ABSTRAK

Air tanah merupakan sumber air berharga bagi masyarakat di Kabupaten Bantul untuk memenuhi kebutuhan sehari-hari. Interaksi antara air tanah dan mineral penyusun akuifer memberi pengaruh besar terhadap kimia air tanah. Studi mengenai hidrogeokimia air tanah dan TOC dapat membantu rencana pengelolaan perlindungan akuifer serta langkah–langkah perbaikan untuk air tanah yang telah terkontaminasi. Maksud utama penelitian ini adalah untuk mengkaji geokimia air tanah dan pencemaran dalam keterkaitannya dengan kondisi kerentanan air tanah serta tataguna lahan. Secara spesifik penelitian ini bertujuan untuk mengetahui fasies air dan proses geokimia yang dominan di wilayah penelitian, mengetahui indeks kerentanan air tanah intrinsik serta mengidentifikasi kaitan antara geokimia air tanah, indeks kerentanan terhadap pencemaran dan tata guna lahan. Analisis yang dilakukan meliputi identifikasi ion mayor menggunakan *ion chromatography*, logam dengan *photometer* dan TOC dengan *TOC analyzer*. Analisis kerentanan air tanah intrinsik dilakukan dengan metode GOD. Hubungan indeks kerentanan air tanah intrinsik, tata guna lahan dan geokimia air tanah dikaji menggunakan analisis statistic regresi logistik. Berdasarkan hasil analisis diketahui bahwa daerah penelitian tersusun atas kation dominan $Ca^{2+} > Na^{+} > Mg^{2+} > K^{+}$ dan anion dominan $HCO_3^{-} > Cl^{-} > SO_4^{2-} > NO3^{-}$. Proses geokimia yang dominan terjadi di daerah penelitian yaitu pertukaran ion, pelapukan silikat, dan pelapukan karbonat. Kerentanan air tanah intrinsik daerah penelitian dibagi ke dalam 4 kelas yaitu sangat rendah, rendah, sedang, dan tinggi. Hasil analisis prediksi kemungkinan terjadinya kontaminasi di daerah penelitian dengan metode regresi logistik menggunakan 2 variabel menunjukkan bahwa kedua variabel bebas yang digunakan tidak signifikan terhadap kehadiran kontaminasi.

Kata kunci: Geokimia air tanah, Kerentanan air tanah, Kontaminasi, Metode GOD

ABSTRACT

Bantul Regency has a fairly high annual population growth rate where most of the population uses groundwater from shallow wells to suffice their daily needs. The interaction between groundwater and minerals in the aquifers has a major influence on groundwater chemistry. Studies of groundwater hydrogeochemistry and TOC can be useful to protect groundwater aquifers and remedial measures for contaminated groundwater. The main purpose of this study is to understand groundwater geochemistry and contamination which may correlate with groundwater vulnerability and land use conditions. In particular, this study aims to determine the water facies domination and geochemical processes in the research area, the intrinsic groundwater vulnerability index, and identify the relationship between groundwater geochemistry, vulnerability index, and land use. The analysis includes identification of major ions using ion chromatography, metals identification using a photometer, and TOC with a TOC analyzer. Intrinsic groundwater vulnerability analysis was carried out using the GOD method. The relationship between intrinsic groundwater vulnerability index, land use, and groundwater geochemistry was studied using logistic regression statistical analysis. Based on the results of the analysis, it is known that the research area are composed of the dominant cations $Ca^{2+} > Na^{+} > Mg^{2+} > K^{+}$ and the dominant anions are $HCO_3^{-} > Cl^{-} > SO_4^{2-} > NO^{3-}$. The dominant geochemical processes occurring in the study area are ion exchange, silicate weathering, and carbonate weathering. The intrinsic groundwater vulnerability of the research area is divided into 4 classes, viz. very low, low, medium, and high. The predictive analysis results of the contamination possibility in the study area using the 2-variables logistic regression method showed that the two independent variables used were generally not significant for the presence of contamination.

Keywords: Contamination, GOD method, Groundwater geochemistry, Groundwater vulnerability,