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WATER QUALITY FROM THE CITY OF DELTA-MG SUPPLY WELL

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Abstract: Water intended for human consumption, whether surface or underground, must meet potability and quality standards, guaranteeing its physical, chemical and biological characteristics. The objective of this study was to verify the water quality of a tubular well in the urban area of the municipality of Delta-Minas Gerais. The water samples were collected in previously sterilized and properly packaged bottles. The results found in the sample indicated that there is no presence of bacteria, neither total nor thermotolerant coliforms, thus making it suitable for human consumption.

Keywords: groundwater, public health, aquifer.

INTRODUCTION

The municipality of Delta is located in the Triângulo Mineiro, on the border between the States of Minas Gerais and São Paulo, and has a territorial area of 102,840 km2. Delta came into existence as a municipality by State Law No. 12030, of December 21, 1995. Today, 17 years old, the municipality has a population of 9,053 inhabitants, according to IBGE statistics (2018). Of which 8320 live in urban areas and 733 in rural areas. The water supply system of the city of Delta takes place through 5 (five) deep tubular wells that supply water to 100% of the population.

To this end, this evaluation of the analysis obtained through the water sample must be established by resolutions. Resolution No. 357/2005, which deals with the classification of water in relation to the quality for its use, establishes levels of quality of Brazilian waters for different classes of uses, according to the National Council for the Environment (BRASIL, 2005).

According to the World Health Organization (BRASIL, 2011), water intended for human consumption, whether surface or groundwater, must meet potability and quality standards, guaranteeing its physical, chemical and biological characteristics. Groundwater is a hundred times more abundant than that of rivers and lakes. They are stored in the cracks and pores of the rocks, they are important reserves of fresh water.

About 39% of Brazilian municipalities meet their water needs through groundwater, which, in addition to serving the population, is used in agriculture, livestock, industries, among others (ANA, 2010).

That is why the aquifers are supplied by the infiltration of rainwater, where it regulates its excess and supplies this water to maintain the courses of surface water. The so-called recharge zones are where the water emerges from the system feeding rivers, gushing under pressure the artesian wells (ANA, 2010).

According to UNEP (2008), 1.5 billion people depend on groundwater, which accounts for 90% of all fresh water in the world. However, the vast majority of the population both in reducing the quality and quantity of water resources is already a problem in 53% of Brazilian municipalities, which have problems such as silting up of water bodies, resulting from the suppression of vegetation along the rivers (APP's), and 38% suffer from water contamination and pollution.

Great urbanization increases the aggravating situation of urban public supply, there has been a great reduction in the level of reservoirs in the last decade. Fresh water scarcity, soil degradation, lack of sanitation, river pollution, garbage accumulation, all this represents a serious challenge for humanity.

The objective of this study was to verify the water quality of a tubular well in the urban area of the municipality of Delta. The environmental conditions of the selected artesian well were analyzed. The depth of the artesian well and the number of families supplied by it were determined. Physical-chemical and microbiological analyzes were

carried out to verify the quality of the water.

MATERIAL AND METHODS

Water was collected in a deep tubular well, which is more than 80 meters deep, located at coordinates 19º58' 41.13" S and 47º46' 33.60" O. The city's well was completed in mid-1980, (Figure 1), the amount of water captured corresponds to 70,000 liters per hour, which corresponds to approximately a quarter of the city's water consumption. The water samples were collected in previously sterilized bottles, packed in a thermal box containing ice, and immediately taken to the Laborphys Water Analysis Laboratory in the Uberaba region to carry out the Physical-chemical and microbiological analyzes on 06/25/2018.

RESULTS AND DISCUSSION

Bacteria belonging to the total coliform group can be found in water, soil and vegetables, and they have the ability to multiply in water with high levels of nutrients (SCHIMIDT, 2006). There is no presence of total or thermotolerant coliforms, *pseudomonasaeruginosa*, and heterotrophic bacteria even without chlorine treatment and without free chlorine. This is an indication of water quality.

According to the parameters analyzed for compliance with Ordinance 2914/2011 of the Ministry of Health (BRASIL, 2011), which provides for control and surveillance procedures for the quality of water for human consumption and its potability standard, the reported results in this sample it meets the established limits (Table 1).

To be suitable for human consumption, water is expected to be transparent, colorless, odorless and tasteless. The parameters of total alkalinity, free chlorine, pH, total coliforms and thermotolerant coliforms are the most important to characterize the quality of the water, as they allow classifying it by its

mineral content, determining the degree of contamination and possible sources and evaluating the biochemical balance that is necessary for the maintenance of aquatic life (MACÊDO, 2001).

CONCLUSION

The results found fit within the parameters established by the specific legislation. The presence of thermotolerant coliforms, which are pathogenic and suitable for human consumption, has not been proven. It is important to carry out analyzes for future comparison of water quality for the health of the Deltense population.

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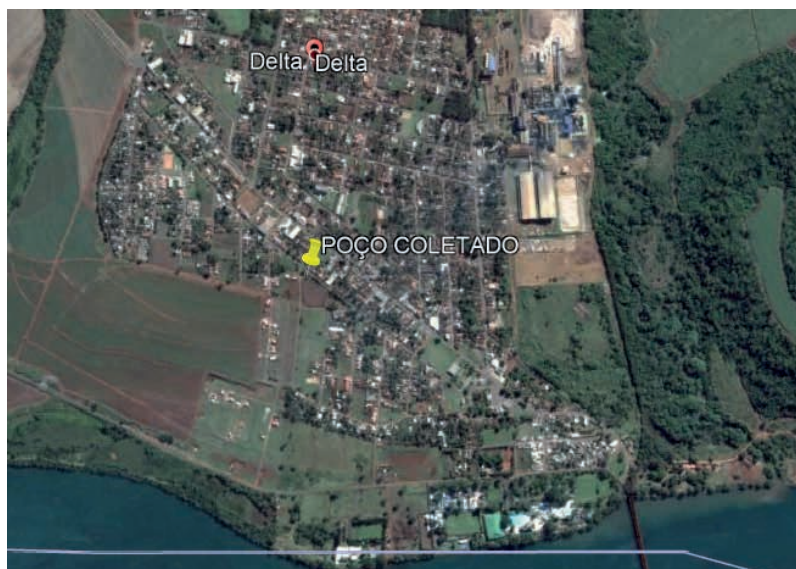
Figure 1. Delta tubular well (water collection).

Rehearsal	Result	Unit	VMP	LQ	Method/Reference
Total alkalinity	0	mg/L	NR	1,0	SM 2320
Total hardness	80	mg/L	500	0,1	SM 2340 C
Total Chlorine	3,55	mg/L	250	0,1	SM 4500 CL-B
Free Chlorine	0	mg/L	NR	0,1	SM 4500 CL
Conductivity	200	mS/cm 3	NR	0,7	SM 2510 B
pH	7,51	----	6.0 – 9.5	0,02	SM 4500
Total Dissolved Solids - STD	82	mg/L	1000	0,05	SM 2510
turbidity	0,49	NTU	5	1	SM 2130 B
Aspect	According	----	limpid	----	SM 2110
Color	According	mg/L	Colorless	----	FB 585
Heterotrophic bacteria	2×10^1	UFC/mL	500	----	SM 9215 B
Total Coliforms	Absence	P-A/100 mL	Absence	----	SM 9221 E
Thermotolerant Coliforms	Absence	P-A/100 mL	Absence	----	SM 9221 E
Pseudomonas aeruginosa	Absence	P-A/100 mL	NR		FB 585

Analysis performed at Laborphys Laboratory in Uberaba-MG.

Table 1. Result of physical-chemical and microbiological analysis