

TOXIC AND ESSENTIAL METALS IN *Stenella coeruleoalba*: ASSESSMENT OF MARINE ENVIRONMENTAL POLLUTION AND DOLPHIN HEALTH STATUS

Naccari Clara, Ferrantelli Vincenzo, Bava Roberto, Palma Ernesto

Introduction

Heavy metals are environmental contaminants and can easily accumulate and biomagnificate in various species (fishes and mammals) at the top of the aquatic food chain. Among marine mammals, common dolphin (*Stenella coeruleoalba*) is used as sentinel specie of environmental pollution. The aim of this study was to determinate the content of toxic metals in organs of *Stenella coeruleoalba* in comparison with essential elements, to assess marine environmental pollution and dolphin health status.

Materials and Methods

Samples of liver, lung, muscle and skin of *Stenella coeruleoalba* (n= 18 dolphins) were digested with HNO₃ (70%) and H₂O₂ (30%) and submitted to analysis in ICP-MS for determination of toxic and potentially toxic metals (Hg, Cd, Pb, As and Cr, Ni) and essential micro and macro-elements (Se, Zn, Cu, Fe, Mn and Na, Ca, K, Mg).

Results

The results showed the presence of all metals analyzed, with highest Hg levels in all dolphin samples. The correlation among toxic and potentially toxic metals (Hg, Cd, Pb, As and Cr, Ni) and essential micro-elements (Zn, Se, Cu) was expressed as molar ratios. Particularly, the ratios were <1 (value considered as protection index) for ⁶⁶Zn/²⁰¹Hg, ⁸²Se/²⁰¹Hg, ⁶³Cu/²⁰¹Hg and for ⁶⁶Zn/⁵²Cr, ⁸²Se/⁵²Cr, ⁶³Cu/⁵²Cr in all organs, showing that toxic metals cannot be detoxified by these essential metals. However, the concentrations of all micro and macro-elements resulted normal and were predictive of dolphins health status.

Conclusions

The presence of toxic metals in organs of dolphins is correlated to marine environmental pollution and influenced by their food habits. The content of micro and macro-elements, introduced with the diet, documents dolphins health status, although the levels of detoxifying essential metals are unable to carry out a protective action against toxic metals, probably due to deficiency, sequestration or presence of other pollutants.

Keywords: Toxic and essential metals; *Stenella coeruleoalba*; marine environmental pollution