

TBT- IMPACT Presentation

By

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Dona Paula

Goa

Objectives:

- Assessing the organotins concentration along some of the major harbours in India
- Monitoring TBT in water, sediments and some organisms
- Evaluate effect of TBT on biochemical composition of bacteria.
- Evaluate effect of TBT on exopolysaccharides produced by bacteria.
- Evaluate effect of TBT on PLFA composition in bacteria.
- Evaluate effect of TBT on PLFA in sediments

TBT contamination in water and sediments along some of the major harbours of India

Sampling sites:



Analytical procedure

Water

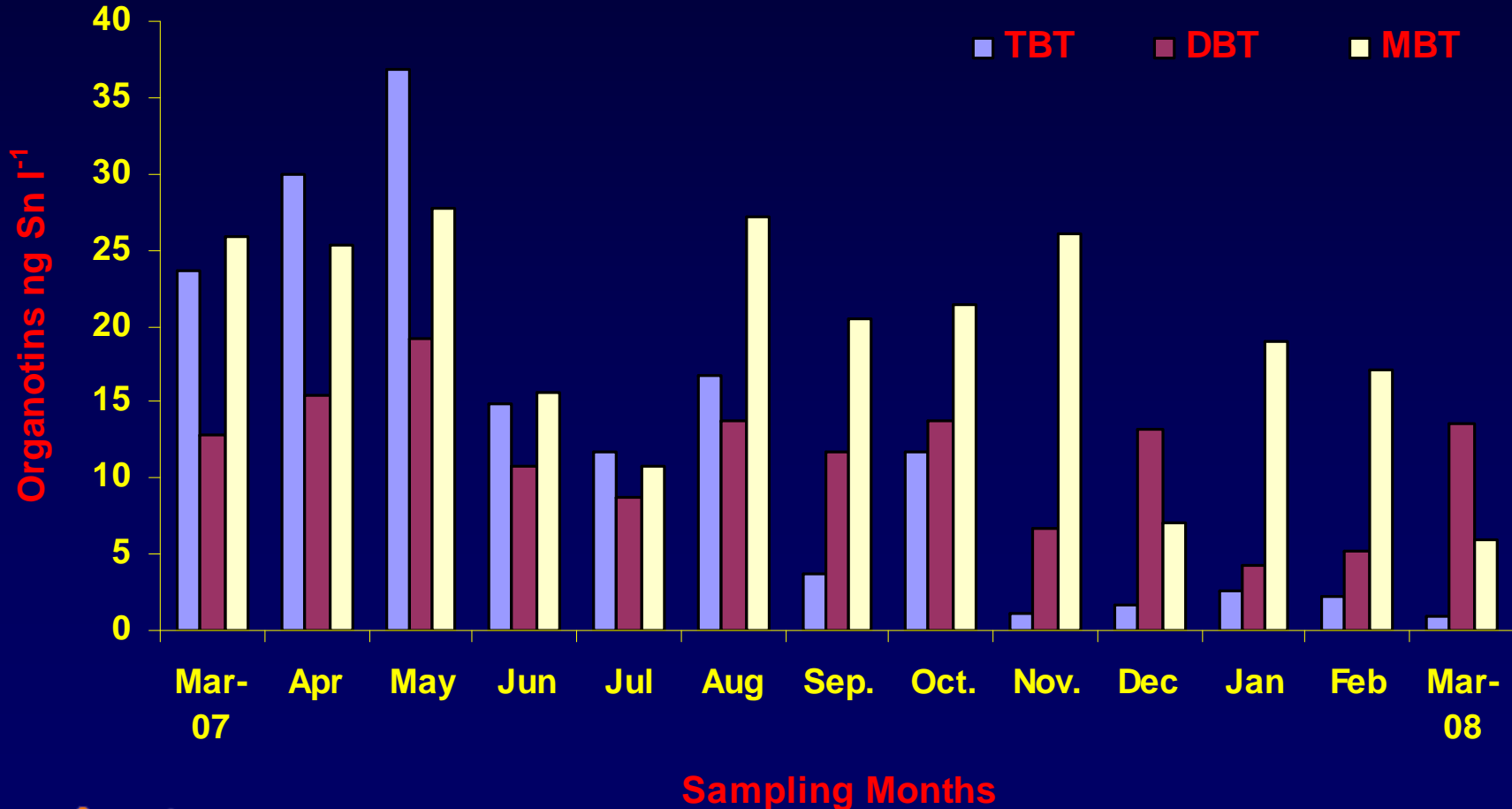
Animal

Sediment

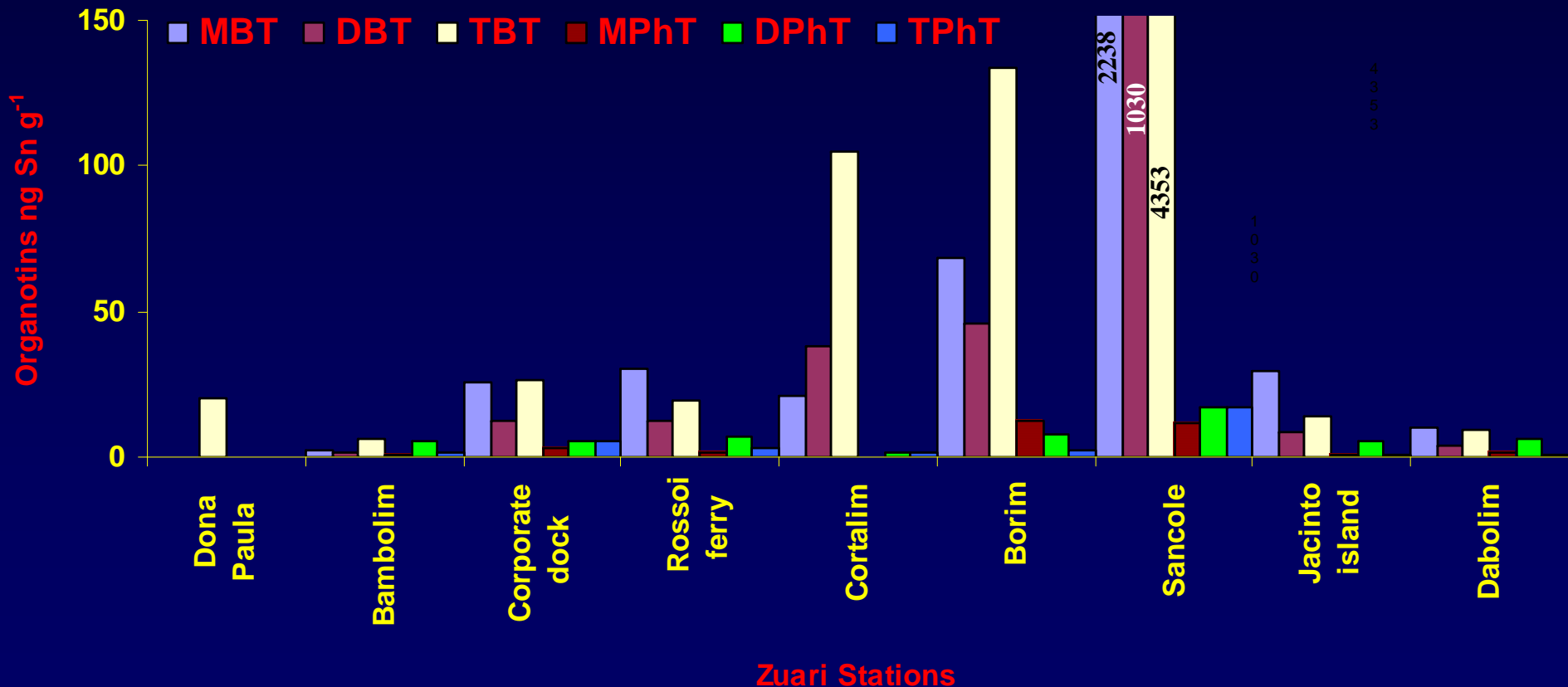
Grignard reagent

GC-MS

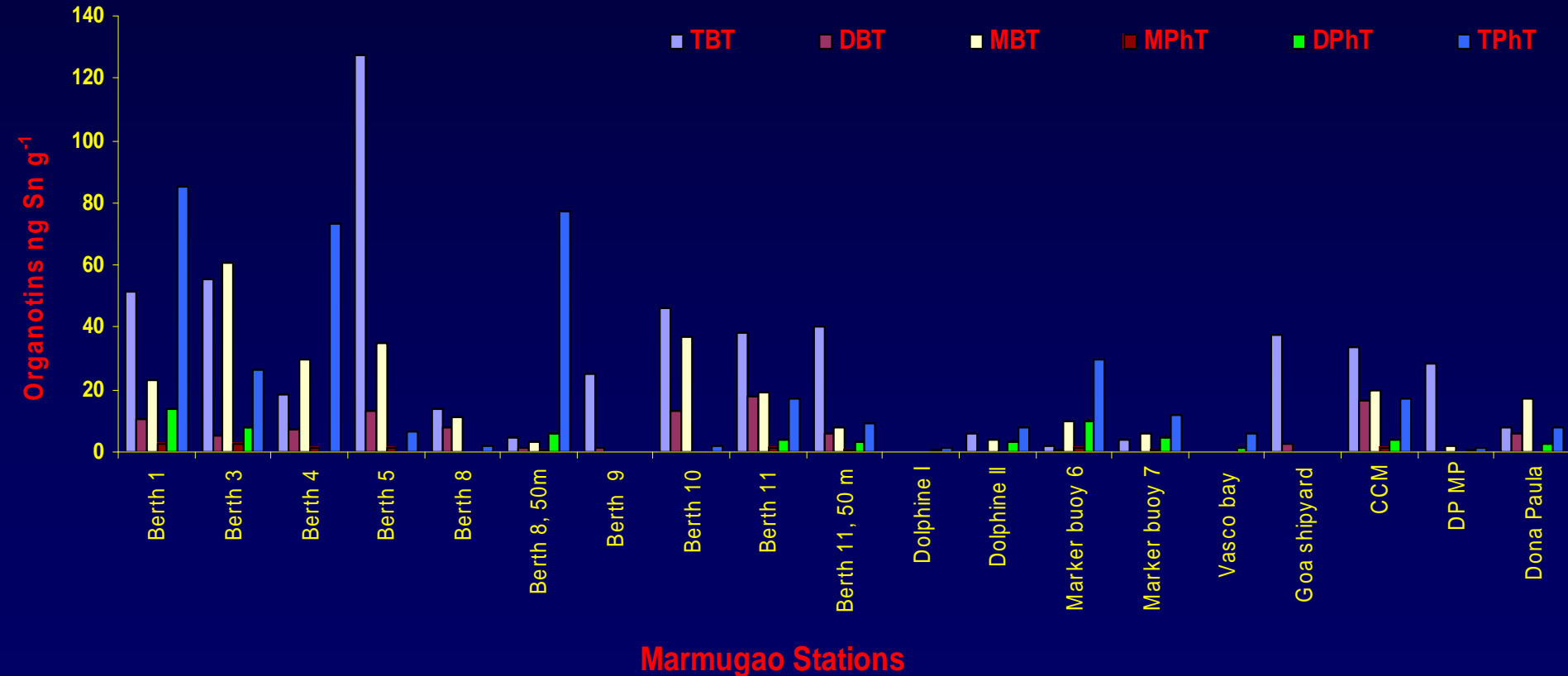
Distribution of Organotins in the waters of Dona Paula Bay at Goa, West Coast of India (March 2007-2008)



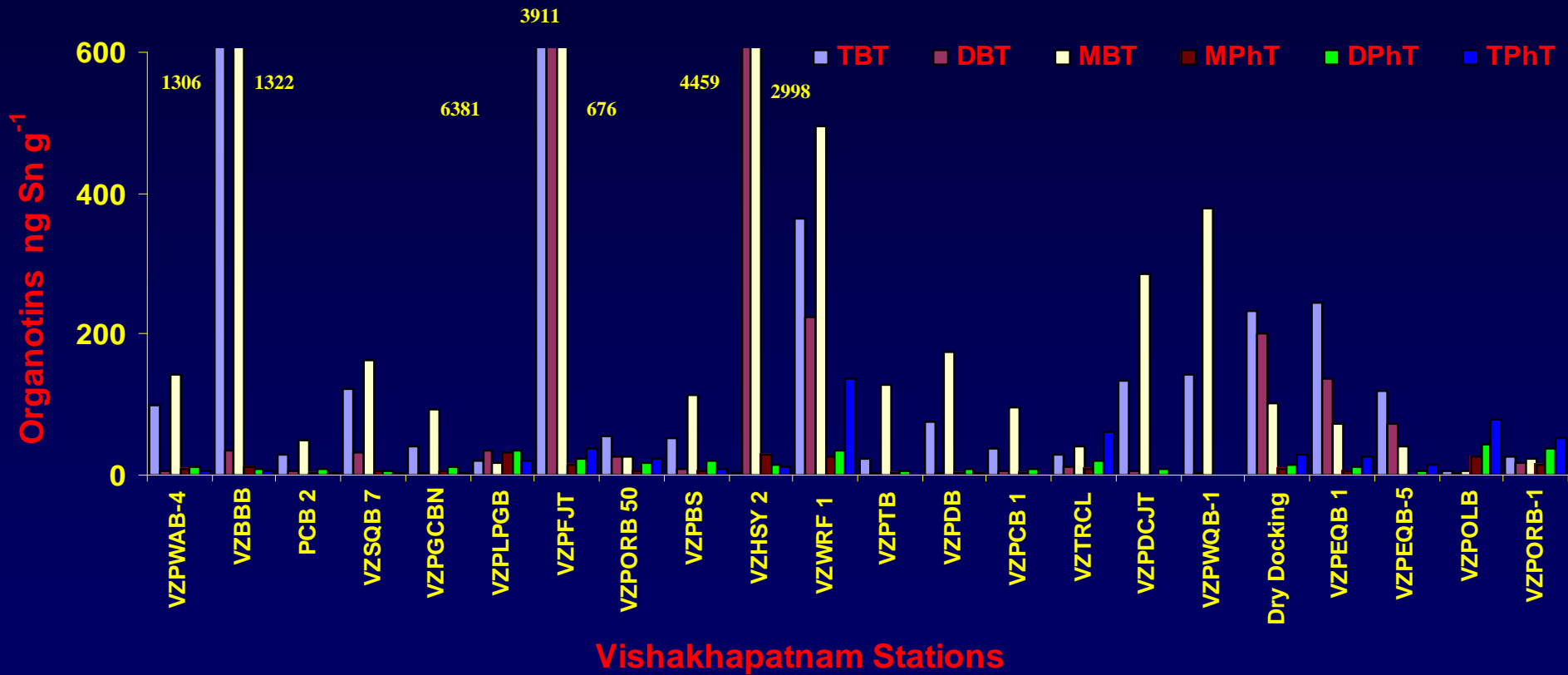
Distribution of Organotins in the sediments of Zuari estuary, West Coast of India



