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CALIDAD MICROBIOLÓGICA DEL ACUÍFERO DE ZACATEPEC, MORELOS, MÉXICO

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Abstract

Groundwater is one of the main supply sources of drinking water in Mexico, as they support a poor biological community, because of their low contain of nutrients. However in the recent years, human activities and urban growth are the main factors of aquifer contamination. Therefore, water may contain chemical contaminants and microorganisms that can cause several diseases; such is the case of free-living amoebae (FLA). The objective of this research is to determine the microbiological quality (total coliforms, fecal coliforms and free-living amoebae) of Zacatepec aquifer, in the state of Morelos. Monthly samplings of thirteen wells of the aquifer were carried out during one year. The following physicochemical parameters were measure in situ: pH, dissolved oxygen (DO) and temperature. Total and fecal coliforms were determined by the membrane filter technique. Free-living amoebae were cultured on non-nutritive agar medium (NNE); the identification was carried out taking in account their morphological features. All the wells were polluted with total coliforms, one with a geometric mean of 107 CFU/100 mL. Fecal coliforms were absent in four wells; nevertheless, one presented a geometric mean of 107 CFU/100 mL. The most polluted well was number 3, and the months with more bacteria were April and July. Free-living amoebae were isolated in all the wells, the highest isolation number was found in well number 2, while the lowest were found in wells 4, 5, and 10. December and January were the months with the highest number of amoebae, and April with the lowest. Twenty two species belonging to 16 genera were isolated; the most frequent was Hartmannella with 38 %; this amoeba has not been reported as pathogenic, but it has been associated to ocular and brain infections in humans. Of the pathogenic amoebae, Acanthamoeba was isolated, but with a low frequency (6.7 %). Physicochemical parameters had low seasonal variation, pH was close to neutrality in a range of 6.4 to 7.3, temperature was in a range of 25.1 to 28 °C, and dissolved oxygen of 2.9 to 4.8 mg/L. The average values of the physicochemical parameters among the wells were very similar. The presence of coliforms indicates human pollution in the aquifer, and together with the presence of pathogenic free-living amoebae, stand out the significance of water disinfection before it being used as drinking water.

Keywords

Coliforms, free-living amoebae, groundwater, aquifer.