

Evento: DIOXIN 2015 – “35TH INTERNATIONAL SYMPOSIUM ON HALOGENATED PERSISTENT ORGANIC POLLUTANTS (DIOXIN2015), realizado nos dias 23 a 28 de agosto de 2015, em São Paulo, SP.

Título: “Evaluation of seabird exposure to pop-like (Organotin) compounds in coastal Waters of Rio de Janeiro state (Brazil) through total tin concentrations in integumentary system”

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Apresentação: painel

35TH INTERNATIONAL SYMPOSIUM ON HALOGENATED PERSISTENT ORGANIC POLLUTANTS (DIOXIN2015)
August 23rd to 28th, 2015
São Paulo - Brazil

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EVALUATION OF SEABIRD EXPOSURE TO POP-LIKE (ORGANOTIN) COMPOUNDS IN COASTAL WATERS OF RIO DE JANEIRO STATE (BRAZIL) THROUGH TOTAL TIN CONCENTRATIONS IN INTEGUMENTARY SYSTEM

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Introduction

Environmental contamination by organotin compounds (OTs) has received considerable attention due to the bioaccumulative nature of these substances. Metals constitute a pollutant group that raises high environmental concern, especially the organic forms, as they are the most toxic chemical species.

Seabirds have been used as sentinels of environmental contamination by toxic elements, due to their high longevity and high trophic positions occupied. Feathers are considered an excretory routes for these toxicants, and can be used for monitoring bird exposure.

OTs in inks applied to submerged parts of ships and floating platforms in order to prevent incrustation of molluscs and crustaceans (antifouling activity). Tributyltin (TBT) is highly toxic and persistent in the environment, generating enormous concern about its use as a biocide in industry and agriculture



Materials and methods

Samples were obtained from individuals that nest in Cagarras Archipelago, which is located 4 km from the coast of Rio de Janeiro city (Fig 2). The seabird samples comprised wing feathers from frigatebirds (*Fregata magnificens*, n=14; 2 female, 1 male and 11 juveniles) and brown boobies (*Sula leucogaster*, n=27; 9 females, 11 males and 7 juveniles).



Fig 1. *Sula leucogaster* (Brown booby) and *Fregata magnificens*, seabirds of this study.

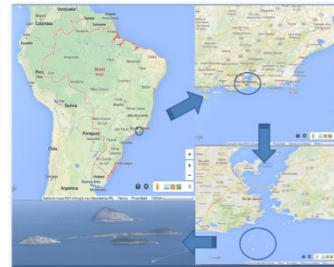


Fig2. Cagarras Archipelago. These islands are located 10 km south-westward from the entrance of this estuary. The birds of this study go in the Guanabara Bay everyday to feed. The most impacted bay in Brazilian coast.

Results and Discussion

No significant correlations were found between Σ Sn concentrations and biological parameters. For brown boobies, there was no significant difference between gender or adults and juveniles. Burger and Gochfeld determined heavy metal concentrations in feathers of *Sula sula* and *Fregata minor* from Midway Atoll (N. Atlantic) the same taxonomic genera. The Σ Sn concentrations found in birds from Cagarras Archipelago (RJ) seem to be lower than those found in *Fregata minor* (Great Frigate) and *Sula sula* (Red-footed Booby) by Burger and Gochfeld (Table 1). This apparent difference may be related to dissimilar degrees of environmental contamination by OTs in the two hemispheres, since the northern half of the planet was significantly more contaminated than the southern one.

Table 1. Mean, standard deviation and n number of analyzed specimens ($\mu\text{g Kg}^{-1}$, dry weight) found in the work of Burger and Gochfeld, 2000* and Archipelago Cagarras (this study).

Species	n	Cd	Se	Mn	Sn
<i>Sula sula</i> *	12	51.3±5.58	2340±112	1460±314	2280±262
<i>Sula leucogaster</i>	19	28.15±24,0	2343,08±1208,22	1559,31±883,74	257±85,7
<i>Fregata minor</i> *	5	204±127	4540±1290	590±79.7	752±165
<i>Fregata magnificens</i>	14	33,07±20,35	1941,845±778,00	1701,25 ±618,30	260 ±117

