
First assessment of plastic pollution in juvenile Magellanic penguins (*Spheniscus magellanicus*) from South Atlantic Coasts

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Abstract

Plastic pollution is a global problem and an improve knowledge in this regard is urgent to find solutions. The aim of this work was to assess, for the first time, the occurrence, types and composition of plastic pollution in juvenile Magellanic penguins (*Spheniscus magellanicus*) stranded at different beaches from the southern Buenos Aires Province, Argentina. Macro-, meso- and microplastic particles (MPs) were found in 100% of the gastrointestinal tract from 21 individuals. Particle levels ranged from 33 to 200 items per individual. A total number of 1609 particles were extracted and characterized, a 0.2% of particles were macroplastic, 8.8% mesoplastics and 91% MPs, represented mostly by fibers (98.5%). A prevalence of the smallest particles was found (< 1 mm; 35%), followed by 1-2 mm (33%) and 2-3 mm (19%). According to the color, black MPs were the most abundant (30%), followed by transparent (26%), blue (14%), yellow (14%), and red (10%). Infrared and Raman spectroscopies were used to evaluate the chemical composition of the particles found. Most of the large particles were identified as polypropylene (62%) followed by low-density polyethylene (23%) and high-density polyethylene (15%). For small plastic particles, polyester was the most abundant material (28%) followed by polypropylene (18%), polyethylene terephthalate (10%), polystyrene (4%) and polyethylene (3%). Materials such as viscose (4%), anthropogenic cellulosic (22%) and anthropogenic pigments (7%) were also found. These findings provide the first and southernmost evidence of plastic pollution in juvenile Magellanic penguins. The characterization of these particles could help to identify possible sources of pollutants in the South Atlantic waters and these data could be a basis for a review of policy measures on plastic pollution and the development of mitigation measures. Finally, stranded juvenile Magellanic penguins are postulated as promising plastic pollution bioindicators from South Atlantic waters.

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