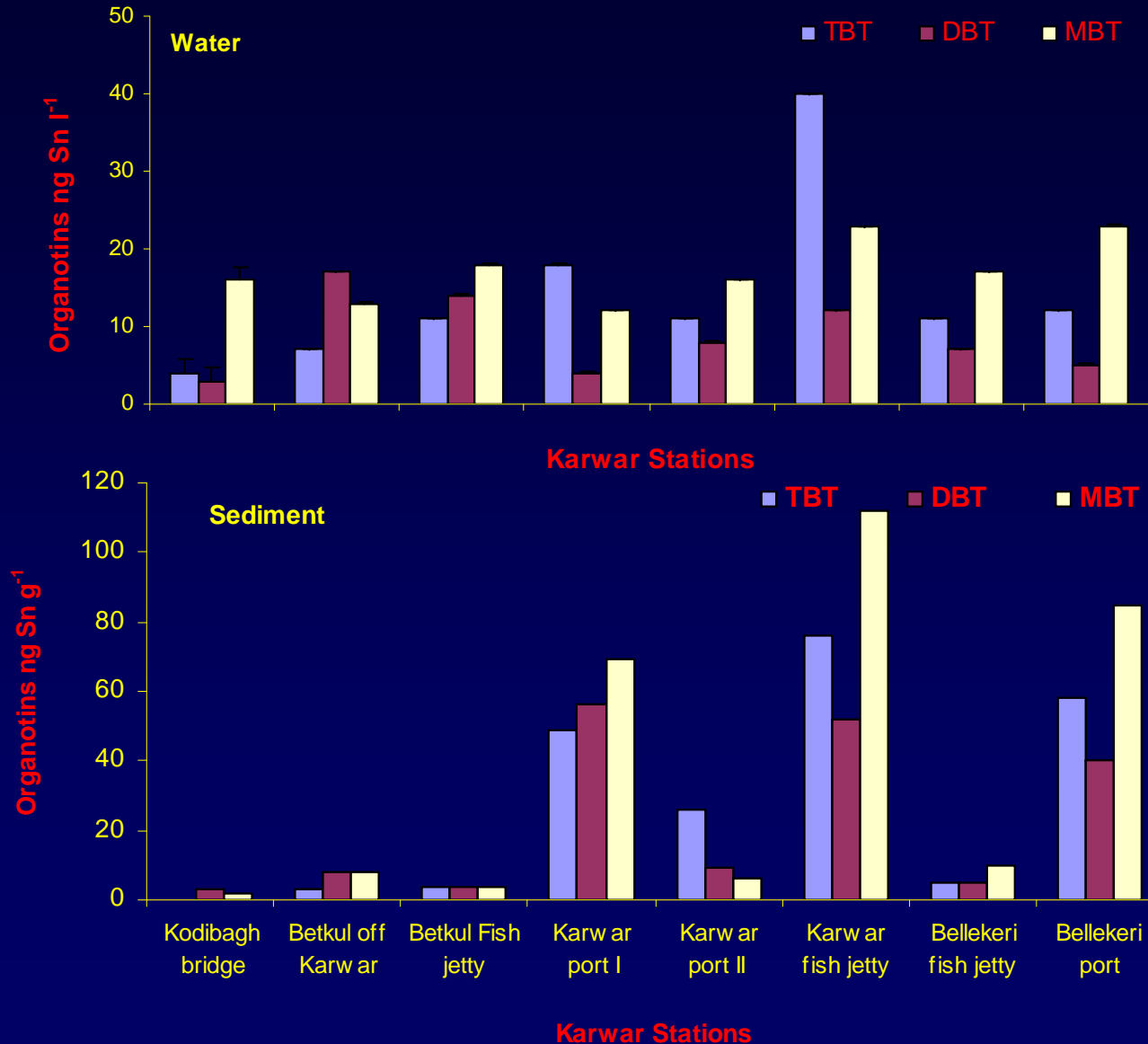
Distribution of organotins in the sediments of Marmugao harbour



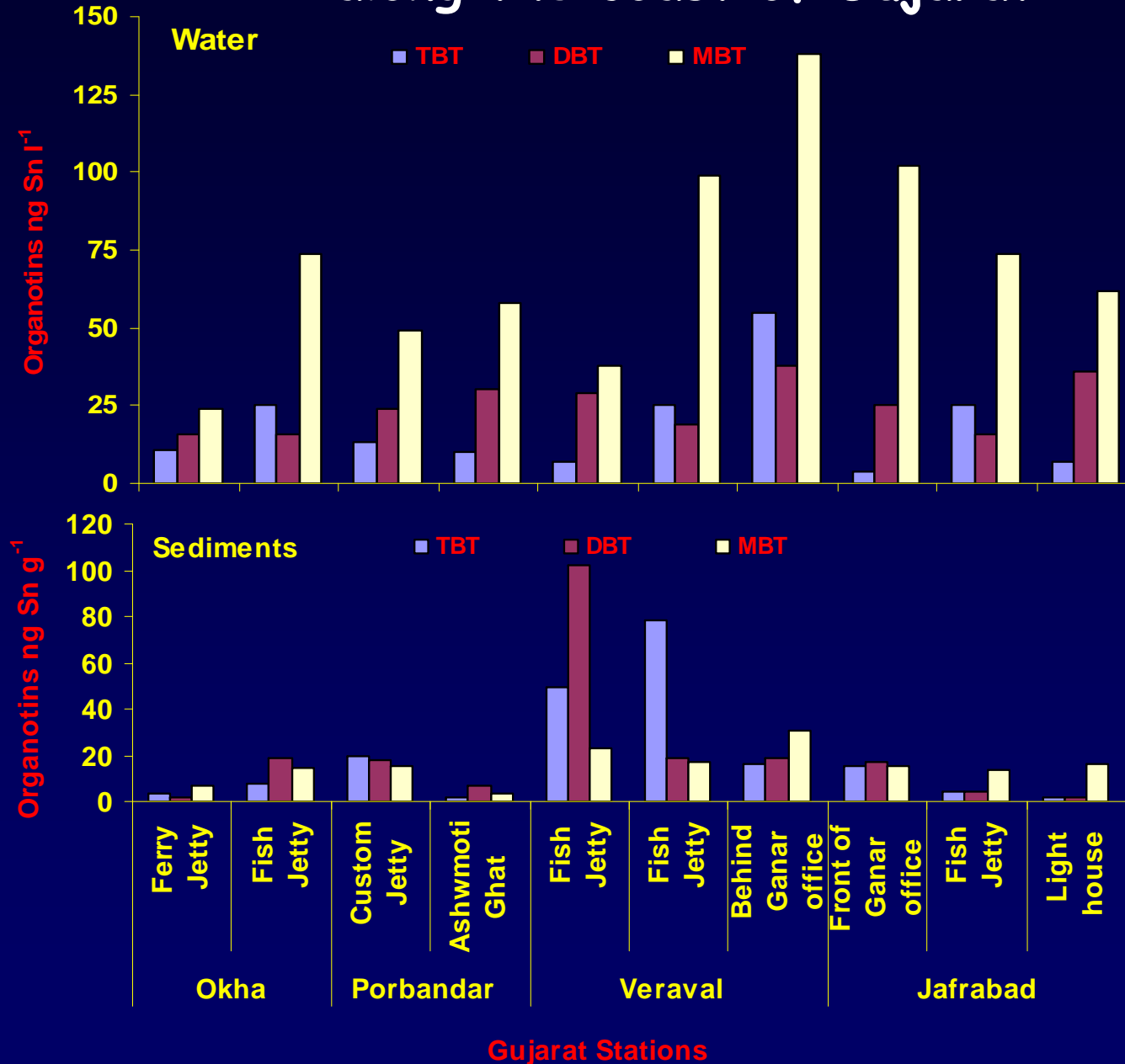
Distribution of organotins in the sediments of Vishakhapatnam harbour



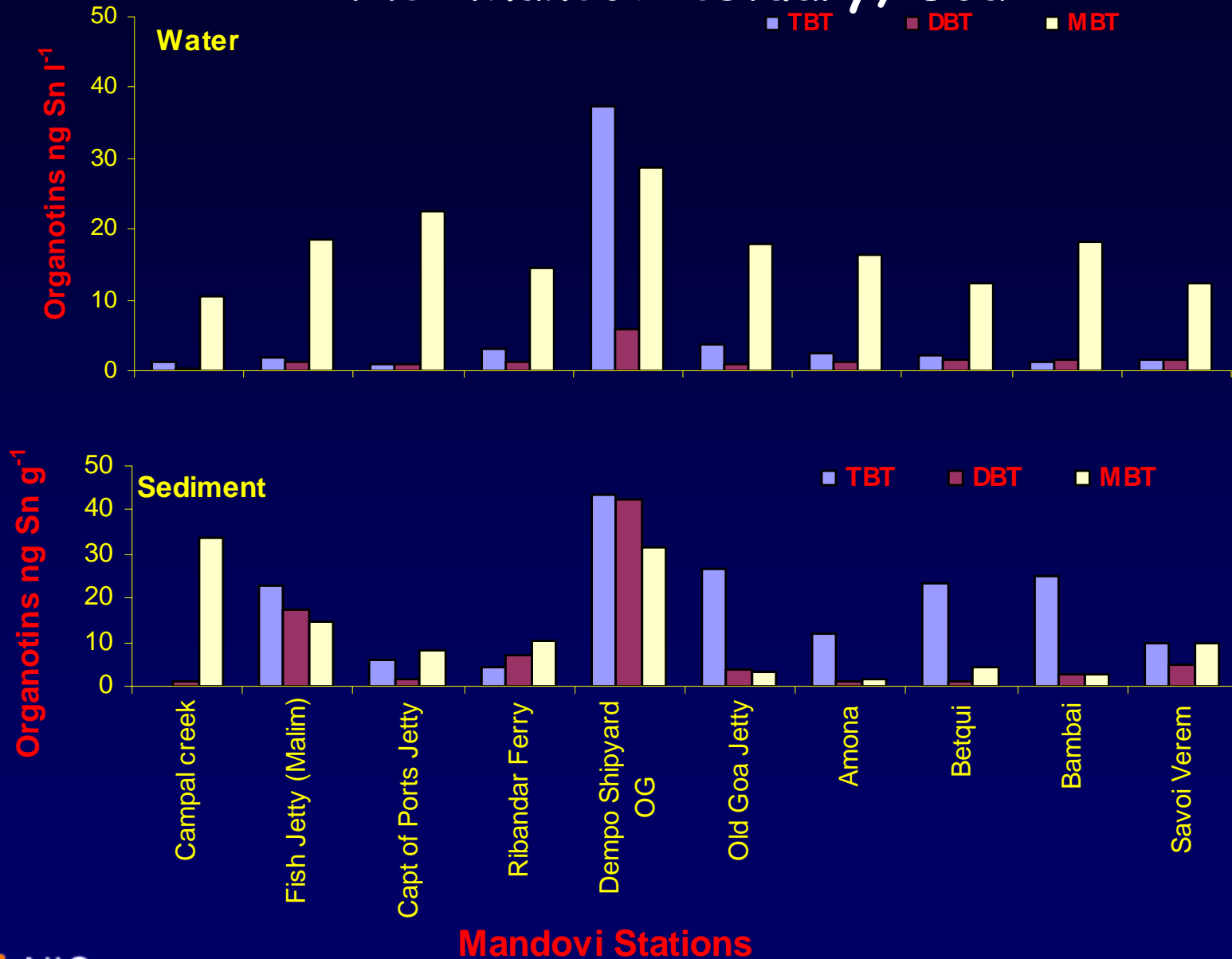
Distribution of butyltins in the water & sediments along Karwar coast



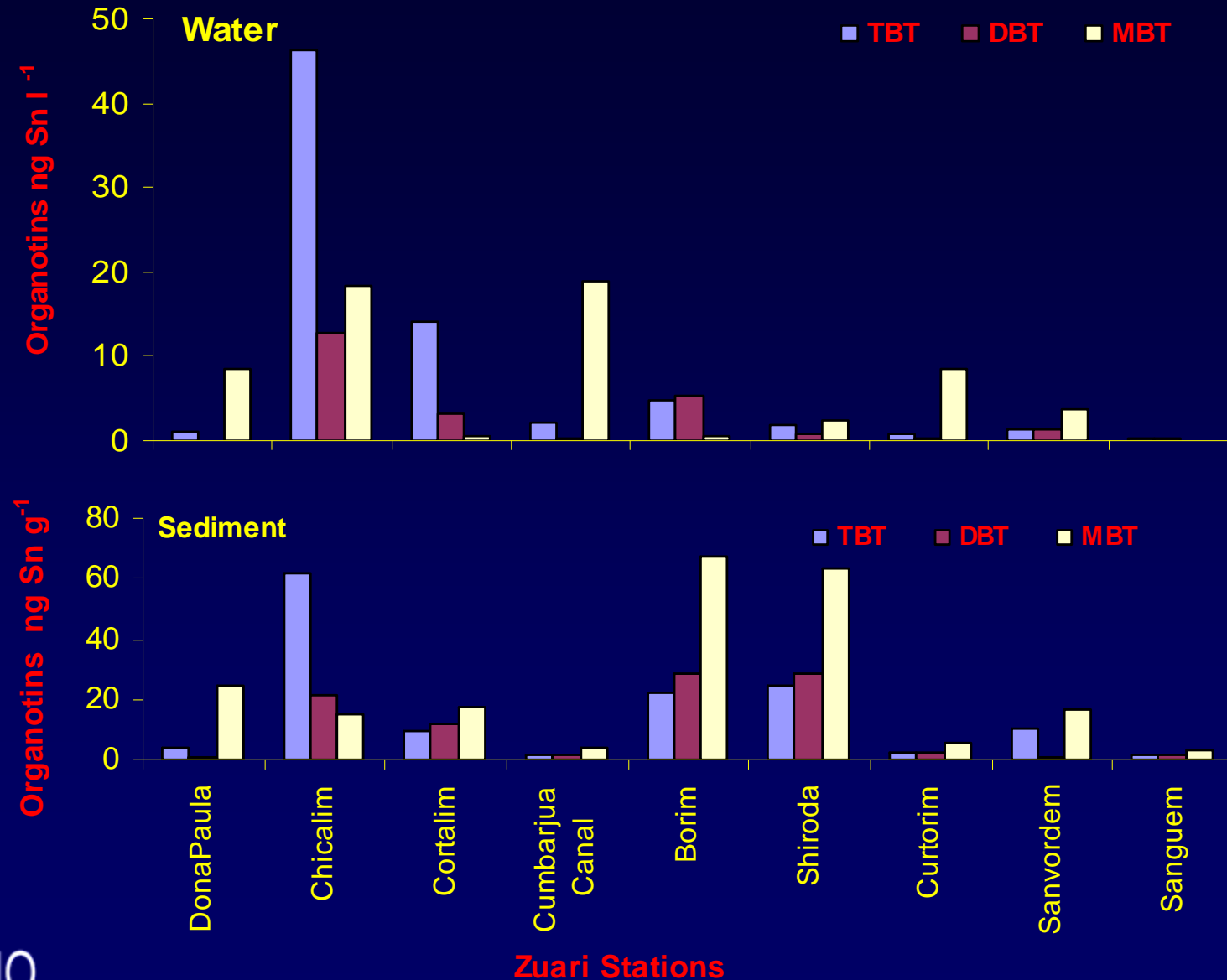
Distribution of organotins in the water & sediments along the coast of Gujarat



