

RAPID EVALUATION OF GROUNDWATER QUALITY BASED ON FLUORESCENCE RATIOS

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Abstract. *Water quality is influenced by the content of dissolved organic matter (DOM). For this study, water samples were collected from a rural area predisposed to contamination due to either intensive agricultural activities or to the faulty management of animal and human waste disposal. Fluorescence spectroscopy was used for analyzing the degree and the possible source of contamination of the water sources. Excitation–emission matrices (EEMs) were presented, evidencing specific fluorescent fingerprints characteristic to clean, drinkable water and to contaminated water. In the case of the samples for which contamination was established, the type of organic matter input, either humic or proteic, was determined. For the samples where proteic input was confirmed, the source of the contamination was evidenced. A thorough analysis of fluorescence intensity ratios obtained for only one excitation wavelength, facilitated a better identification of the type and source of water contaminant.*

Keywords: Dissolved organic matter, fluorescence spectroscopy, groundwater contamination.

1. Introduction

Our most valuable natural resource without which life would not be possible is water. It is essential for our survival and for our wellbeing. In this context, it is of utmost importance to have access to clean, uncontaminated water. Being used for agriculture, industries, human daily consumption and for a variety of household applications, ground water plays a major role in the ensuring an adequate livelihood for most of the Earth's inhabitants [1].

Water quality is influenced by the content of organic matter which can be determined by a number of allochthonous and autochthonous factors. Every natural aquatic system contains certain amounts of dissolved organic matter (DOM). Generally, DOM is comprised of a heterogeneous mixture of aromatic and aliphatic compounds, among which proteins, carbohydrates, lipids and humic substances are the most commonly detected [2]. However, its composition is not

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