

KUANTIFIKASI KANDUNGAN NITRAT (NO_3^-), NITRIT (NO_2^-), DAN AMONIA (NH_3^+) YANG HILANG PADA MATAAIR KALISIRAH DAN MATAAIR JUMBLENG KAWASAN KARST GOMBONG SELATAN

ABSTRAK

Kawasan bentangalam karst Gombong terletak di selatan Jawa bagian tengah. Besarnya potensi sumberdaya air pada kawasan bentangalam karst Gombong tercermin dalam dua mataair besar yang menjadi sumber utama air bersih penduduk, yaitu Mataair Kalisirah dan Mataair Jumbleng. Mataair Kalisirah dan Mataair Jumbleng terletak di Desa Sikayu, Kecamatan Buayan, Kebumen, Jawa Tengah. Survey arah aliran dan penentuan batas daerah tangkapan air (DTA) kedua mataair menunjukkan bahwa DTA kedua mataair didominasi oleh lahan pertanian. Karakteristik penggunaan lahan pada DTA penting karena kawasan karst memiliki rongga yang memungkinkan zat kontaminan yang ada di permukaan langsung masuk ke sistem akuifer karst.

Penelitian ini menggunakan data curah hujan, debit aliran, sampel air, dan karakteristik pemupukan. Data curah hujan, debit aliran, dan sampel air diambil selama 10 bulan (November 2018-September 2019) untuk Mataair Kalisirah dan 8 bulan (Februari 2019-Oktober 2019) untuk Mataair Jumbleng. Data-data tersebut disajikan dalam satuan waktu harian. Pengambilan data mempertimbangkan perbedaan musim, yaitu musim penghujan dan musim kemarau. Sampel air diuji nutrient untuk parameter nitrat, nitrit, dan amonia. Hasil pengujian konsentrasi kimia air di analisis regresi dan korelasi dengan debit, sehingga fluktuasinya dalam jangka panjang dapat dianalisis melalui hidrograf nutrient. Perhitungan *load* juga dilakukan untuk mengetahui total N yang ada pada akuifer.

Hasil penelitian menunjukkan kesamaan perkembangan karst pada kedua mataair. Imbuhan pada Mataair Kalisirah dan Mataair Jumbleng didominasi *diffuse*. Hal ini diperkuat dengan bukti bahwa debit aliran kedua mataair masih cukup stabil pada saat musim kemarau, meskipun nilainya mengalami penurunan. Perhitungan *load* N pada kedua mataair menunjukkan hasil yang berbeda. Mataair Kalisirah memiliki *load* N yang lebih besar dibandingkan dengan Mataair Jumbleng. *Load* N pada Mataair Kalisirah berada pada angka 91 kg/hari–532 kg/hari. Mataair Jumbleng memiliki nilai *load* N yang lebih kecil, yaitu 7 kg/hari–26 kg/hari. Daerah tangkapan air Jumbleng juga mengalami kehilangan N sebesar 57,86%, dimana nilai ini lebih besar dibandingkan dengan DTA Kalisirah yang mengalami kehilangan 56,08% N dari lahan pertanian. Perbedaan kehilangan N ini disebabkan presentase luas lahan pertanian pada DTA Jumbleng lebih besar dibandingkan dengan DTA Kalisirah.

Kata Kunci: daerah tangkapan air, pertanian, nutrient, *load* N, kehilangan N

QUANTIFICATION OF NITRATE (NO_3^-), NITRITE (NO_2^-), AND AMONIA (NH_3^+) LOSSES ON THE KALISIRAH AND JUMBLENG KARST SPRING, SOUTH GOMBONG KARST AREA

ABSTRACT

Gombong karst landscape is located in the south of Central Java. The potential of water resources in the Gombong karst landscape is reflected in two large springs that are the main sources of clean water for the population, namely Kalisirah Springs and Jumbleng Springs. Kalisirah Springs and Jumbleng Springs are located in Sikayu Village, Buayan District, Kebumen, Central Java. The survey of flow direction and determination of water catchment area of the two springs shows that the catchment area of the two springs is dominated by agricultural land. The landuse of catchment area is important because karst region has a cavity that allows contaminants on the surface to directly enter the karst aquifer system.

This study uses rainfall data, flowrate data, water samples, and fertilizer characteristics. Rainfall data, flowrate, and water samples are taken for 10 months (November 2018-September 2019) for Kalisirah Springs and 8 months (February 2019-October 2019) for Jumbleng Springs. The data is presented in units of daily time. Retrieval of data considers differences in seasons, namely the rainy season and the dry season. Water samples were tested for nutrients for the parameters of nitrate, nitrite, and ammonia. The results of testing the concentration of water in the regression analysis and correlation with discharge, so that fluctuations, in the long run, can be analyzed through nutrient hydrographs. The load calculation is also performed to find out the total N that exists in the aquifer.

The results showed the similarity of karst development in both springs. The recharge of Kalisirah Springs and Jumbleng Springs are dominated by diffuse. This is reinforced by the evidence that the flow of both springs is still quite stable during the dry season, even though the value has decreased. The calculation of N loads in the two springs shows different results. Kalisirah Springs has a greater N load compared to Mata Jumbleng. N load in Kalisirah Spring is at 91 kg/day – 532 kg/day. The Jumbleng spring has a smaller N load value, which is 7 kg/day – 26 kg/day. The Jumbleng catchment area also suffered an N loss of 57.86%, which is greater than the Kalisirahwatershed which lost 56.08% N of agricultural land. This N losses difference is due to the precentage area of the agriculture land at Jumbleng catchment area is greater than the Kalisirah catchment area.

Keywords: *catchment area, agriculture, nutrient, N load, N loss*