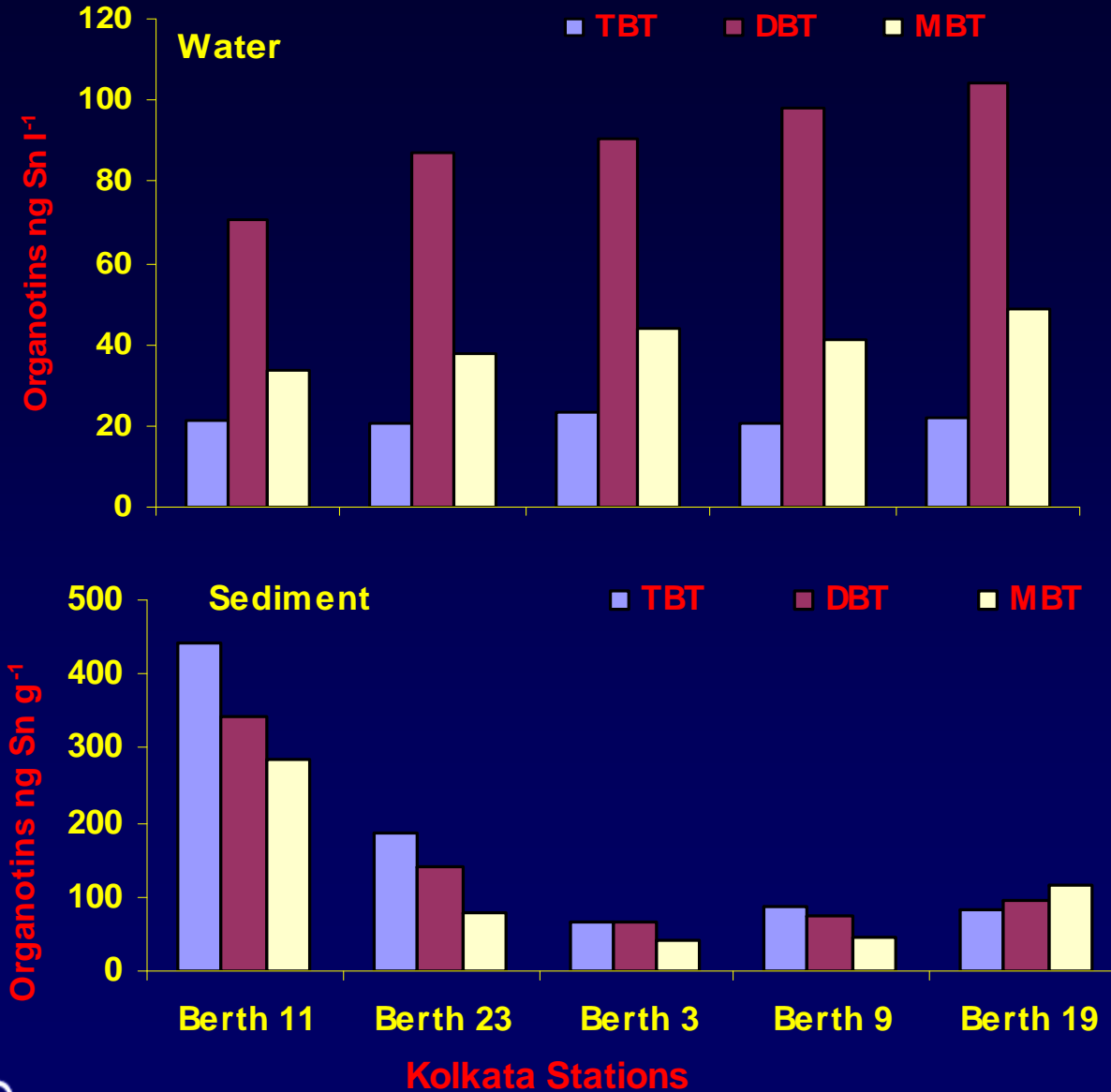
Distribution of Organotins in water & sediments along the Mandovi estuary, Goa



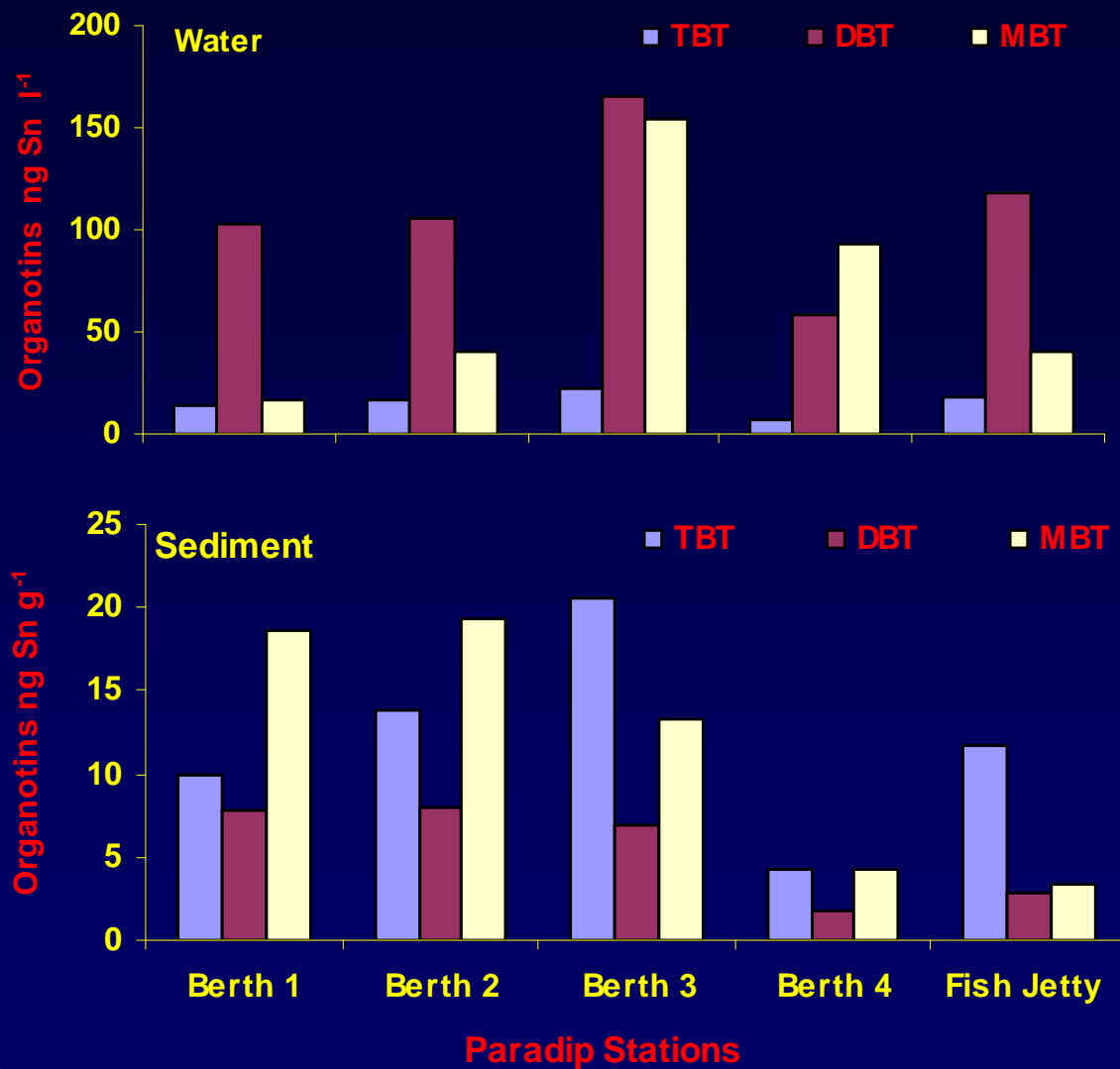
Distribution of butyltins in water & sediments along the Zuari estuary, Goa



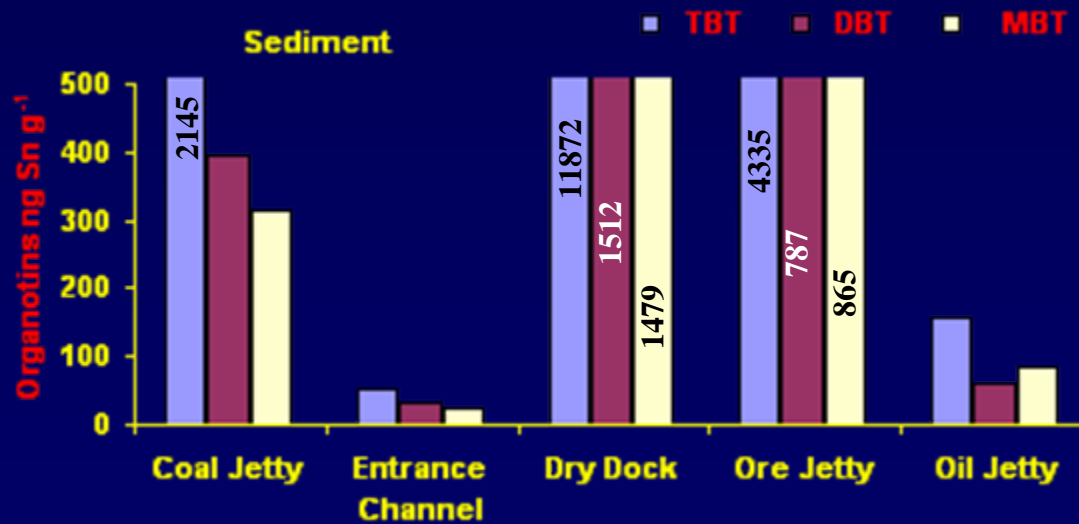
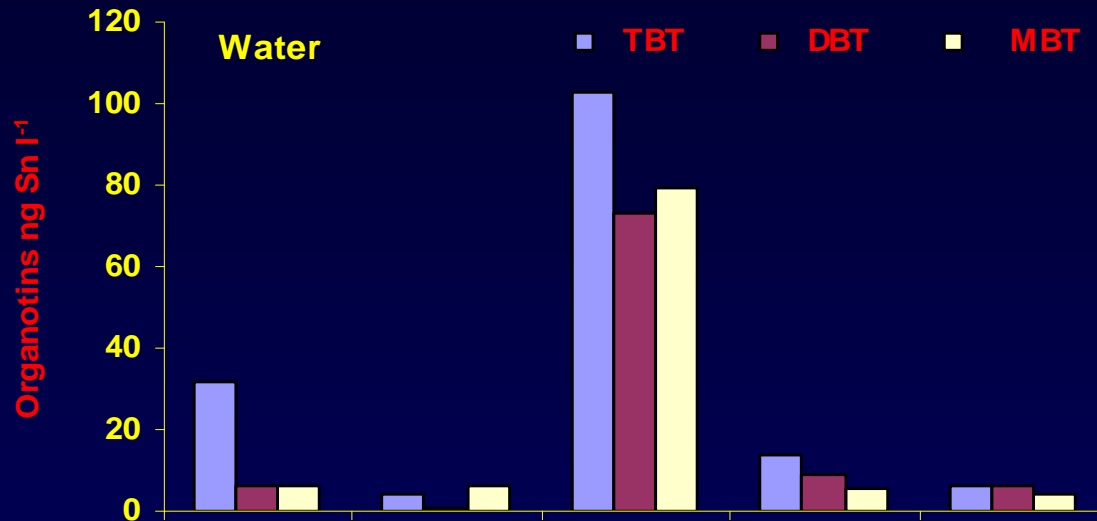
Distribution of organotins in the water & sediments at Kolkata port



