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Analysis of phthalate esters in adipose tissue of *Pontoporia blainvillei* collected in southern Brazil (Florianopolis county, Santa Catarina state)

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Preliminary results

Analysis of phthalate esters in adipose tissue of *Pontoporia blainvillei* collected in southern Brazil (Florianópolis county, Santa Catarina state)

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Summary

The impact of marine pollution on the health of marine animals is a growing concern worldwide, with plastic being one of the most alarming pollutants. Plastic polymers disposed in oceans give rise to fragments as, for instance, microplastics and nanoplastics (Barnes et al., 2009). This process release chemical compounds added during the manufacturing of plastic products, including phthalate esters (dimethyl and dibutyl phthalates, e.g.) (Arthur et. Al., 2009), the largest chemical class of plasticizers used worldwide (Godwin, 2017). Such ester compounds are not chemically bound to the plastic polymers and can leach and integrate into the marine environment (Navarro et. Al., 2010). Further, animals can become contaminated through the ingestion of contaminated food or plastics, or by exposure to the contaminated environment (Fierens et. al., 2012; Heudorf et al., 2007). The literature has shown the endocrine disruption potential of phthalate esters, causing problems linked to the reproduction of marine animals (Routti et al., 2021). In this context, this study investigated the presence and the amounts of four phthalate esters, namely dimethyl phthalate (DMP), diethyl phthalate (DEP), dibutyl phthalate (DBP), and di(2-ethylhexyl phthalate) (DEHP) in abdominal adipose tissue (i.e., blubber) collected from 24 *Pontoporia blainvillei* carcasses, an *Odontoceti* species critically endangered according to the IUCN Red List. For that, an extraction method involving organic solvents and sonication of the blubber samples was developed, followed by gas chromatography analysis (Vanstreels et al., 2022). DEP and DEHP were present in 100% of samples, with minor but relevant frequencies found for DMP (66.66%) and DBP (58.33%). A wide range of concentrations of those xenobiotics was detected, varying from 0.57-37.32 ng/μl (DMP), 10.21-80.78 ng/μl (DEP), 3.03-44.86 ng/μl (DBP), and 0.51-132.21 ng/μl for DEHP. The later ester has been the most commonly used phthalate worldwide (Godwin, 2017), and its presence is still significant in the oceans where it has been accumulated over decades, which may explain its

frequency of occurrence and contents in the bubbler samples herein studied. The presence of phthalates in the environment (foods, water, soil, etc.) (Yukioka et al., 2020; Alfonso et al., 2020) is an increasing global problem that needs to be better understood and overcome, aiming at the preservation of marine fauna, such as the critically endangered species *Pontoporia blainvillei*. Further metabolomics studies should be carried out to gain insights regarding the impact of these xenobiotics in animal metabolism, helping to identify the biochemical pathways more directly disrupted and their consequences on cell and animal physiology.

Keywords: Phthalates, Cetacean, Pollution

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