species reared in this district. Livestock mostly obtain their drinking water from open, bore wells, ponds and river. Consumption of polluted water may result in decreased performance of animals (CPCB, 2007). Poor quality water is not palatable and animal do not accept it readily which results in low water and feed intake, low feed conversion ratio ultimately decreased growth and production, poor performance and non - specific diseases conditions (Sajid Umar et al, 2014). In this present study, an attempt has been made to evaluate the quality of bore well water used for drinking purpose in livestock and poultry farms.

Key words: Drinking Water Quality, Karur District, Water**How to cite:** Nallathambi, B., Periannan, V., & Ganesan, V. (2019). Quality of Drinking Water Used for Livestock and Poultry in Karur District of Tamil Nadu. International Journal of Livestock Research, 9(8), 233-236. doi: 10.5455/ijlr.20190331034714**Introduction**

Water pollution occurs when unwanted materials enter in to water, changes the quality of water and harmful to environment, human health and livestock. Water is an important natural resource used for drinking and other developmental purposes in day today activities. Safe drinking water is necessary for human health

and livestock all over the world. Being a universal solvent, water is a major source of infection. According to world health organization (WHO) 80% diseases are water borne. Drinking water in various countries does not meet WHO standards. 3.1% deaths occur due to the unhygienic and poor quality of water.

Material and Methods

Karur district of Tamil Nadu is located at 10°57' N 78° 05'E / 10.95° N 78° 08'E. It has average elevation of 122 m (400ft). A total of 50 water samples collected from bore wells of farmers belonging to Karur District of Tamil Nadu during the period from 2014 to 2018 (five years) were subjected to analyses. The water samples were brought to laboratory for the estimation of various physico-chemical parameters. The parameters such as odor, appearance, turbidity was analyzed immediately on the spot by physical appearance. The analyses of remaining parameters such as TDS by using TDS meter, hardness by chemical method, pH using digital pH meter, nitrate and sulphate using spectrophotometer method and conductivity by conductivity meter were done in the laboratory. The results obtained were compared with WHO and BIS specifications / standards.

Results and Discussion

The results of all physico chemical parameters for the water samples collected from livestock farms in Karur district are presented in Table 1. The physical parameters like color, turbidity, taste, odor and conductivity were agreeable (100%) in bore well water. The total dissolved solids of water samples ranged from 80 to 3840 with a mean value of 2150 ± 210.17 and only 60 % of samples were containing permissible level of below 500 mg/litre. High TDS may be due to the presence of carbonates / bicarbonates (Ranibai and Reddy, 2015). In dairy animals, change in the body weight or milk production of animals drinking water containing high levels of salinity leads to changes in feed consumption. The increase in consumption of salts causes depression in digestibility and utilization of nutrients (Ayyat *et al.*, 1991). In poultry, the egg shell quality in laying hens was affected by salinity of drinking water (Balnave and Yoselewitz, 1988). Sheep are generally considered to be more tolerant of salt water than other domestic animals. In small ruminants, reduced feed consumption by ingesting large amounts of salt (> 3000ppm) and also adversely affect the body health or rumen flora, leading to retardation of feed digestion with a decrease in the rate of passage through the alimentary tract. Schmidt - Nielsen recommended (1976) that the maximum permitted concentration of salt should be 2% for sheep, 2% for cattle and 1.5% for horse and pigs. The pH range of samples varied from 6.5 to 9.0 with mean value of 7.27 ± 0.081 which was within acceptable levels and found to be fit for human and animal use.

Table 1: Quality of drinking water used for livestock and poultry in Karur district

| S. No. | Parameters | Range | | % of Sample with Acceptable Level | Mean Values | WHO Standard | BIS Standard |
|-----------------------------|-------------------------------|------------------------|------------------------|-----------------------------------|------------------------|---------------------|---------------------|
| | | Minimum | Maximum | | | | |
| Physical Examination | | | | | | | |
| 1 | Color | Colorless | Colorless | 100% | Colorless | - | 5 Hazen units |
| 2 | Turbidity | Clear | Clear | 100% | Clear | clear | clear |
| 3 | Taste and Odor | Tasteless and odorless | Tasteless and odorless | 100% | Tasteless and odorless | acceptable | acceptable |
| 4 | Conductivity (mS/uS/cm) | 1.75 | 9.05 | 100% | 3.88 ± 0.265 | 250-750Us/cm | 2.5 – 50 mS |
| 5 | Total dissolved solids (mg/l) | 80 | 3840 | 60% | 2150 ± 210.17 | 500 | 500 |
| Chemical Examination | | | | | | | |
| 6 | P _H | 6.5 | 9 | 100% | 7.27 ± 0.081 | 6.5 - 9.5 | 6.5 -9.5 |
| 7 | Ammonia (ppm) | 0.4 | 2.2 | 83% | 0.34 ± 0.079 | 0.3 | 0.5 |
| 8 | Chloride (mg/l) | 120 | 2800 | 6% | 655.75 ± 76.72 | 250 | 250 |
| 9 | Nitrite (mg/l) | 0.1 | 0.4 | 100% | 0.12 ± 0.02 | 3 | 45 |
| 10 | Nitrate (mg/l) | 0.2 | 20 | 100% | 7.01 ± 1.483 | 45 | 45 |
| 11 | Phosphate (mg/l) | 0 | 0.5 | 84% | 0.14 ± 0.043 | Not to be in traces | Not to be in traces |
| 12 | Fluoride (mg/l) | 0.5 | 2 | 100% | 0.53 ± 0.11 | 1.5 | 1.5 |
| 13 | Iron (mg/l) | 0.3 | 1 | 98% | 0.27 ± 0.081 | 0.3 | 0.3 |
| 14 | Residual chlorine (mg/l) | 0 | 20 | 86% | 0.04 ± 0.026 | 0.2 | 0.2 |

All other parameters such as ammonia (0.34 ± 0.079 ppm), nitrite (0.12 ± 0.02 mg/l), nitrate (7.01 ± 1.483 mg/l), phosphate (0.14 ± 0.043 mg/l), fluoride (0.53 ± 0.11 mg/l), residual chlorine (0.04 ± 0.026 mg/l) and iron (0.27 ± 0.081 mg/l) were within the normal limit. The chloride content of the bore well water samples ranged from 120 to 2800 mg/l with a mean value 655.75 ± 76.72 mg/l. The normal range of chloride content is 250 mg/l. This shows that, the water in the study area is hard to very hard (94%) and salt content of the water is also high. This may be due to high chloride containing rocks and soils with which the water comes in contact and mixing of animal and plant organic matter might be the other possible cause for this contamination. This implies that the ground water is not fit for direct consumption and warrants for usage of water treatment systems for its usage (Peden *et al.*, 2009).

Reverse osmosis will remove 90 - 95 % of the chlorides because of its salt rejection capabilities. Electro dialysis and distillation are two more processes that can be used to reduce the chloride content of water. This must be prevented by entry of contaminates in water sources by proper monitoring and cleaning.

Conclusion

The quality assessment of water samples showed that most of the parameters determined did not exceed the permissible limit of the World Health Organization (WHO, 2006). Ammonia, nitrite and nitrate were

present in small quantity in the bore well water. The chloride and the total dissolved solids were very high. These can be treated by water softener/ reverse osmosis. This must be prevented by entry of contaminates in water sources by proper monitoring and cleaning. Bore well water is safe enough to be consumed by humans or used with low risk of immediate or long-term harm above measures.

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