Distribution of organotins in the water & sediments at Paradip port

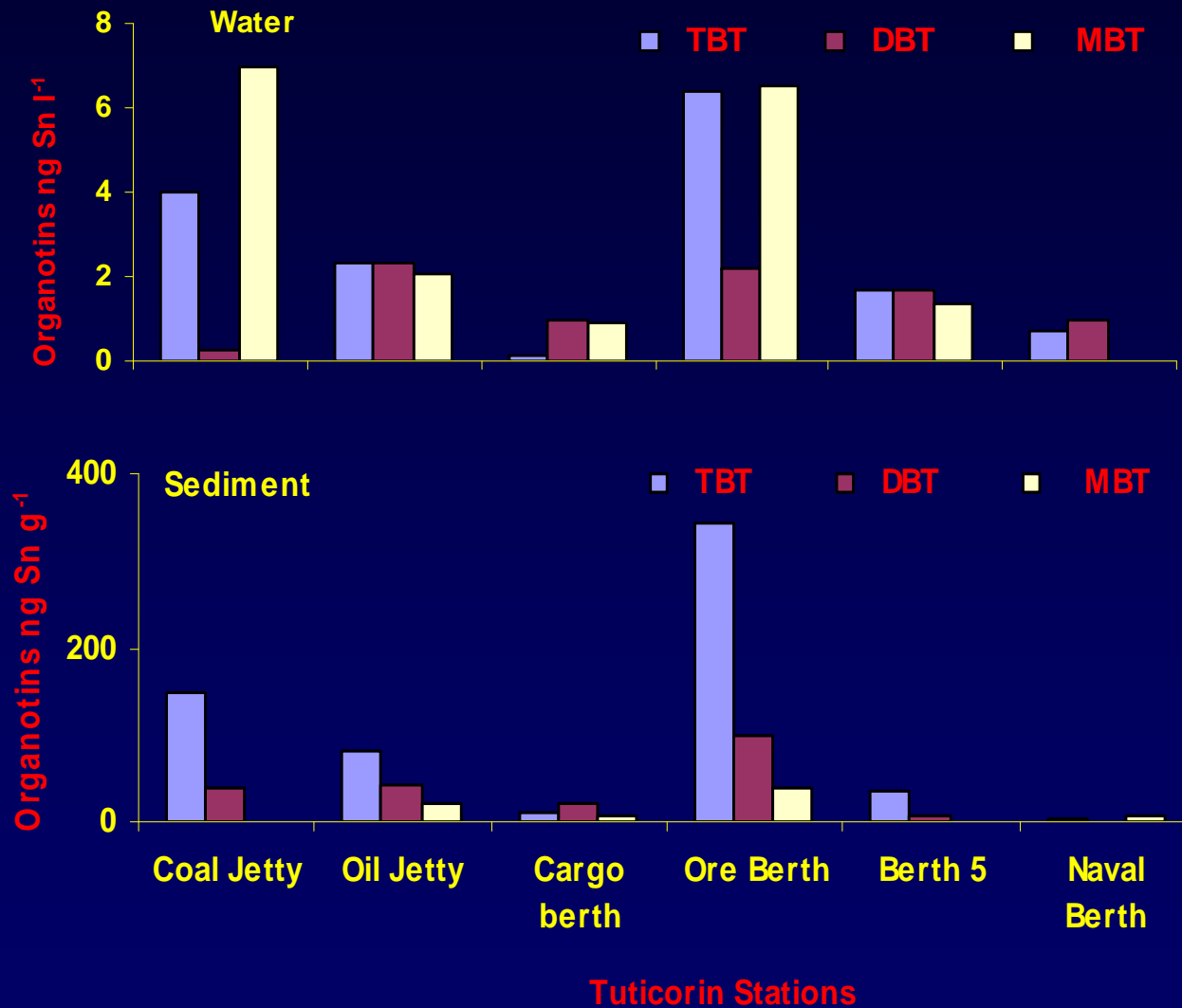


Distribution of organotins in the water & sediments at Chennai harbour

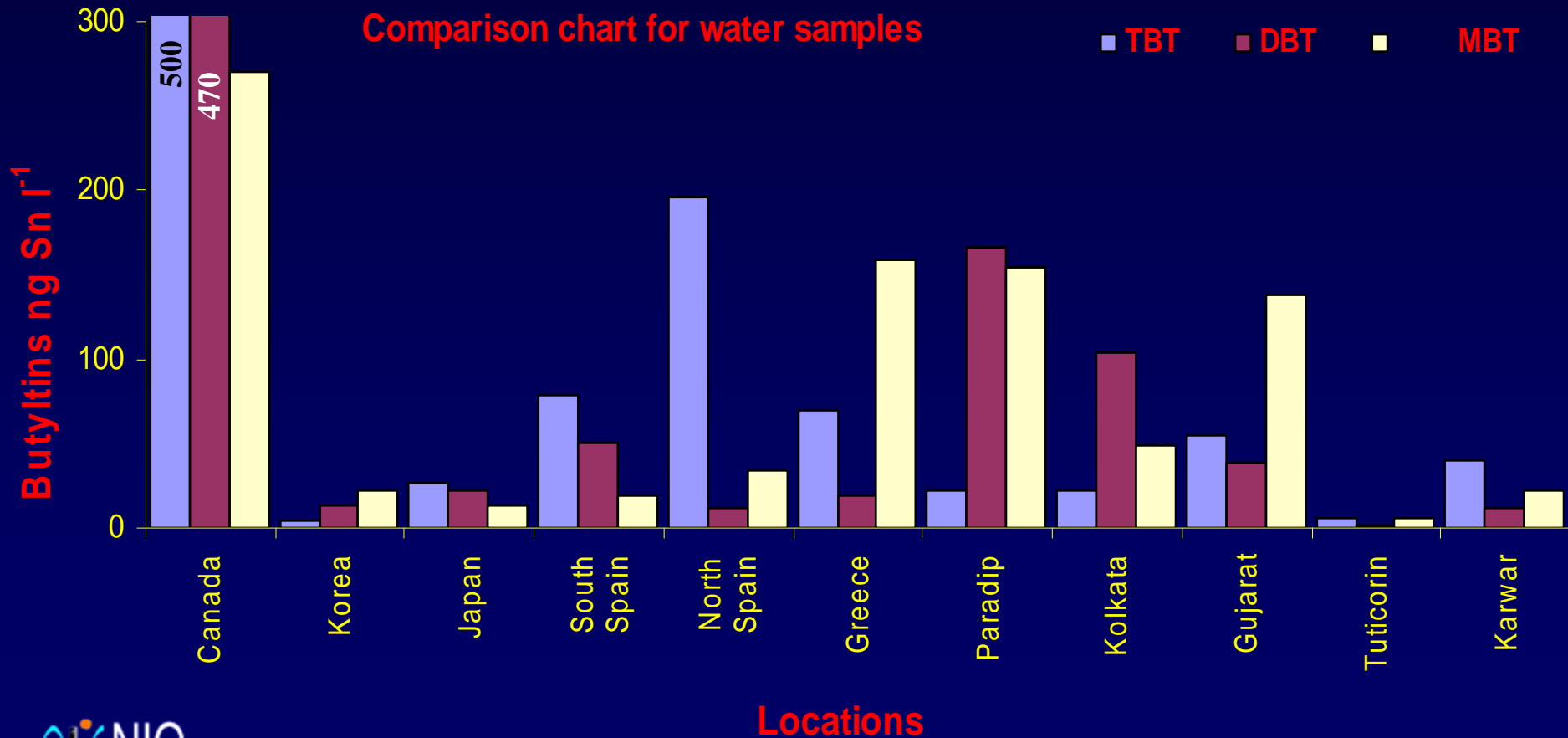


Chennai Stations

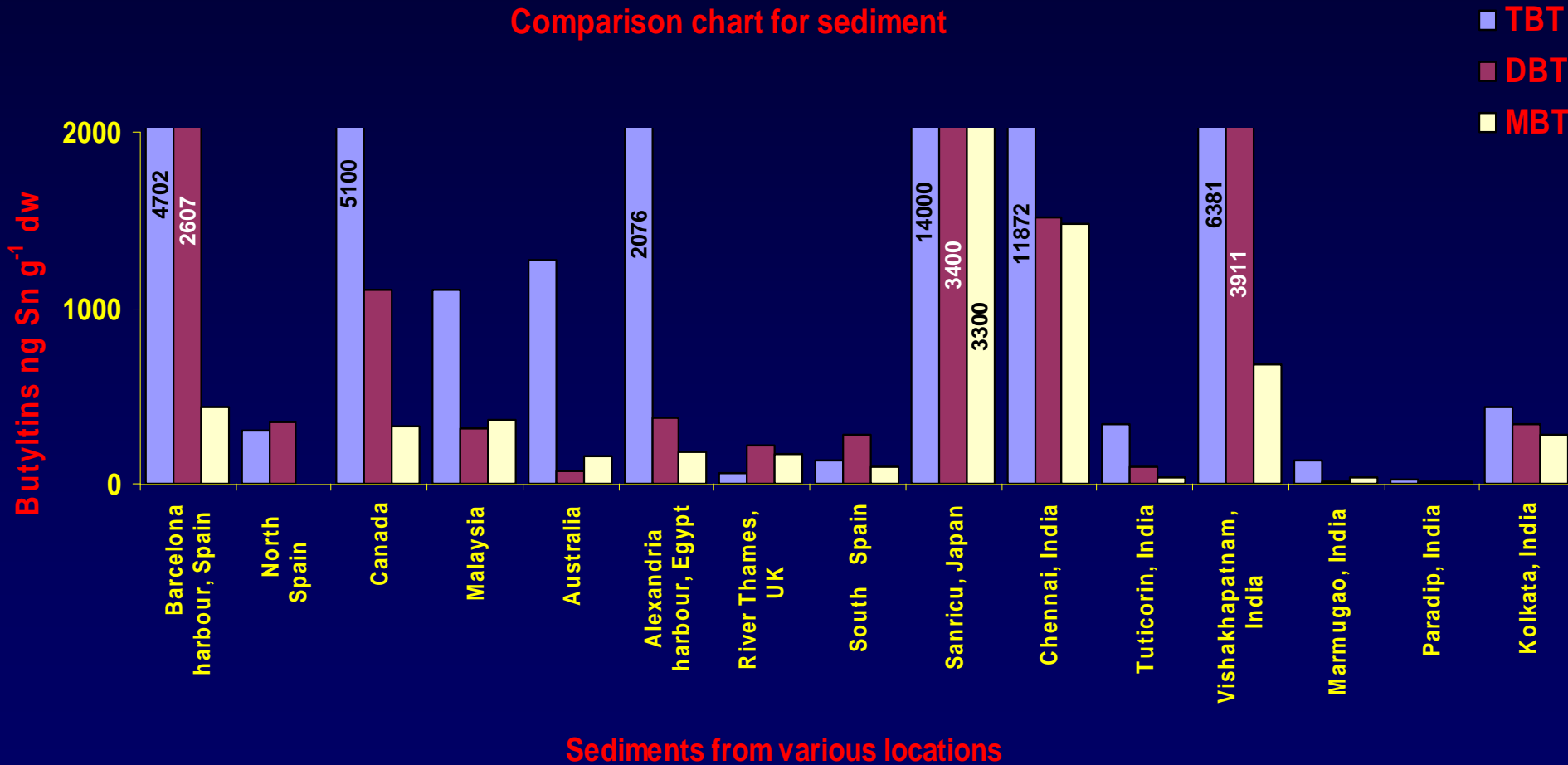
Distribution of organotins in the water & sediments of Tuticorin harbour



