Plastic ingestion and associated additives in Faroe Islands chicks of the Northern Fulmar Fulmarus glacialis

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Abstract

Northern Fulmars (*Fulmarus glacialis*) are a pelagic seabird species distributed at northern and polar latitudes. They are often used as an indicator of plastic pollution in the North Sea region, but data are lacking from higher latitudes, especially for juveniles and chicks. Here, we investigated plastic burdens in the stomachs of fulmar chicks from the Faroe Islands and associated contaminants in their livers. Plastic particles (≥1 mm) in chicks of two age classes (2 and 6 weeks old) were analyzed using a digestion method with KOH. Stomach contents were digested and all plastic particles were weighed, counted and characterized (shape, colour and length). To evaluate if additive tissue burden reflects plastic ingestion, we measured liver tissue concentrations of two contaminant classes associated with plastic materials: polybrominated diphenyl ethers (PBDEs) and dechloranes, using gas chromatography with high-resolution mass spectrometry. The most common shape was hard fragment (81%) and the most common polymer was polyethylene (73%). On average, 12.4 ± 17.5 plastic particles and 0.15 ± 0.21 mg of plastic were found per chick. The maximum number of plastic particles was 78 particles in a 6-week old chick. Plastic contamination did not differ between age classes, and we found no correlation between either the number and mass of plastic particles and the concentration of additives. Every chick was contaminated with at least four different PBDEs, where the youngest ones contained on average higher total PBDE concentrations than their older counterparts. Similarly, at least one congener of dechlorane was detected in every chick, with the youngest ones showing higher levels than the older ones. After comparison with previous plastic pollution studies on adult fulmars, we do not recommend using chicks for biomonitoring of plastics because chicks seem to ingest more plastics than adults and this makes comparisons with studies on older fulmars impossible.

Keywords: Plastic, fulmar, Faroe Islands, OSPAR, PBDE, dechlorane

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