

ABSTRAK

Produksi garam dengan metode geomembran bertujuan meningkatkan kualitas produk, namun masih berpotensi mengalami kontaminasi mikroplastik. Penelitian ini bertujuan untuk menganalisis kelimpahan, bentuk, ukuran, dan warna mikroplastik serta pengaruh penambahan arkea pada tambak garam geomembran di Pademawu, Pamekasan. Metode penelitian dilakukan melalui pengambilan sampel air garam, sedimen, dan garam kristal, kemudian dilakukan identifikasi mikroplastik secara visual menggunakan mikroskop berdasarkan karakteristik fisik. Hasil penelitian menunjukkan bahwa mikroplastik ditemukan pada seluruh sampel, dengan kelimpahan lebih tinggi pada perlakuan arkea yaitu 0,36 partikel/m³ pada air garam dan 0,86 partikel/kg pada garam, dibandingkan kontrol sebesar 0,23 partikel/m³ dan 0,47 partikel/kg. Mikroplastik didominasi oleh bentuk fiber. Warna mikroplastik didominasi oleh hitam dengan persentase mencapai 83,87% pada air laut dan 77–83% pada sistem produksi garam, diikuti warna transparan dan merah dalam jumlah lebih kecil. Hasil uji statistik menunjukkan adanya perbedaan signifikan antara perlakuan dan kontrol (sig < **0,05**), yang mengindikasikan bahwa penambahan arkea berpotensi mempercepat proses fragmentasi mikroplastik sehingga meningkatkan jumlah partikel dengan ukuran lebih kecil, meskipun tidak mempengaruhi karakter warna. Selain itu, faktor lingkungan seperti evaporasi, suhu, dan paparan sinar matahari turut berperan dalam proses fragmentasi dan akumulasi mikroplastik selama kristalisasi garam.

Kata Kunci: Garam Geomembran, Mikroplastik, Arkea, Kelimpahan, Fragmentasi, Tambak Garam

M. Hifnin NPM 220341100066 *Analysis of the Effect of Archaea on Microplastics in Geomembrane-Based Salt Production (Case Study: Pademawu Salt Ponds, Pamekasan)* **Nike Ika Nuzula, S.Si., M.T**

ABSTRACT

Geomembrane-based salt production systems are designed to enhance product quality; however, they remain susceptible to microplastic contamination. This study aimed to quantitatively and qualitatively characterize microplastics—specifically their abundance, morphology, size distribution, and color—and to evaluate the effect of archaea addition in geomembrane salt ponds located in Pademawu, Pamekasan. Samples of brine water, sediment, and crystallized salt were collected and analyzed through microscopic observation, with microplastics identified based on their physical characteristics. The results showed that microplastics were present in all samples, with higher abundance in the archaea treatment (0.36 particles/m³ in brine and 0.86 particles/kg in salt) compared to the control (0.23 particles/m³ and 0.47 particles/kg). Microplastics were predominantly fiber-shaped, with black as the dominant color (83.87% in seawater and 77–83% in the salt production system), followed by transparent and red particles in smaller amounts. Statistical analysis showed a significant difference between treatment and control ($p < 0.05$), indicating that the addition of archaea may accelerate microplastic fragmentation and increase the number of smaller particles, although it does not affect color characteristics. Environmental factors such as evaporation, temperature, and solar radiation also contribute to microplastic fragmentation and accumulation during salt crystallization.

Keywords: Geomembrane salt, microplastics, archaea, abundance, fragmentation, salt pond