Comparison of butyltins in water samples from several locations of the world

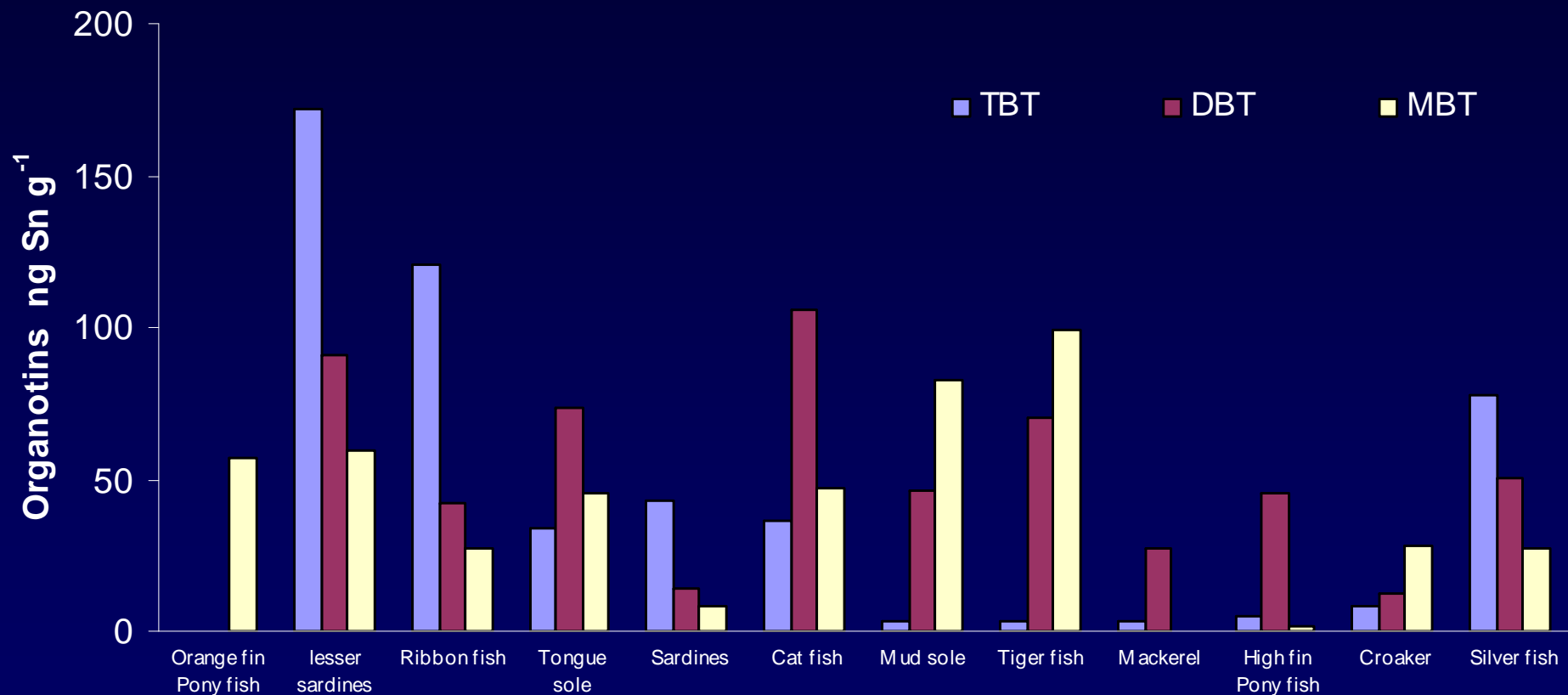


Comparison of butyltins in sediment samples from several locations of the world

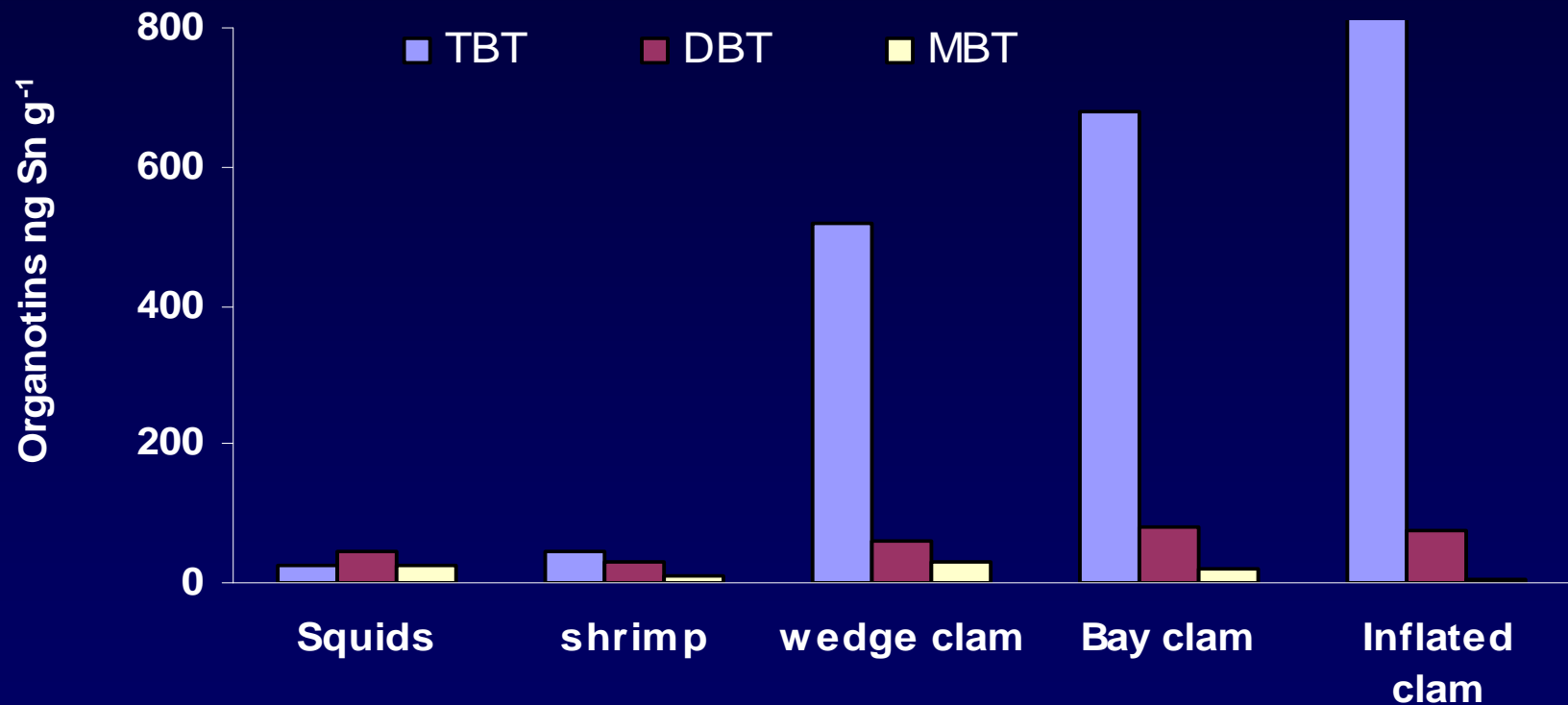


TBT contamination in Organisms from some coastal regions of India

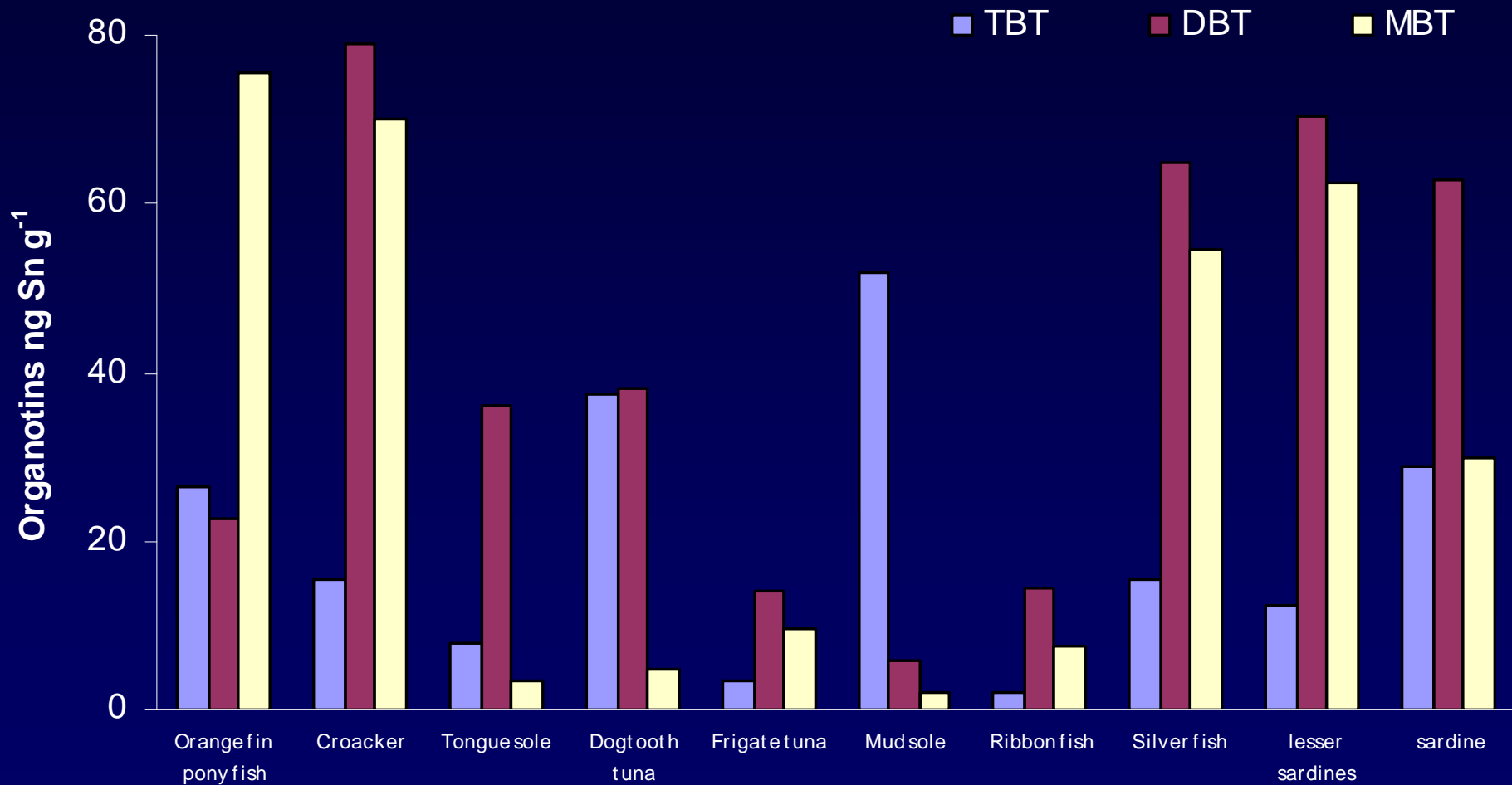
Distribution of Organotins in commercial fishes from Goa



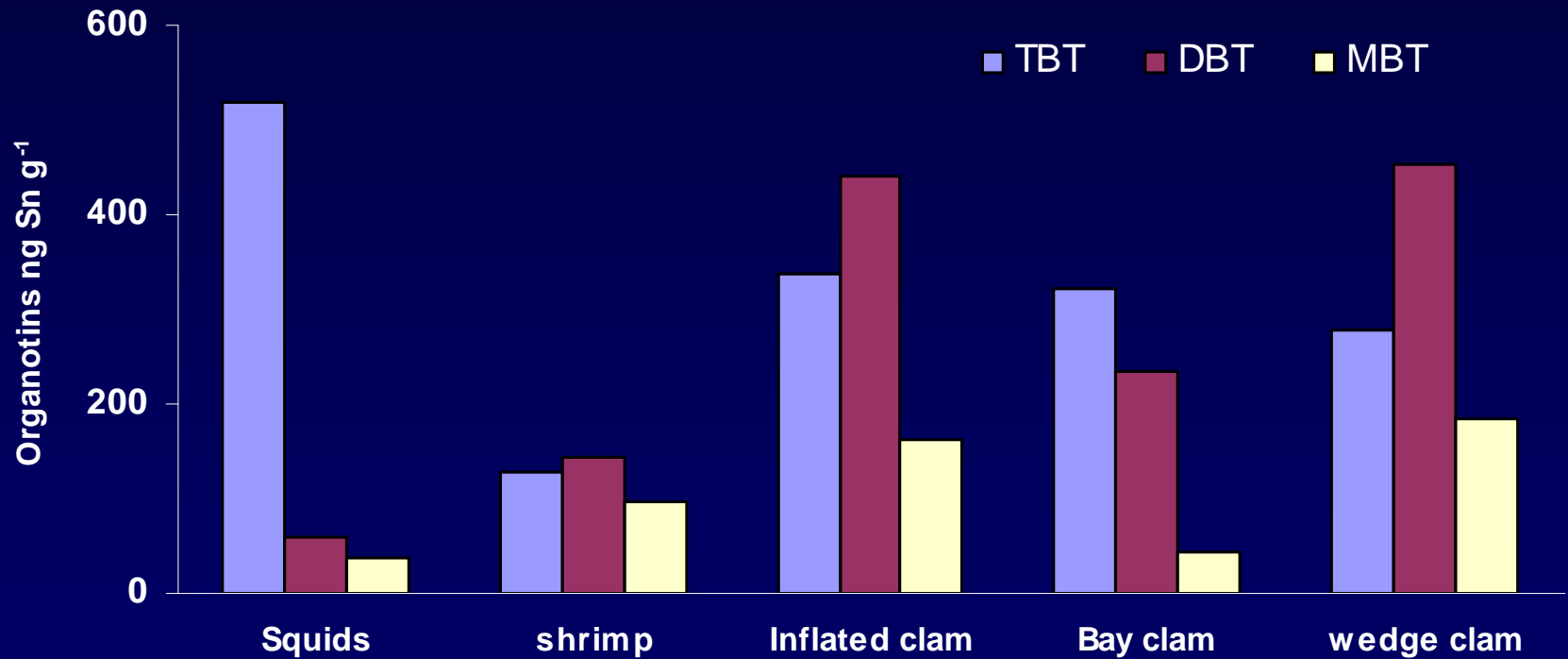
Distribution of Organotins in some mollusks, crustaceans & clams from Goa



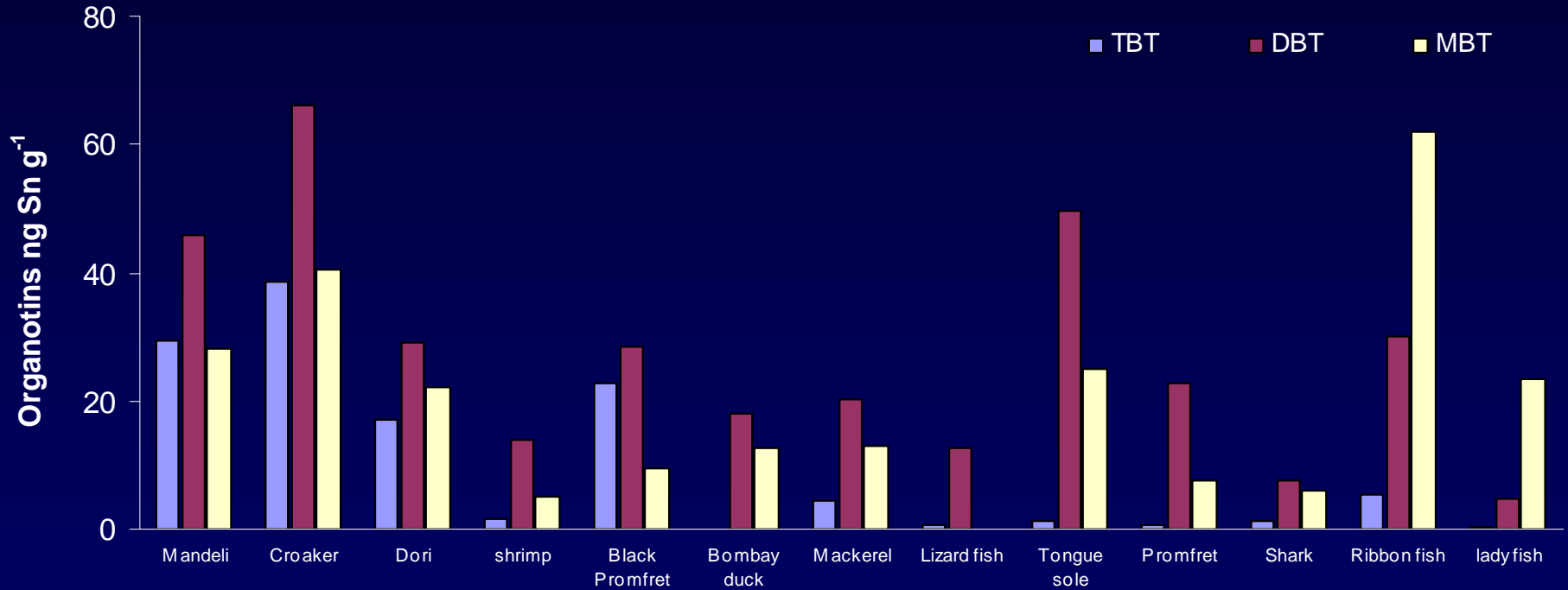
Distribution of organotins in commercial fishes from Karwar



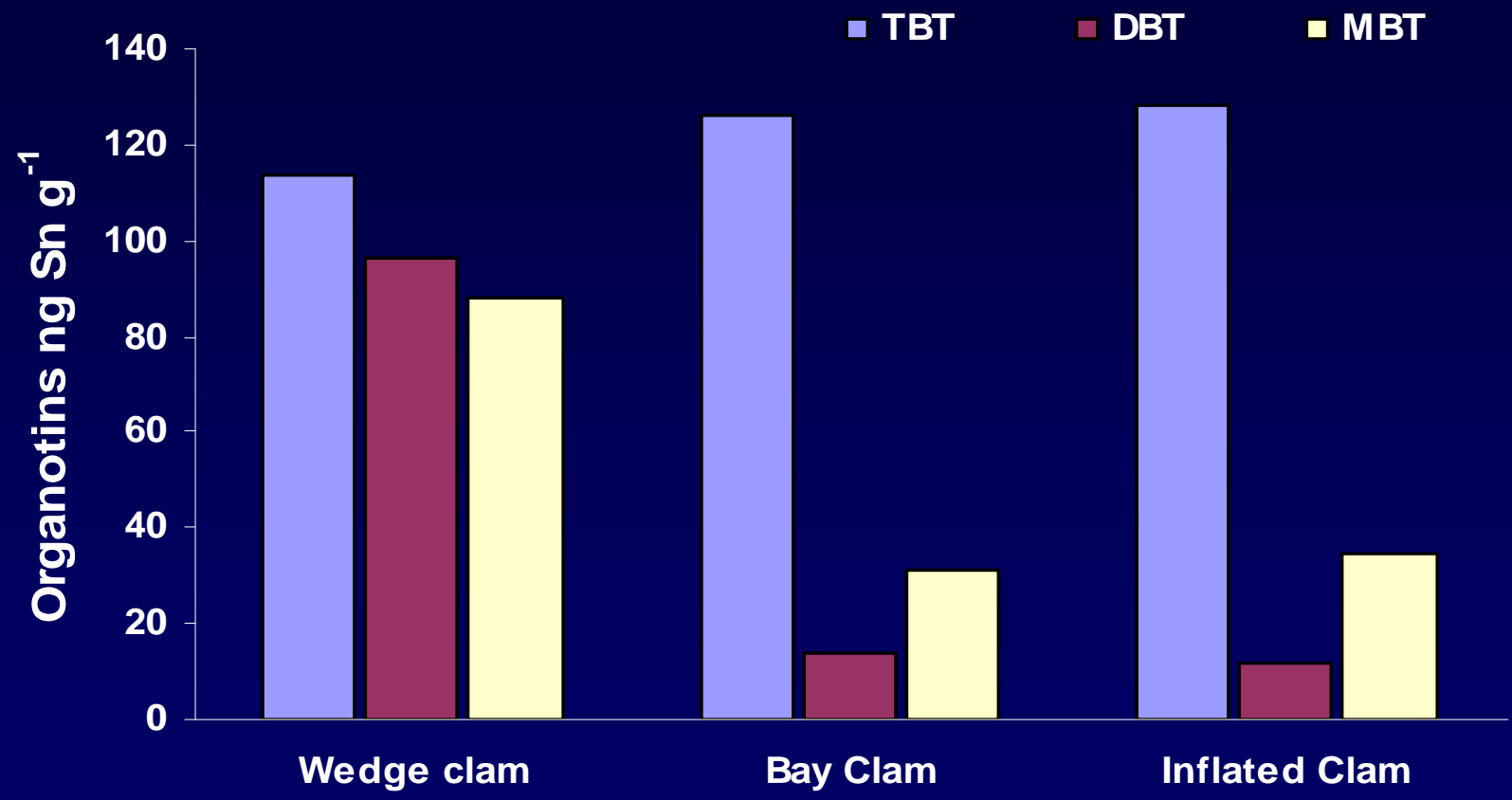
Distribution of organotins in Mollusks, crustaceans and clams from Karwar



