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DOES SHELF LIFE AFFECT THE LEVEL OF MICROPLASTICS IN BOTTLED WATER

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Microplastics (MPs) have been detected worldwide in freshwater systems and drinking water. This longitudinal study examined the effect of the shelf-life of bottled water on MP levels and their properties over time. Bottled water samples were purchased from the market in the Kandy District and were stored at room temperature with ambient light conditions for 3, 6, and 12 months. Water was then filtered through a 0.45µm membrane filter to separate MPs. The membrane filter was examined and enumerated under the stereomicroscope at 40X magnification. The MPs were classified according to their colour, form, and shape. Confirmation of detected particles as MPs and identification of polymer type was performed using FTIR spectroscopy. Of the 44 bottles analysed, 43 (98%) had MPs, which were mostly found as fibres, followed by films and fragments. About half of the MPs were transparent; others were blue, pink, black, brown, purple and yellow. Twelve types of polymers and sizes ranging from 5 – 5,000µm were identified. There was no difference in the concentration of MPs in bottled water with different storage durations (Two-way ANOVA; $f = 14.54$; $p > 0.05$). However, the number of MPs significantly decreased with the storage time, from a range of 2–28, 2–20 and 5–12 MPs/L in bottles kept for 3, 6, and 12 months, respectively. The results showed that although the shelf life did not increase the amount of microplastics in bottled water, they may break into smaller nanoplastics during longer storage, which has to be further investigated.

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