ABSTRAK

Latar Belakang: Mikroplastik adalah partikel plastik yang berukuran 1 -5000 µm. Mikroplastik merupakan *emerging pollutant* yang banyak ditemukan dalam berbagai sumber air, termasuk air minum dalam kemasan (AMDK) galon dan berpotensi memiliki risiko terhadap kesehatan manusia.
Metode: Penelitian dilakukan dengan pendekatan deskriptif kuantitatif melalui observasi dan uji laboratorium menggunakan mikroskop stereo serta *Fourier Transform Infrared* (FTIR). Sebanyak 45 sampel air galon dianalisis, terdiri dari galon bermerek (A dan B) dan air isi ulang (IU).
Hasil: Sebanyak 1016 partikel mikroplastik terdeteksi, dengan bentuk dominan fiber (66.5%), diikuti fragmen, film, pellet, dan foam. Warna partikel yang paling banyak ditemukan adalah hitam (47.5%), disusul transparan/bening, biru, kuning, dan merah. Mikroplastik berukuran 1001–5000 µm paling sering ditemukan, terutama pada galon isi ulang. Kelimpahan rata-rata mikroplastik tertinggi terdapat pada air galon isi ulang sebesar 28.0 partikel/L, lebih tinggi dibandingkan merek B (20.9 partikel/L) dan merek A (18.9 partikel/L), dengan perbedaan kelimpahan signifikan antar merek ($p = .001$). Uji FTIR mengidentifikasi polimer dominan berupa Cellophane dan Polyethylene Terephthalate (PET), selain itu ditemukan juga Polypropylene (PP), Polyester Resin, Polyarylamide, dan Poly (Tetrafluoroethylene: propene). Hasil regresi linear sederhana menunjukkan bahwa jumlah goresan pada area leher dan mulut galon serta paparan sinar UV berhubungan signifikan dengan kelimpahan mikroplastik.
Kesimpulan: Temuan ini mengindikasikan bahwa air minum kemasan galon isi ulang memiliki potensi kontaminasi mikroplastik yang lebih tinggi dibandingkan galon bermerek. Temuan ini diharapkan dapat menjadi landasan awal dalam meningkatkan kesadaran publik, perbaikan kualitas produksi oleh produsen, penguatan kebijakan pengawasan kualitas air minum dalam kemasan galon. Selain itu, mengingat potensi paparan jangka panjang, diperlukan penelitian lanjutan mengenai implikasi mikroplastik terhadap kesehatan manusia.

Kata kunci: Air galon, FTIR, Mikroplastik, Polimer Plastik

ABSTRACT

Background: Microplastics are plastic particles with the size of 1-5000 µm. They are a type of emerging pollutants commonly found in various water sources, including packaged drinking water (PDW), and have the potential to pose a risk to human health. This research focuses on 19-L bottled drinking water that will be called as packaged water consequently.
Method: The research was conducted using a quantitative descriptive approach through observation and laboratory tests using a stereo microscope and *Fourier Transform Infrared* (FTIR). A total of 45 packaged water samples were analyzed, consisting of branded packaged water (brands A and B) and refillable packaged water.
Results: A total of 1016 microplastic particles were detected, with the dominant form being fiber (66.5%), followed by fragments, films, pellets, and foam. The most common particle color found was black (47.5%), followed by transparent, blue, yellow, and red. Microplastics at the size ranging from 1001 to 5000 µm were most frequently found, especially in refillable packaged water. The highest average abundance of microplastics was found in refillable packaged water at 28.0 particles/L, higher than brand B (20.9 particles/L) and brand A (18.9 particles/L), with significant differences in abundance between brands ($p = .001$). FTIR testing identified the dominant polymers as Cellophane and Polyethylene Terephthalate (PET), and Polypropylene (PP), Polyester Resin, Polyarylamide, and Poly (Tetrafluoroethylene: propene) were also found. The results of simple linear regression showed that the number of scratches on the neck and mouth of the bottle and exposure to UV light were significantly related to the abundance of microplastics.
Conclusion: These findings indicate that refillable packaged drinking water has a higher potential for microplastic contamination compared to branded gallons. These findings are expected to be the initial basis for increasing public awareness, improving production quality by producers, strengthening policies for monitoring the quality of gallon bottled drinking water. In addition, given the potential for long-term exposure, further research is needed on the implications of microplastics on human health.

Keywords: FTIR, Microplastics, Packaged Water, Plastic Polymers