Mohammed KADAOU, Abderrahime BOUALI, Mourad ARABI

ASSESSMENT OF PHYSICOCHEMICAL AND BACTERIOLOGICAL GROUNDWATER QUALITY IN IRRIGATED TRIFFA PLAIN, NORTH-EAST OF MOROCCO

Abstract

The physicochemical and bacteriological quality of groundwater was assessed to show the impact of the agriculture and human activities in the Triffa Plain located in North-East of Morocco. The current levels of contamination of the groundwater were estimated by analysing electrical conductivity, nitrate, nitrite, ammonia, orthophosphate, and indicators of faecal pollution content.

Water samples from 55 locations were collected during two period of time, the wet and the dry season of the year 2016. Result obtained indicated that most samples are highly contaminated. The electrical conductivity varied from 800 to 9100 μS·cm⁻¹. Nitrate levels ranged from 25 to 216 mg·dm⁻³, with 78% of samples exceeding the critical level value set at 50 mg·dm⁻³. Nitrate concentrations are slightly higher during the wet period in 73% of studied cases. Nitrite rarely exceeded the normal rate fixed by World Health Organization and reached 0.90 mg·dm⁻³. Ammonia and orthophosphate contents do not exceed these norms.

The study revealed a wide contamination of groundwater by microbial agents such as, total coliforms, faecal coliforms and faecal streptococci, with content ranged from 0 to 14000, 0 to 5000 and 0 to 5000 CFU·(100 cm³)⁻¹ respectively, confirming the impact of septic tanks, wastewater discharge into rivers without treatment, and the use of animal waste on the ground water vulnerability.

Samplings and measurements were carried out according to the international standard ISO 13395, ISO 11732 and ISO 15681-2 for chemical compounds and ISO 9308-1 and ISO 7899-2 for microbiological numerations.

Key words: agriculture, bacteriological quality, groundwater, physicochemical quality, Triffa Plain, wastewater