

## ANTIFOULANTS IN SEDIMENTS FROM THE FRENCH MEDITERRANEAN COAST

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### Abstract

Organotins have been used most extensively as the main biocide in antifouling paints. Due to deleterious effects, the use of organotins on small boats has been widely prohibited since the mid-1980s. IMO's Antifouling System Convention entered into force on 17 Sept. 2008 [1]. As a result, other formulations have been used. The goal of this study is to assess the level of antifoulants in ports and marinas along the Southern France coastline. Simultaneous derivatisation and extraction were used for organotins sample preparation and a GC-FPD (610 nm filter) was used for determinations. Other antifoulants were extracted by a microwave and analysed with a GC-NPD. Every port and marina showed high levels of organotins (37-4000 ng Sn/g d.w.) [2]. The only non-organotin compound found was Irgarol 1051 (<1-689 ng/g d.w.).

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Organotin compounds have been used most extensively as the main biocide in marine antifouling paints. Organotin-based paints have seen service on boats of all sizes, from small yachts to supertankers, thereby ensuring the global dispersion of tributyltin (TBT) throughout the marine environment. Due to deleterious effects on non-target organisms, the use of organotin compounds as antifouling agents on boat hulls of small vessels has been widely prohibited since the mid-1980s. IMO's Antifouling System Convention entered into force on 17 September 2008 [1]. As a result of restrictions on the use of organotin based paints, other antifouling formulations containing organic biocides have been utilised. Ports and marinas are recipients of a variety of toxic chemical inputs and can affect adjacent marine coastal ecosystems by, for example, dumping of dredge spoils. Thus, monitoring levels of contaminants in ports and marinas should be an important issue for local authorities. The goal of the present study is to assess the occurrence of organotin compounds and several other antifoulants in ports and marinas all along the Southern France coastline. Apart from organotin compounds, Irgarol 1051, Sea-nine, chlorothalonil, dichlofluanid and folpet were also measured in surface sediments collected in the major ports and marinas. Simultaneous derivatisation and extraction using sodium tetraethylborate were used for organotins sample preparation. An HP 5890 GC equipped with a FPD (610 nm filter) was used for all organotin determinations. A 30 x 0.25 mm x 0.25  $\mu$ m HP-5 capillary column was used with splitless injection. Other antifoulants were extracted by a microwave system and extracts were cleaned up using SPE florisil cartridges. An HP 6890 GC-NPD was used for all antifoulants determinations. A 30 x 0.25 mm x 0.25  $\mu$ m HP-5 capillary column was used with pulse splitless injection. Every port and marina exhibited high levels of organotin compounds, with concentrations ranging from 37 to 4000 ng Sn g<sup>-1</sup> dry wt [2]. The only non-organotin compound found was Irgarol 1051. The concentrations ranged from <1 to almost 700 ng g<sup>-1</sup> dry wt and, not surprisingly, the highest levels were found near the ship chandlers. Despite the strict regulations introduced 20 years ago in France banning the application of TBT based antifouling paints on ships of <25 m and more recently on all other boats, TBT still appears to be the main active ingredient in marine antifouling currently used in Southern France.

### References

- 1 - IMO Press Briefing 40, 16 September 2008, Harmful ships' paint systems outlawed as international convention enters into force.
- 2 - Cassi R., Tolosa I. and de Mora S., 2008. A survey of antifoulants in sediments from Ports and Marinas along the French Mediterranean coast. *Marine Pollution Bulletin*, 56: 943-1948 (scientific article).