



## STUDY OF BIOACCUMULATION OF MERCURY IN SHELLFISH (*Tapes decussatus*) FROM TUNISIAN COAST

CHOUBA, L., N. ZAMOURI-LANGAR and A. EL ABED  
 INSTM, Port de pêche 2060  
 La Goulette  
 Tunisie

The mercury is found in the sea and lagoons at negligible concentrations which are affected directly with the tellurian supplies. The mercury accumulation could reach the toxic level and be noxious for both marine organisms and human being.

A national network for monitoring the shellfish production area has been created in 1995. The network aims to conserve marine ecosystem, living resources and human health. The present work consists on determination of mercury concentration in the flesh of Veneridae (*Tapes decussatus*) locally called "clovisse or palourde." The total national production is estimated to about 1500 t/year and the 75 % is exported.

Six sampling areas were selected, two from the North and four from the South. For each area, the specimens collected during the summer of 1997 are grouped by sex and by category of size (Big >40mm, 35mm < Middle < 39mm, 30mm < Small < 35mm).

The sex is determined using a biopsy of the animal leg and the microscopic examination.

After the grinding and the lyophilization of flesh, the mercury concentration is measured by VARIAN AA 10 Atomic Absorption Spectrophotometer in cold vapor; [2]. With each batch of samples, a known certified standard (IAEA-MA-M-2/TM) was analyzed. The certified concentration of mercury of the standard material is  $0,956 \pm 0,096 \mu\text{g/g}$ . We obtained a value of  $0,910 \pm 0,075 \mu\text{g/g}$ . The results, expressed in  $\mu\text{g}$  of metal per g of dry tissue, were treated statistically using the following techniques:

- a/Student t-test for the comparison of mean concentration
- b/Honestly Significant Difference (HSD) of Tukey is used in the classification means mercury values by area.

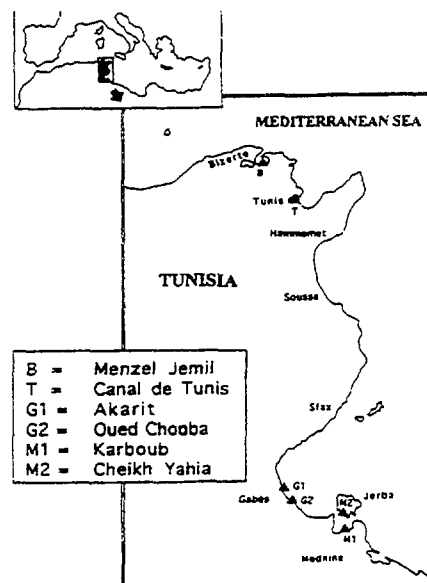


Fig 1. Sampling Areas. (*Tapes decussatus*)

The mean concentrations of mercury obtained by sex is plotted in figure 2 and that by size in Fig 3. The minimum and maximum concentration of recorded were 0,097 and 0,171  $\mu\text{g/g}$  of dry weight. These values were below the limit level admitted by the World Health Organization (WHO). In fact, the cockles production areas are not yet mercury polluted. The cockles are filter-feeder which are exposed to local environmental mercury concentrations that are easily influenced by natural or anthropogenic sources [3].

The statistical analysis (Student test) showed no significant difference between males and females collected from the same area (North/North and South/South) and from two different areas (North/South).

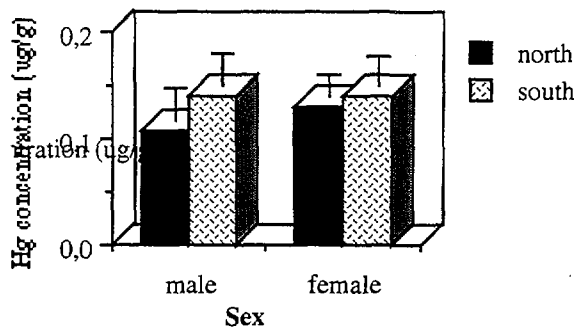


Fig. 2: Average concentration of mercury in *Tapes decussatus* determined by area and sex. Error bars denote standard deviation.

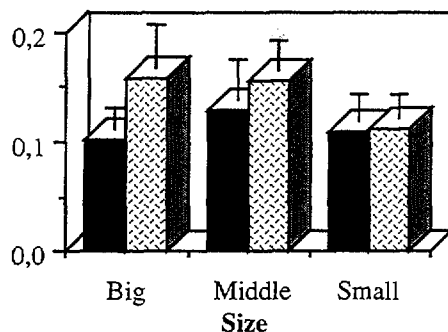


Fig. 3: Average concentration of mercury in *Tapes decussatus* determined by area and size. Error bars denote standard deviation.

However, a significant difference has been shown in south first between big cockles and small ones and then between middles and small ones. The comparison between areas (North/South) showed only a significant difference among the big cockles.

The classification of sampling areas depending on the determined mercury level is as follows : Bizerte (B) < Oued Chooba (G1) < Tunis (T) < Cheikh Yahia (G2) < Karboub (M1) < Akarit (M2). In fact the mercury concentrations in a sessile filter-feeder organism can change within very small distances [1].

The mercury levels in cockles has greatly contributed to a better understanding of the distribution of mercury concentrations.

The bioaccumulation mercury determined in cockles flesh collected from different locations aren't dangerous for human health.

On the basis of the findings and to minimize the monitoring network charges regarding its reliability, the following recommendations can be cited :

- The sex difference must not be considerate in the analysis.

- The mercury concentration levels recorded by category of size are clearly under the level admitted by WHO, so it will be judicious to treat all size mixed up together. The size will be considerate on the south area when we note that the mercury concentrations are increasing from year to year.

## References

- [1] LEONZIO C., E. BACCI, S. FOCARDI and A. RENZONI 1981. Heavy metals in organisms from the northern Tyrrhenian sea. *Sci. Total Environ.*, 20 : 131-146.
- [2] SCHNITZER G., C. PELLERIN and C. LOUET 1987. Apport des micro-ondes à la minéralisation humide d'un produit biologique en vue du dosage du Hg par SAA. *Bull. Lab. Vét.* N 25.
- [3] UNEP/FAO/WHO 1987. Assessment of the state of pollution of the Mediterranean Sea by mercury and mercury compounds. Technical Reports Series N°.18. UNEP, Athens 1987.