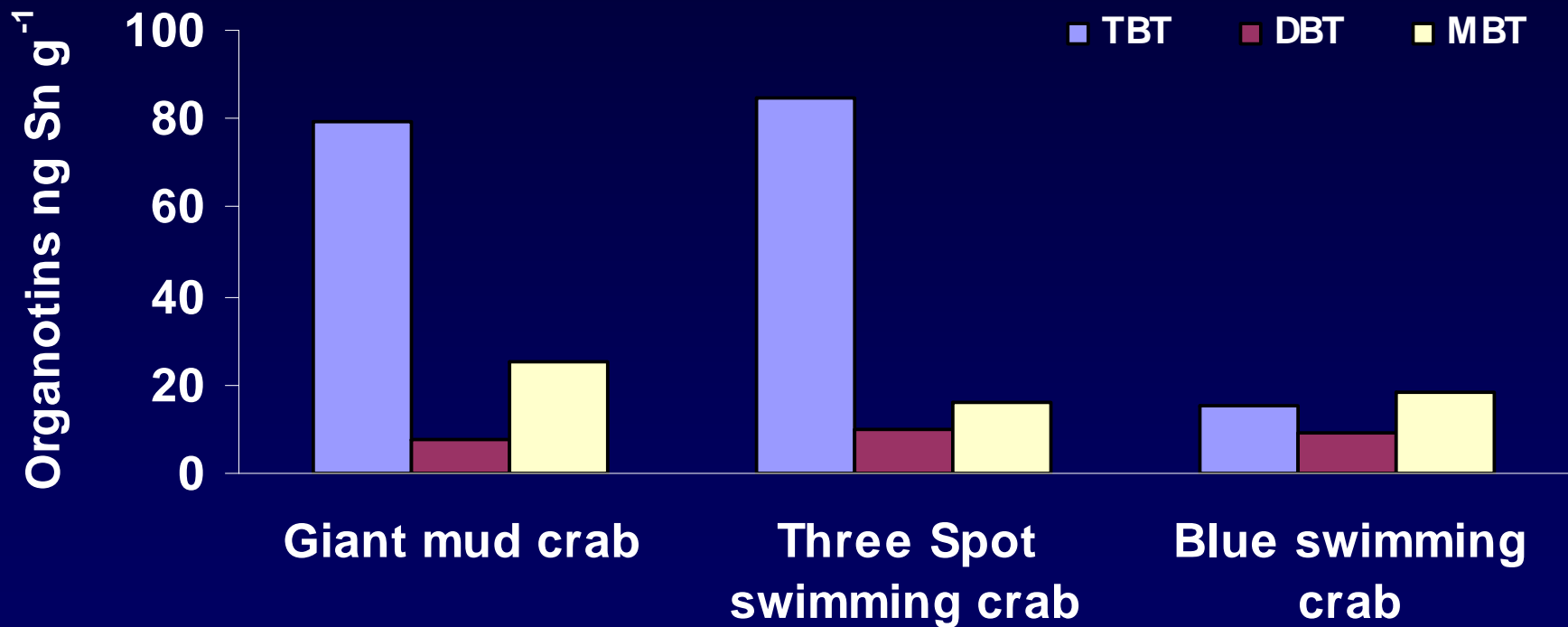
Distribution of Organotins in commercial fishes from Mumbai



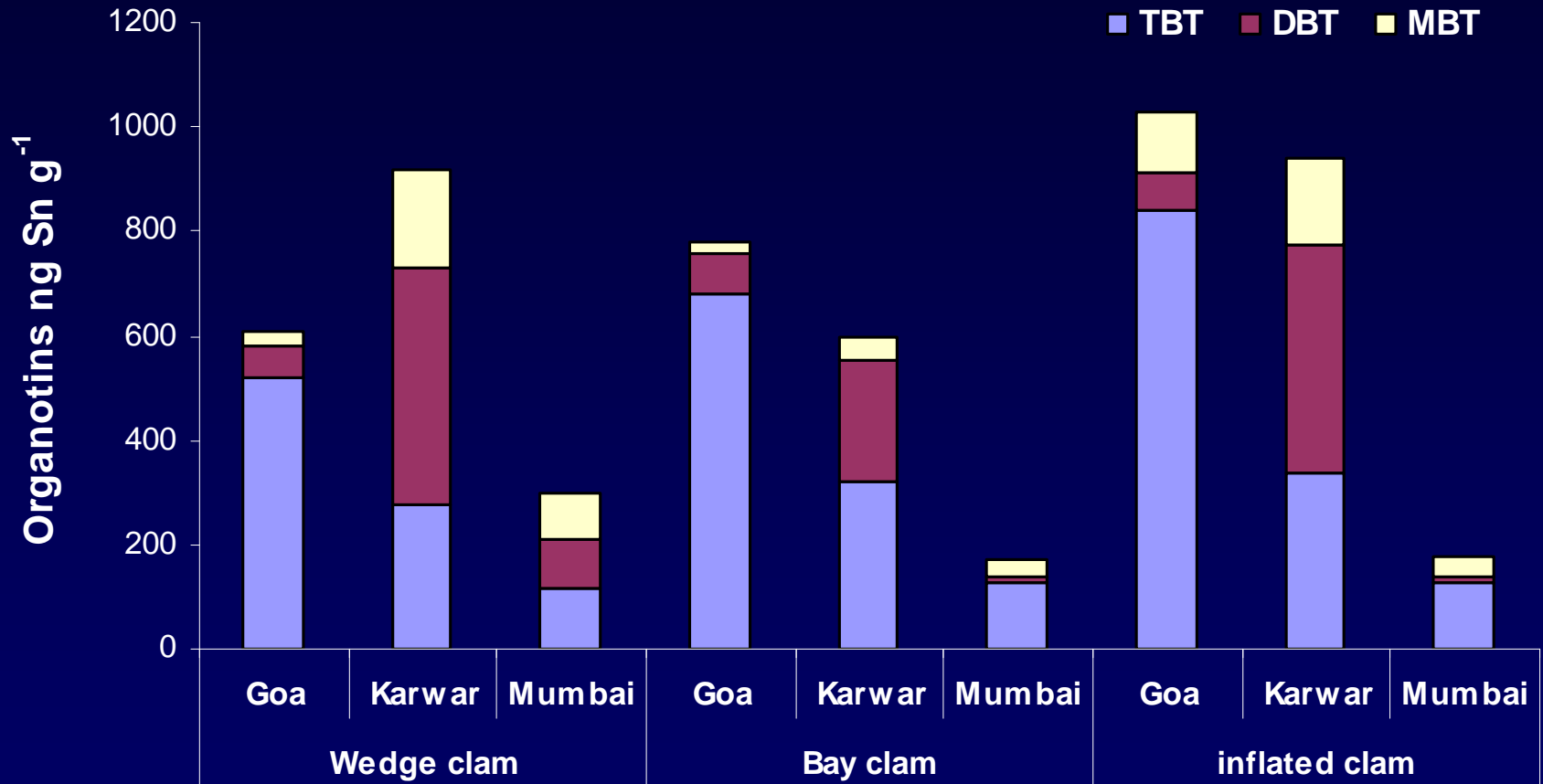
Distribution of Organotins in clams from Mumbai



Distribution of Organotins in crabs from Mumbai



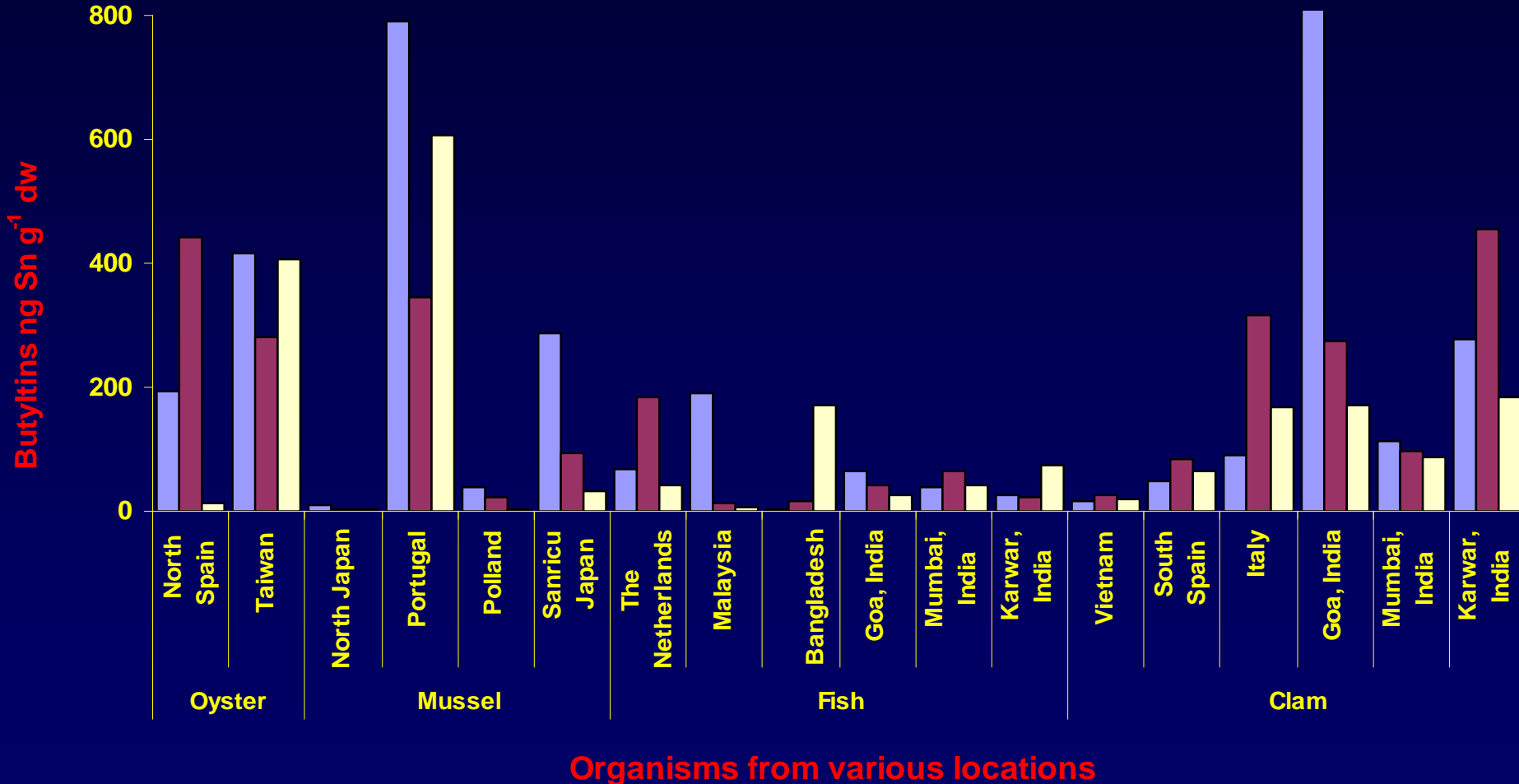
Comparison of Organotins levels in clams from west coast of India



