

## ABSTRAK

Kualitas air di Desa Madangan Kaja, Gianyar, memiliki peran penting sebagai sumber utama kebutuhan domestik Masyarakat. Aktivitas pertanian, pemukiman, dan pariwisata di sekitar lokasi berpotensi menurunkan kualitas air melalui pencemaran fisik, kimia, maupun biologi. Hingga saat ini belum ada penelitian terkait status mutu dan tingkat pencemaran pada mata air Sungai Pura Gunung Mertha. Penelitian ini bertujuan menilai kualitas air berdasarkan parameter fisika, kimia, dan biologi, serta menentukan nilai Indeks Pencemar menggunakan metode Storet dan Indeks Pencemaran, serta menganalisis hubungan antarparameter dengan *Principal Component Analysis* (PCA). Pengambilan sampel dilakukan di tiga titik dan tiga periode pengamatan. Hasil analisis metode Storet menunjukkan status mutu air berkisar dari baik hingga tercemar ringan, sedangkan metode Indeks Pencemaran menunjukkan kategori memenuhi baku mutu hingga tercemar ringan. Analisis PCA mengidentifikasi parameter dominan penyumbang pencemaran, antara lain beberapa logam berat dan bakteri *E. coli*. Berdasarkan hasil tersebut, kualitas air masih layak untuk dikonsumsi setelah pengolahan tambahan, dengan rekomendasi peningkatan pengelolaan sumber mata air dan edukasi masyarakat untuk mencegah penurunan kualitas di masa mendatang.

Kata kunci: *Kualitas air, indeks pencemar, storet, PCA*

## ABSTRACT

Water quality in Madangan Kaja Village, Gianyar, plays a crucial role as the primary source of domestic water supply for the community. Agricultural activities, residential areas, and tourism around the location have the potential to degrade water quality through physical, chemical, and biological pollution. To date, no studies have been conducted on the water quality status and pollution levels of the Pura Gunung Mertha River Spring. This study aims to assess water quality based on physical, chemical, and biological parameters; determine the Pollutant Index value using the Storet method and Pollution Index; and analyze the relationship between parameters using Principal Component Analysis (PCA). Sampling was carried out at three points and three observation periods. The results of the Storet method analysis showed that water quality ranged from good to moderately polluted, while the Pollution Index method indicated categories ranging from meeting quality standards to slightly polluted. PCA analysis identified dominant parameters contributing to pollution, including several heavy metals and biological parameters. Based on these results, water quality is still suitable for consumption after additional treatment, with recommendations for improved management of water sources and public education to prevent future quality degradation.

Keywords: *Pollution Index, water quality, PCA, Storet*