
Microfibers at the Negro River, Patagonia Argentina

Marisol Fernandez^{*1}, Ana L. Oliva², Ana C. Ronda^{1,3}, Maria C. Menendez¹, Cintia M. Piccolo¹, Alejandro Vitale¹, and Andrés H. Arias^{†1,4}

¹Instituto Argentino de Oceanografía (IADO – CONICET/UNS). – Camino La Carrindanga km 7.5, 8000 Bahía Blanca, Argentina., Argentina

²Argentine institute of oceanography – Florida 8000 (Camino La Carrindanga km 7,5), Bahía Blanca, Provincia de Buenos Aires, Argentina

³Departamento de Biología, Bioquímica y Farmacia, Universidad Nacional del Sur. – Av. Alem 1253, 8000 Bahía Blanca, Argentina., Argentina

⁴Departamento de Química, Área III, Química Analítica. Universidad Nacional del Sur – Av. Alem 1253, 8000 Bahía Blanca, Argentina., Argentina

Abstract

Riverine inputs to the ocean has been pointed as a major source of plastics to the ocean; beside this, information on river plastic loads is scarce and patchily distributed around the world. In this work, we aimed to assess the average amount of microfibers (MFs) transported in the Negro River (NR, Argentinean Patagonia) water which reaches its estuary and the Atlantic coast along cold (July) and warm (December) seasons. Then, surface water was collected at six locations along the Negro River estuary (El Condor, El Pescadero, La Baliza, NR mouth, Water Facilities, Patagones City) using a 350 μm pore floating net fitted with a mechanical flowmeter. The samples were subsequently digested with 30% H₂O₂ at 40 °C for 72 h, filtered with GF/F filters and finally counted under binocular stereoscopic loupe. The results obtained showed that MF particles were found in 100% of the samples with a global average of 0.65 MFs.m⁻³. While lower counts were found in winter (0.42 ± 0.21 MFs.m⁻³), concentrations in summer almost doubled the winter values (0.79 ± 0.72 MFs.m⁻³) probably due to the higher outdoor activities along the river. The northern and much less urbanized area of the river estuary (La Baliza) showed the minimum microfiber values independently of the sampling season. In regards to microfiber size distribution and colour, there was a homogeneous pattern along the year which showed higher counts in the medium and small microplastic range ($> 1 \mu\text{m}$ up to 3 mm). The average colour distribution was black (41%)> transparent (20%)> blue (12%)> white (11%)> red (9%)> green (7%). This work provides evidence of the impact of plastic in riverine waters reaching the Atlantic Ocean, providing a scientific baseline and raising a concern in regard to the need to mitigate each possible source of MFs to the water course.

Keywords: Negro River, Estuary, Microplastics, Microfibers, Atlantic Ocean

^{*}Speaker

[†]Corresponding author: andresarias.ar@gmail.com