Comparison of butyltins in organisms from several locations of the world

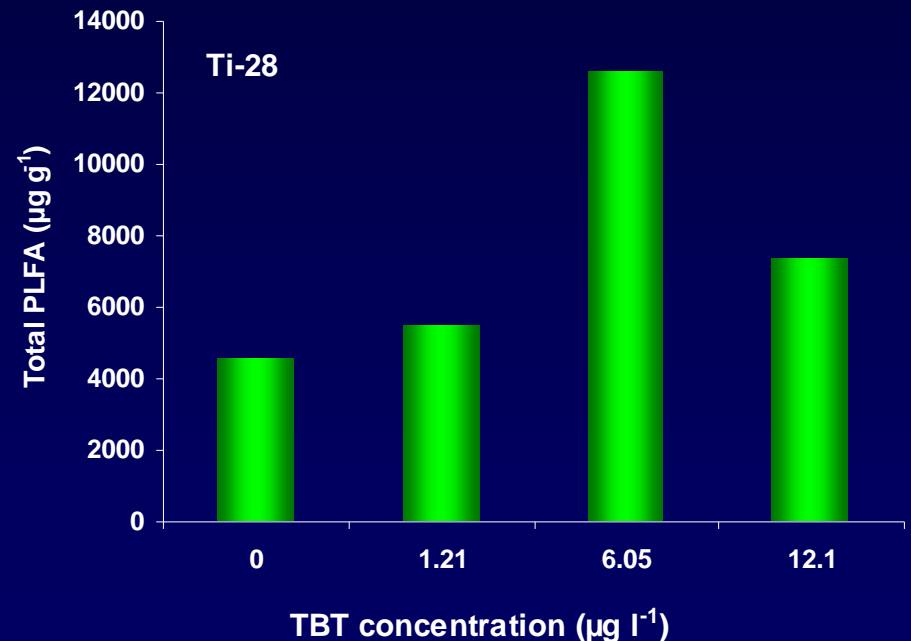
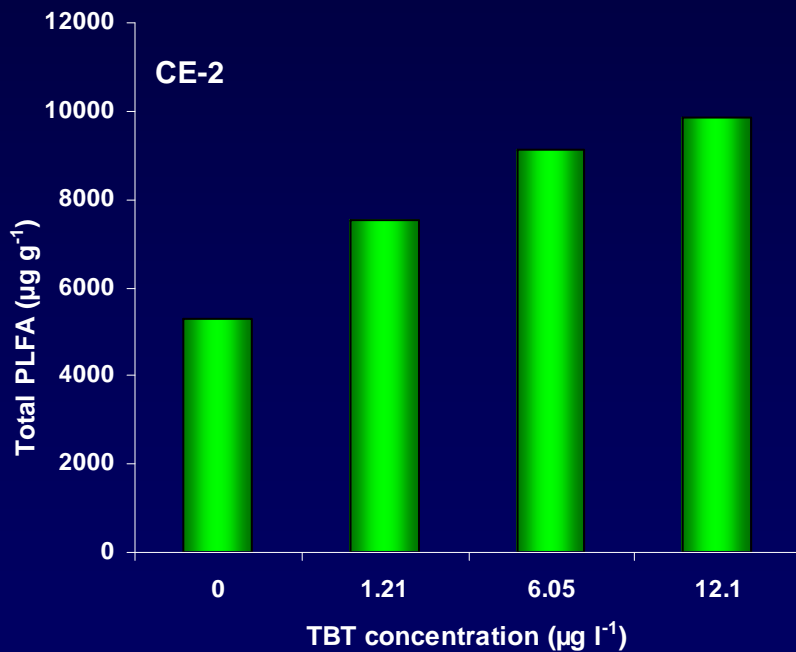
Comparison chart for organisms

TBT DBT MBT

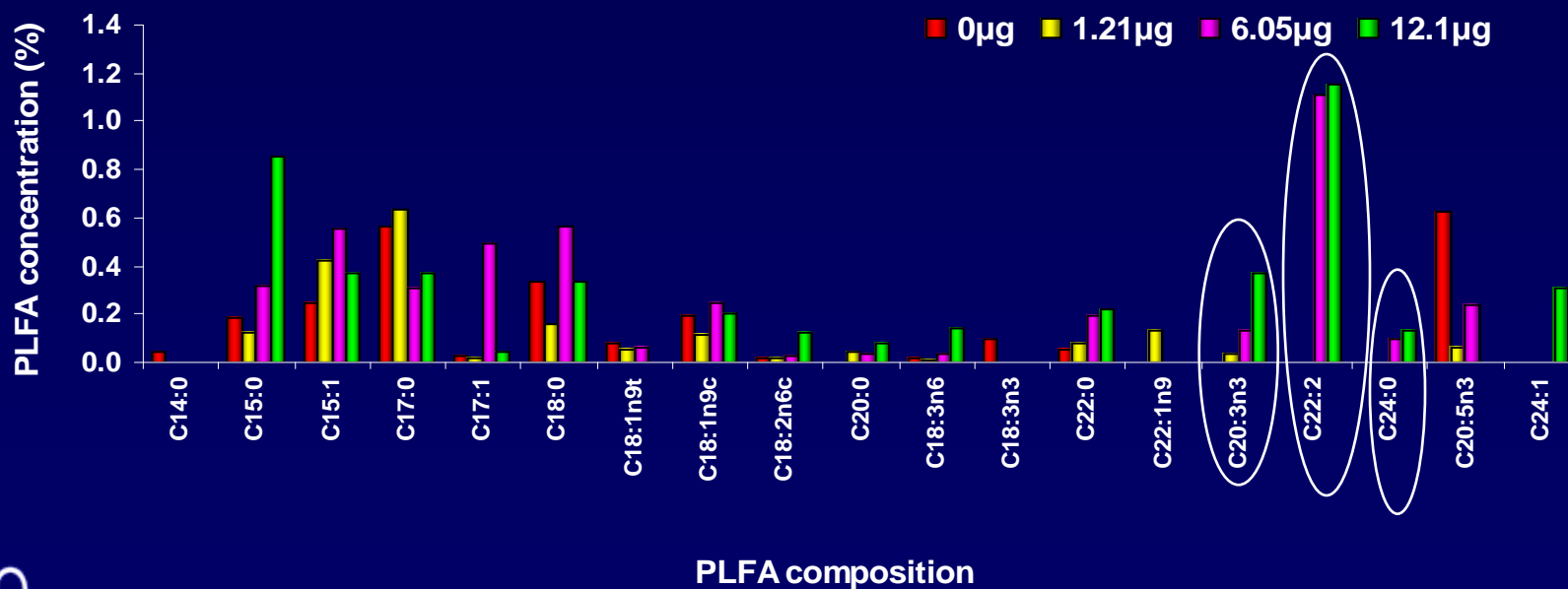
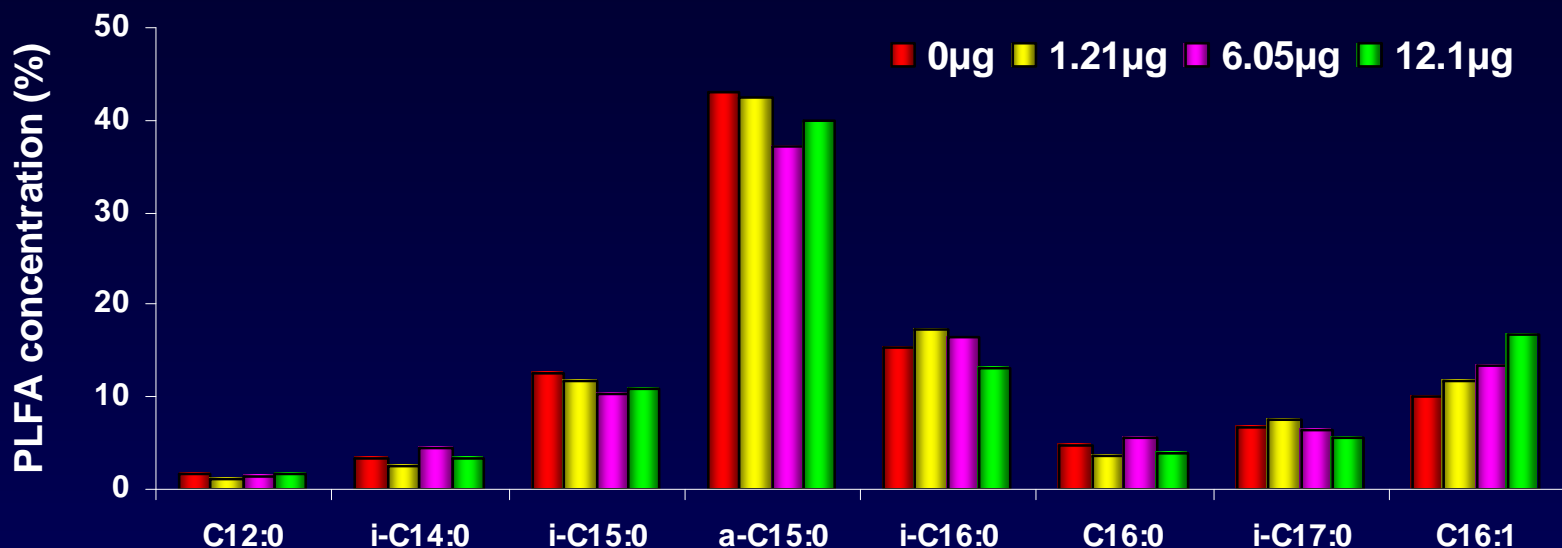


Fatty acid biomarker an indication of TBT contamination

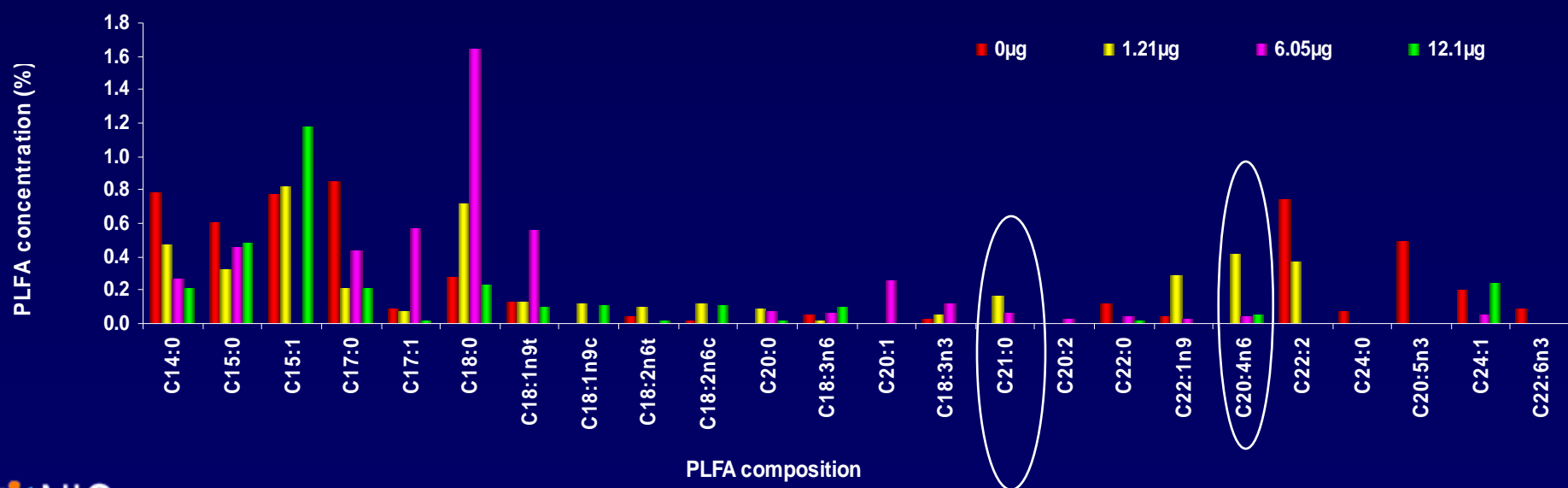
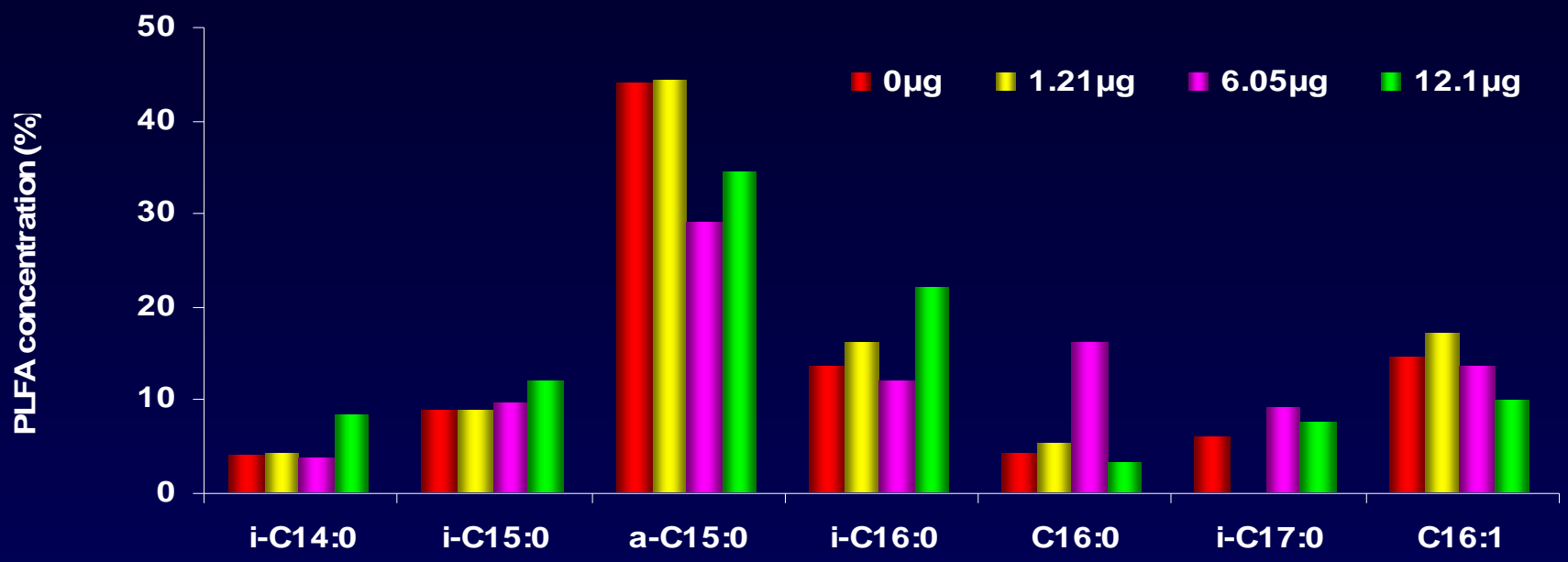
Effect of TBT on PLFA of 2 marine fouling bacteria namely CE-2 and Ti-28 were studied



