



Water analysis report of the well under construction in the community of El Corozo Niquinohomo - Masaya, Nicaragua.

Chain of custody or third party water testing

Table 1. Chain of custody

Sample description	
Date	Tuesday, September 06th, 2022
Time	5:14 pm
Number of samples	1
Matrix	Water
Origin of the source	This sample comes from the pumping test of the corozo well, which is currently under construction.
Sampling location	El corozo Niquinohomo – Masaya
Coordinates	Well: 11° 50' 32.41" N y 86° 07' 18.39" O
Total volume	1000 ml o 1 liter total sample
Analysis information	
Measured parameters	Total and fecal coliforms pH conductivity, salinity, total dissolved solids, temperature, conductivity, salinity, total dissolved solids, temperature
Analysis method	Method of the most probable number Multi parametric Pocket pro + tester
Remarks	The sample from the well in the community of El Corozo showed brown turbidity due to the fact that at the time the sample was taken, the pumping test, which is performed over a prolonged period of time, was being carried out.

1. Results for Total Coliforms

Parameter	Value	Recommended values	Maximum permissible values according to CAPRE
Total coliforms NMP/100 ml of sample	22	Negative	≤4

1. Fecal coliform result

Parameter	Value	Recommended values	Maximum permissible values according to CAPRE
Total coliforms NMP/100 ml of sample	17	Negative	Negative

According to the N.M.P. method with a reliability limit of 95% for various combinations of positive results, when 5 tubes are used for each dilution (10 ml, 1.0 ml and 0.1 ml), which consists of inoculating a diluted water sample in tubes containing selective liquid culture medium, and the aim is to know if there is any type of bacterial contamination. The result for total coliforms was 22 NMP/100 ml of positive sample for the group of total coliforms, exceeding the maximum admissible value of the CAPRE technical standard, which indicates less than or equal to 4 in 100 ml of sample.

While for fecal coliforms 17 NMP/100 ml of sample as a positive result demonstrating the presence of these microorganisms in a general way through the specific culture medium EC. This subgroup being the main indicator of microbiological contamination due to its specific origin in the intestinal tract of warm-blooded animals, including humans. Over passing both the recommended value and the maximum admissible value for this parameter according to the CAPRE technical standard, there should not be any presence of this group in water for human consumption.

However, although the two parameters are above the permissible values according to the CAPRE standard, the main water quality reference in the Central American region for human consumption and the results of the MPN method are between the intermediate values of the limits established by this method. Thus, passing over the lower ones but not

over the upper ones for 100 ml of sample. Additionally, the mere presence of these bacteriological groups in water represents a health risk for consumers, causing gastrointestinal diseases such as diarrhea, vomiting, nausea and fever, depending on the degree to which they are found in the water source. In addition, their presence indicates that there is a contamination pathway between a source of bacteria, surface water, septic system, animal waste or previously disseminated in the area.

It is recommended that a chlorination method be implemented to prevent the development of microorganisms, thus improving water quality at the microbiological and physical-chemical levels, and then perform another analysis to rule out the presence of microbiological contamination, including more specific analyses for the detection of individual bacteria such as E. coli of fecal origin only, thus guaranteeing the safety of the water from the El Corozo well.

2. Table of physical and chemical analysis results

Parameters	Value	Maximum permissible values according to CAPRE
Total Dissolved Solids (mg/L)	227	1000
Salinity (ppt)	0.16	
pH	7.74	6,5 a 8,5
Conductivity (μ S/cm)	319	400
Temperature	23 °C	

The quality of freshwater supplies is increasingly threatened by pollution. Although water has natural pollutants, it is increasingly contaminated by human activities, inadequate wastewater management, waste dumping, and poor agricultural practices. The inadequate management of these waters leads to the sources from which people draw their water supply to become dangerously chemically polluted, directly affecting the most vulnerable.

The results of the parameters analyzed by the multiparametric tool are below the maximum admissible values according to CAPRE standards (1994). For water for human consumption with respect to physical-chemical parameters.

These parameters are among the most essential in the physical-chemical evaluations in relation to water quality because of their importance for the health of people, as is the case of pH, the indicator of acidity and alkalinity of water, the ideal value being 7, although the value is below the recommended and admissible. The value establishes a slightly alkaline pH that in high values causes problems in the water treatments as well as in the prevention of corrosion, increasing the concentration of minerals such as calcium that in great quantity gives a sour taste to the water.

However, a broader analysis is recommended to determine more precisely the chemical quality of the water, which is composed of several physicochemical parameters, including heavy metals, which have a direct impact on human health depending on the value at which they are found in drinking water.

Figure 1. Presumptive total coliform analysis



Figure 2. Confirmatory analysis for total coliforms

Figure 4. Fecal coliform analyses



3. Bibliographic references

- Caballero, P. (26 de Octubre de 2010). Analisis mriobiologicos y fisicos-quimicos . Mexico .
- COMITÉ COORDINADOR REGIONAL DE INSTITUCIONES DE AGUA POTABLE Y . (26 de Noviembre de 1994). Norma regional CAPRE . San jose , Costa rica .
- Palacio, G. D. (17 de Junio de 2015). VALIDACIÓN DEL MÉTODO DE NÚMERO MÁS PROBABLE (NMP). Pereira, Colombia .
- wu, B. y. (24 de Marzo de 2014). Calidad fisico-quimica y bacteriologica del agua para consumo humanode la microcuenta de la quebrada la victoria . San jose , Costa rica .

