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Seabirds accumulate harmful chemicals in their bodies from eating plastic

A new study by an international team of scientists on plastic pollution, and its associated impacts on marine fauna due to chemical contamination, found that many seabirds are likely to accumulate harmful chemicals directly from eating plastic.

The study, published in the new online journal *Environmental Monitoring and Contaminants Research*, analyzed 145 preen gland oil samples from 32 seabird species with different foraging habits and life history strategies from around the world for plastic additives and other persistent organic pollutants.

Plastic additives were detected among a range of seabirds from around the world. Brominated flame retardants were detected in 11% of seabirds and benzotriazole-type UV stabilizers in 46% of seabirds.

High concentrations of additives were detected in seabirds that ate large plastic loads, including Great Shearwaters from Gough Island in the central South Atlantic Ocean and Blue Petrels from the Southern Ocean south of Africa. Other species with particularly high concentrations of these plastic-associated compounds included Black-footed and Laysan Albatrosses and Hawaiian petrels, all from Hawaii, and Flesh-footed Shearwaters from Western Australia.

One of the paper's co-authors and director of the FitzPatrick Institute of African Ornithology at the University of Cape Town, Professor Peter Ryan, said that polychlorinated biphenyls (PCBs) and organochlorine pesticides (DDT, DDE and HCHs) were detected in almost all samples.

"High concentrations of PCBs and DDTs were observed in seabird top predators, indicating that these long-lasting legacy pollutants, which have long been banned under the Stockholm Convention, are obtained from seabird prey and biomagnification," he said.

By comparison, the plastic-associated contaminants were not correlated with these legacy pollutants, and were mostly found in species that often ingest large amounts of

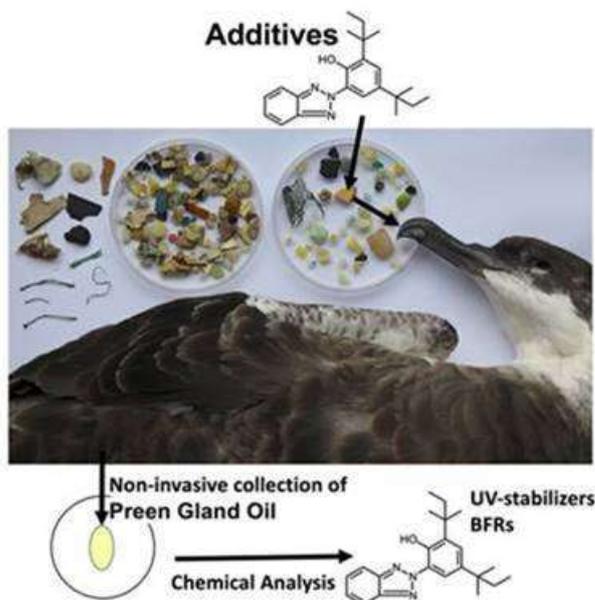
plastic. Ryan noted that UV stabilizers were detected more frequently than flame retardants because UV stabilizers are more widely used in the manufacture of plastic products.

“Although plastic items are largely immune to biodegradation, they gradually break down when exposed to UV radiation, which is why UV stabilisers are added to plastics used in long-lasting applications such as window frames and car parts,” said Ryan.

Flame retardants are also added to some consumer products to reduce the risk of fires. “Marine plastic debris can contain other hazardous chemicals, and our study confirms that such compounds can be taken up directly from ingested plastic into seabirds. The potential toxicological impact is concerning because some of these compounds are known to disrupt endocrine functioning,” he added.

Globally, approximately 400 million metric tons of plastics are produced each year, a portion of which escapes into the environment, eventually finding its way into the oceans. Currently, around half of the world’s seabirds have been reported to contain ingested plastics, but it is likely that virtually all species are exposed to plastics, either consuming it directly, or through contaminated prey.

Ryan commented: “It is worrying that species like the Blue Petrel, which spend all their lives in the Southern Ocean, the ocean with the lowest concentration of floating plastic, can find enough plastic to be affected in this way. We need to ensure that all plastic waste is disposed of correctly – ideally re-used or recycled, but definitely not littered or dumped illegally in the environment.”



A Great Shearwater with an exceptionally large load of ingested plastics found dead at Tristan da Cunha.

Photo: Peter Ryan

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