

**LEVELS OF MERCURY, CADMIUM AND LEAD IN THE TISSUE OF *DIPLodus VULGARIS* (LINNEUS, 1758) (TELEOSTEI SPARIDAE) FROM THE COAST OF SYRIA**

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**Abstract**

Mercury(Hg), Cadmium(Cd) and Lead(Pb) contents are determined in organs (liver,gonad,muscle tissues) of *Diplodus vulgaris* caught from Tartous,Banias and Lattakia-fishing zones along the coast of Syria during the2000-2001. Mercury concentration reaches maximum in liver (0.947µg/g dry weight) followed by muscle (0.640µg/gdry weight), and gonad (0.202µg/g dry weight). Cadmium content reaches maximum in liver (2.318µg/g dry weight), followed by muscle (0.406 µg/g dry weight), and gonad (0.228 µg/g dry weight) . Lead concentration is highest in liver (1.512 µg/g dry weight), followed by muscle (0.616 µg/g dry weight), and gonad (0.185 µg/g dry weight).. The edible tissue of the species was not harmful for human health.

*Keywords : Bio-accumulation, Fishes, Levantine Basin, Trace Elements.*

**Introduction**

Investigations of metals in fish are an important aspect of environmental pollution control . Contaminant accumulation in various fish tissues is used as a measure of contaminant exposure and effects the accumulation of heavy metals in fish depends on several factors, namely trophic concentrations and age /size which comprise the nature and activity of organisms. Mercury , cadmium and lead are among the most toxic heavy metals [1] because of their ability to be concentrated in the organs of marine organisms [2] In this work we report the levels of these metals in muscle tissue, liver and gonad of the demersal fish *D.vulgaris*, and the relationship between concentration and biological state of fish.

**Material and Methods**

Fish samples were collected at three locations in coast of Syria (Tartous, Banias and Lattakia) during one year Oct.2002-Sept2003). Biometric measurements (weight, length and age) were made according to[3].In the presented study, scales were used for age determination, by counting the number of annual rings on the fish scales.Three organs (muscle, liver and gonad) were taken for analysis. Two or three grams of muscle and gonad tissues and whole liver were processed for analysis. Trace metals (Cd and Pb)were determined by Shimadzu 6800 /6650 AAS coupled with a GFA-EX7graphite furnace [4] , Mercury concentration was measured by cold vapor apparatus according to the techniques described in (5).

**Results and Discussion**

The higher lead concentration was in liver tissues 1.512 µg/g dry weight ranging from 0.002-4.998 µg/g dry weight followed muscle and gonad tissues 0.616- 0.185 µg/g dry weight respectively. Cadmium level in gonad tissues is low 0.228 µg/g dry weight compared with other tissues such as muscle 0.406 µg/g and liver 2.318 µg/g [ table 1] . On the other hand liver tissues have high Mercury concentration 0.947 µg/g ranging from (0.064-3.125 µg/g ,then in muscle 0.640 µg/g and finally in gonad tissues 0.202 µg/g dry weight.Results show no significant difference (P<0.05 ) between the three sampling stations for cadmium and mercury. Banias has a higher concentration of Lead (p<0.05) ,there are no significant difference between the two sampling stations Lattakia and Tartous for lead concentration, P-value(0.45) P>0.05.

Tab. 1. Average values of Lead ,Cadmium ,and Mercury concentration (µg/g dry weight ) in the selected organs and tissues of *D. vulgaris* from the coast of Syria m: = mean , r: =range of metal concentration , ( ) : = number of samples

Elements	Concentration (µg/g dry weight ) in			
		Muscle tissue	Liver	Gonad
Lead	m	0.616 (95)	1.512 (102)	0.185 (24)
	r	< 0.002-3.976	<0.002- 4.998	<0.002- 0.440
Cadmium	m	0.406 (102)	2.318 (95)	0.228 (24)
	r	<0.002-1.968	0.035-8.335	<0.002-0.624
Mercury	m	0.640 (80)	0.947 (95)	0.202 (20)
	r	0.180-1.980	0.064-3.125	0.019-0.436

Lead has no biological function in the fish [1] and its movement across cell membrane is restricted by the fact that solubility of lead salts are low, making its concentration in the muscle tissue few times lower than it in the

other organs. This makes such metal be concentrated in the most direct organs such as the gill and liver .

Tab. 2. Trace metals in *D.vulgaris* µg/g wet weight and Sea water µg/l from Lattakia-Banias-and Tartous

Area	Samples	Lead	Cadmium	Mercury
Lattakia	<i>D.vulgaris</i>	0.151	0.224	0.129
	Sea Water	0.05-0.150	0.015-0.022	-
Banias	<i>D.vulgaris</i>	0.257	0.213	0.158
	Sea Water	0.052-0.500	0.003-0.175	-
Tartous	<i>D.vulgaris</i>	0.134	0.215	0.108
	Sea Water	0.30-0.75	0.03-0.08	-

*D.vulgaris* feeds primarily on Crustacea, Mollusca and Echinodermata [6], this type of food concentrate heavy metals directly from waters. Thus, it is likely that the food is the main source of transferring lead to the liver tissue. This reflect the tendency of gonad tissue to accumulate other metals such as zinc and copper but not cadmium, lead or mercury [1].

**References**

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