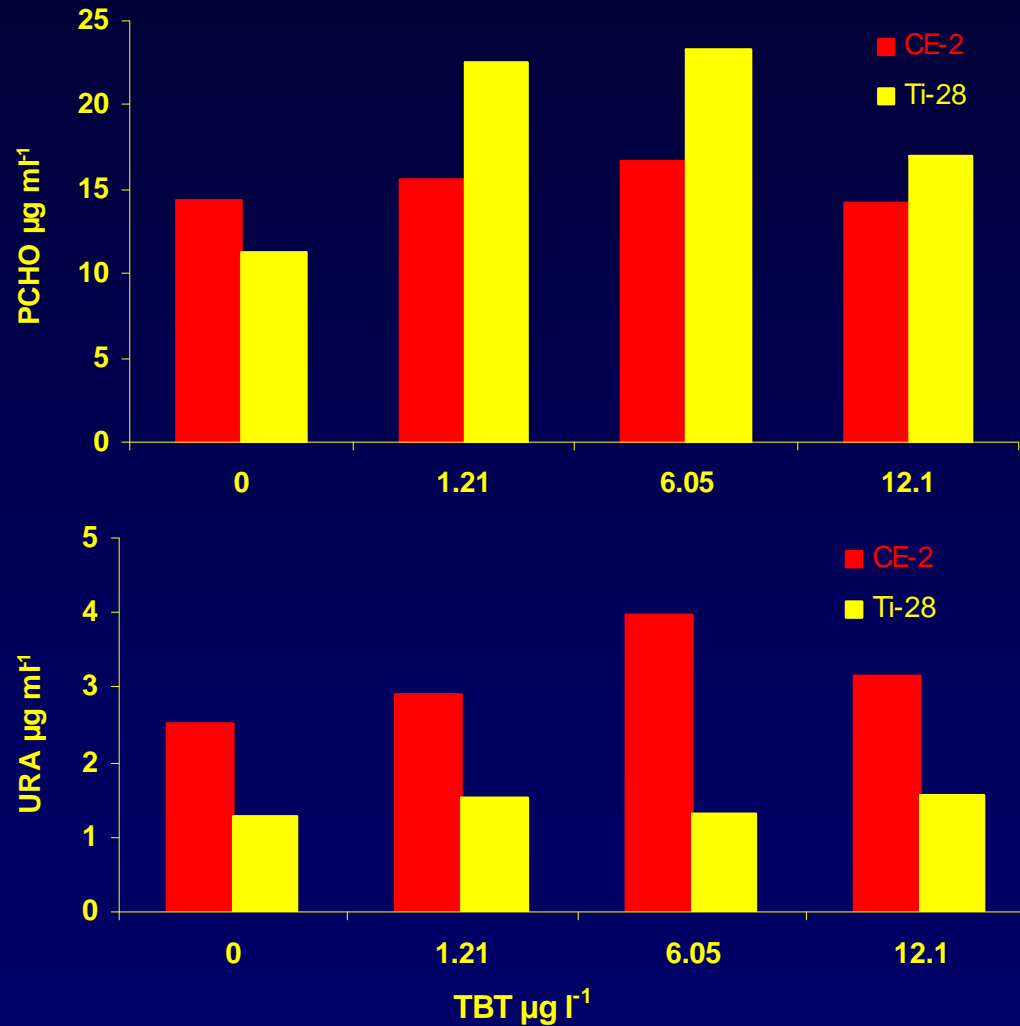
Effect of TBT on major PLFA comp. in CE-2 bacterium



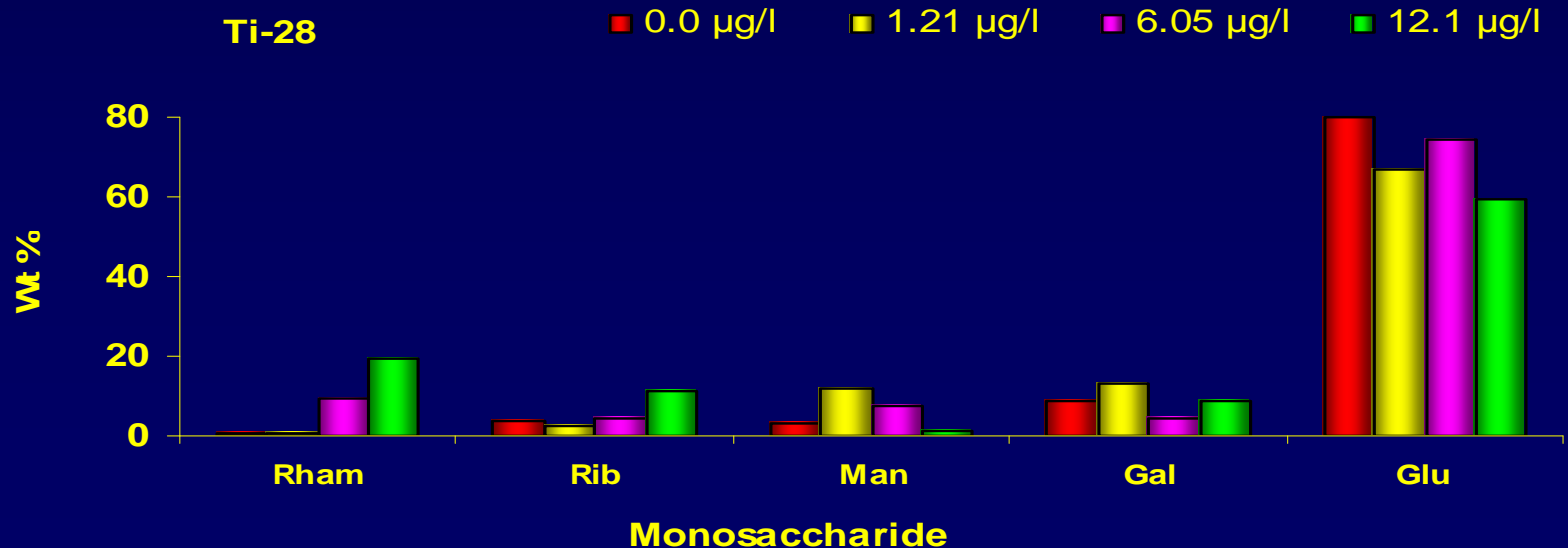
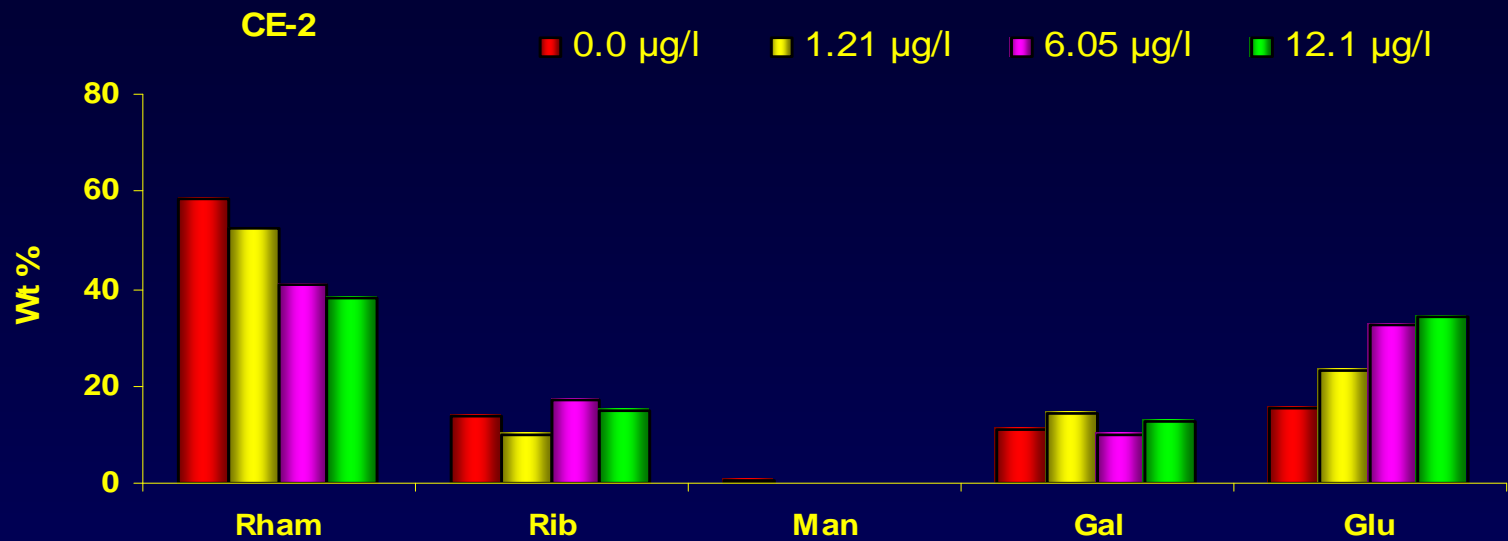
Effect of TBT on major PLFA comp. in Ti-28 bacterium



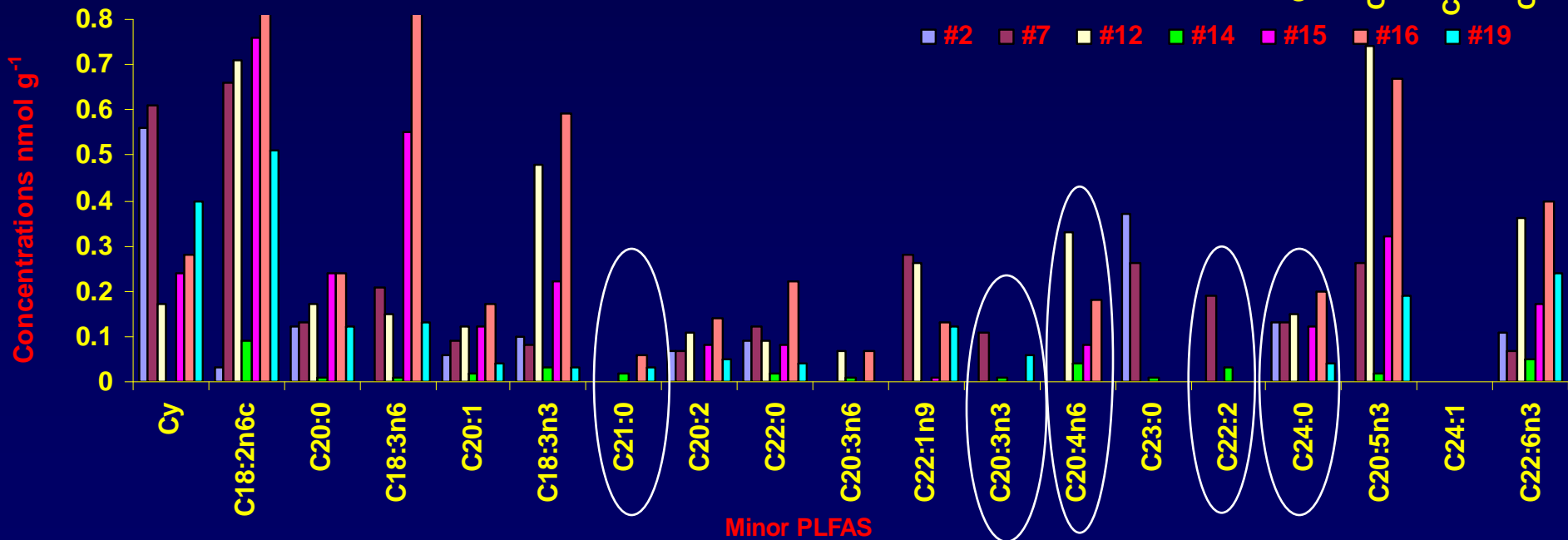
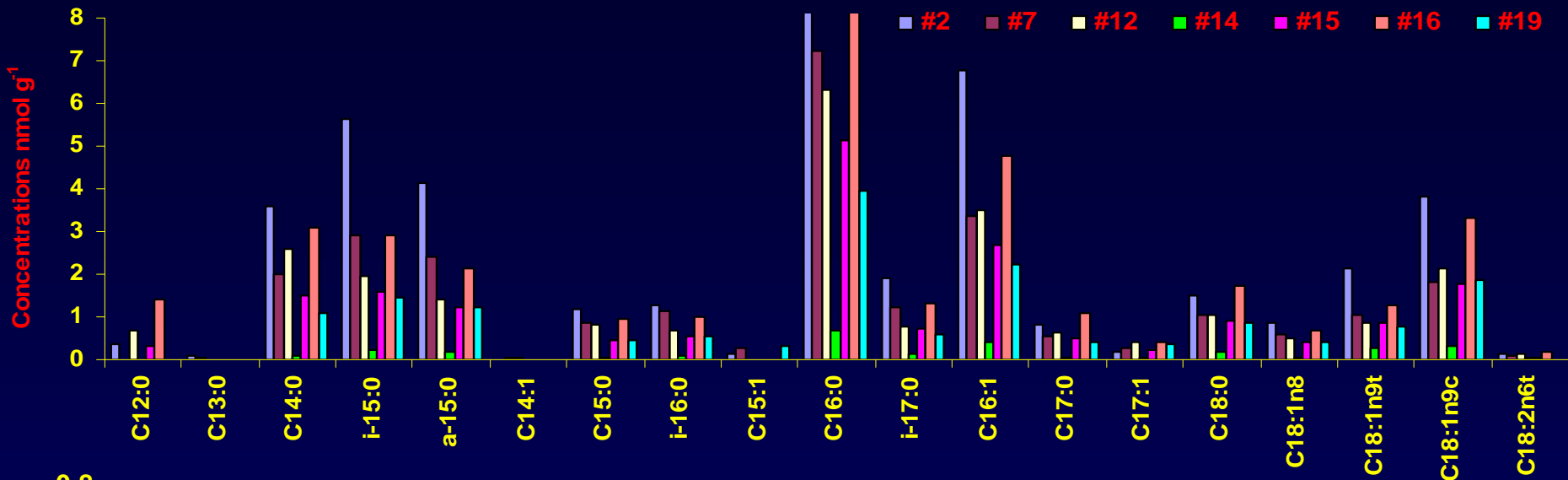
Effect of TBT on EPS & URA production in CE-2 & Ti-28 bacteria



Effect of TBT on carbohydrate composition of the cells of CE-2 & Ti-28 bacteria



Minor PLFAs in the sediments of Vishakhapatnam



Conclusions:

- **Most of the study areas suffer from TBT contamination especially harbour areas**
- **Contamination level high enough to pose a risk to aquatic and benthic organisms**
- **Amongst all the harbours Chennai harbour recorded highest level of TBT followed by Vishakhapatnam harbour, and Paradip harbour was the least contaminated**

- **Clams were the most contaminated of the organisms analyzed for Organotins**
- **Mumbai fishes and clams were comparatively less contaminated than Karwar and Goa**
- **Contamination level in the organisms could pose a risk to human health**

- **For the bacterial experiments, overall there was a decrease in the growth of the two bacteria with increase in TBT concentration**
- **Bacteria CE-2 and Ti-28 grown in TBT containing media showed an increase in EPS and URA with increase in TBT concentration**
- **Increasing TBT concentration also affects the individual monosaccharide composition**

- **The presence of TBT influenced the PLFA composition of the CE-2 and Ti-28 cultures by changing the relative concentrations of the PLFAs and/or by synthesizing new or removing some PLFAs from the lipid.**
- **This change in the PLFA composition can be used as an indicator to evaluate TBT contamination in the marine environment**

➤ **The presence of TBT in the sediment influenced the PLFA profile of the Vishakhapatnam sediments indicate stress in the PLFA composition**

➤ **New PLFAs such as those synthesized by the two bacteria studied in the laboratory were detected in the sediments at some of the stations**

➤ **The PLFA profile of the sediments of Vishakhapatnam indicate stress in the environment**

➤ **This PLFA composition in the sediment can be used as an indicator to evaluate TBT contamination in the marine sediments**

Thank you