

INTISARI

Kota Bontang adalah kota yang berada di pesisir Kalimantan Timur dan berbatasan langsung dengan Selat Makassar. Kondisi geologis setempat, seperti keberadaan batuan yang kaya akan mineral, dapat mempengaruhi kualitas air di wilayah Kota Bontang. Penelitian ini bertujuan untuk mengetahui dan mengidentifikasi kadar logam berat pada sumber air baku dan batuan, dengan fokus pada unsur arsenik, chromium, timbal, dan merkuri serta menganalisis distribusinya untuk mengidentifikasi potensi kontaminasi yang berdampak pada kesehatan masyarakat. Hal ini dilatar belakangi oleh kondisi geologi lokal, khususnya keberadaan batubara yang kaya akan mineral sulfida, yang berpotensi melepaskan logam berat melalui proses pelapukan dan berpotensi menjadi sumber kontaminasi geogenik. Penelitian ini juga menganalisis kandungan logam berat pada batuan dan makanan laut sebagai pembandingan untuk memberikan gambaran komprehensif mengenai potensi kontaminasi yang dikonsumsi oleh masyarakat. Metode penelitian melibatkan pengumpulan data primer dan sekunder. Data primer diperoleh melalui observasi dan pengambilan sampel air sungai, air sumur, serta sampel batuan dari Formasi Kampungbaru. Sampel-sampel tersebut kemudian dianalisis menggunakan metode petrografi, *X-Ray Fluorescence* (XRF), *Ion Chromatography* (IC), dan *Inductively Coupled Plasma Mass Spectrometry* (ICP-MS) untuk mengetahui dan mengidentifikasi kadar logam berat. Hasil penelitian menunjukkan bahwa kadar logam berat bervariasi antar lokasi, dengan beberapa titik melebihi ambang batas baku mutu. Pada penelitian ini, standar baku mutu yang digunakan berdasarkan Peraturan Pemerintah (PP) No. 22 Tahun 2021 tentang air baku dan Peraturan Menteri Kesehatan Nomor 2 Tahun 2023 tentang air minum. Batuan batubara, quartz wacke, dan lithic wacke mengandung logam berat yang berpotensi menjadi sumber alami kontaminasi. Distribusi logam berat pada air menunjukkan pola peningkatan konsentrasi di hilir akibat proses transportasi dan akumulasi dan mengindikasikan kontribusi sumber geogenik terhadap kualitas air, yang berimplikasi pada risiko kesehatan.

Kata kunci: Kota Bontang, kontaminasi, logam berat, geogenik, air baku

ABSTRACT

Bontang City is a coastal city located in East Kalimantan and directly borders the Makassar Strait. The local geological conditions, such as the presence of mineral-rich rocks, can influence the water quality in the Bontang area. This study aims to determine and identify the concentrations of heavy metals in raw water sources and rocks, with a focus on arsenic, chromium, lead, and mercury, as well as to analyze their distribution in order to identify potential contamination that may impact public health. This research is motivated by the local geological setting, particularly the presence of coal rich in sulfide minerals, which has the potential to release heavy metals through weathering processes and become a source of geogenic contamination. The study also analyzes heavy metal content in rocks and seafood as a comparison, providing a comprehensive overview of potential contamination sources that may be consumed by the community. The research methods involve both primary and secondary data collection. Primary data were obtained through field observations and sampling of river water, groundwater, and rock samples from the Kampungbaru Formation. These samples were then analyzed using petrography, X-Ray Fluorescence (XRF), Ion Chromatography (IC), and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) to determine and identify the concentrations of heavy metals. The results indicate that heavy metal concentrations vary across locations, with some points exceeding the established quality standards. In this study, the water quality standards were based on Government Regulation (PP) No. 22 of 2021 concerning raw water and Ministry of Health Regulation No. 2 of 2023 concerning drinking water. Coal, quartz wacke, and lithic wacke were found to contain heavy metals that potentially serve as natural sources of contamination. The distribution of heavy metals in water shows an increasing concentration downstream due to transport and accumulation processes, indicating the contribution of geogenic sources to water quality, which poses potential health risks.

Keywords: Bontang City, contamination, heavy metals, geogenic, raw water