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INTERNATIONAL WHALING COMMISSION

TOXIC ELEMENTS (Fe, Zn, Cu, Hg, As, Cd, Pb) IN GRAY WHALES AND PACIFIC WALRUS ORGANS IN THE MECHIGMENSKY BAY (WESTERN BERING SEA, RUSSIA)

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In coastal waters of the Chukchi Peninsula (the Mechigmenskiy Bay, Western Bering Sea, Russia) contamination levels of marine mammal tissues were investigated by TINRO-Center and ChukotTINRO. Organs of Gray whales (*Eschrichtius robustus)* and Pacific walruses (*Odobenus rosmarus)* were necropsied after aboriginal harvest and landing by Chukotka Natives (Figure).

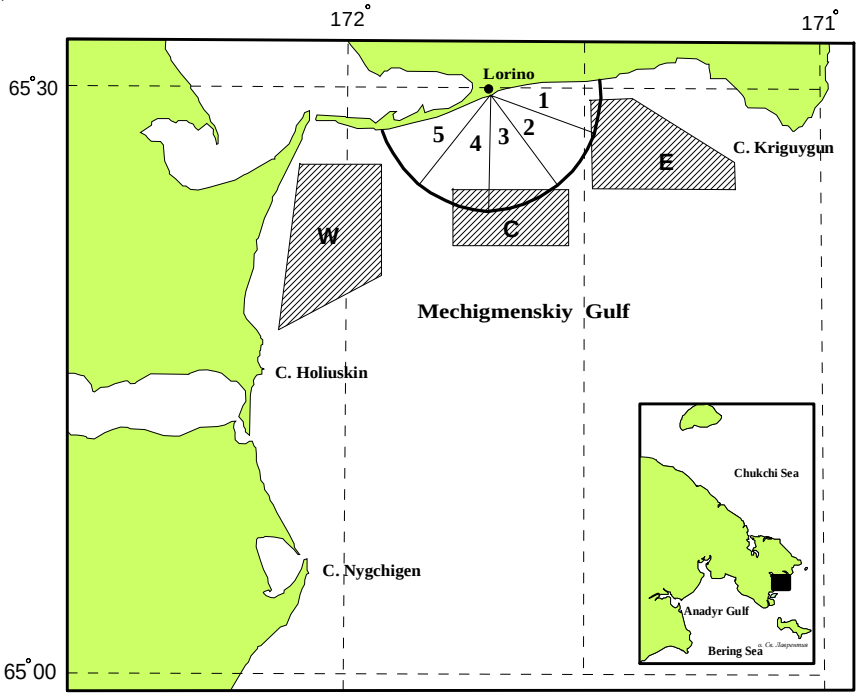

Figure. Observation water area and whaling sectors in the Mechigmensky Bay (Chukchi Peninsula; Blokhin, Litovka, IWC 2009-2014)

Necropsy samples included muscle, kidney, liver, blubber by 50-100 g and blood 50-100 ml. All samples were freezed at - 24ºC and delivered to Laboratory of ApplEcology of TINRO-Center.

Measuring the concentrations of iron, zinc and copper was performed on the atomic absorption spectrophotometer «Shimadzu» Aa-6800. As an atomizer we used a single split burner, as a combustible mixture we used an acetylene-air. The background was corrected by a deuterium lamp. Concentrations of cadmium, arsenic and lead was determined with the atomic absorption spectrophotometer «Shimadzu» Aa-6800. The atomizer was a graphite cuvette, and background corrector was the deuterium lamp.

The mercury concentrations in the samples were determined by a flameless atomic absorption method with the direct mercury analyzer DMA-80.

The elements determining standard errors were less than 10%.

As standard samples we used State Standard Metal Solutions Samples (GSORM).

The results of atomic absorption determination of toxic elements in organs of whales and walruses in the Mechigmen Bay are presented in the Table.

The biologically active components of Fe, Zn and Cu had the highest amounts, but Cd and Hg had the lowest concentration levels in the tested animal organs.

The levels of Fe, Zn, Cu, As and Hg were significantly higher in the liver of animals. This is due to the fact that the regulation of elements content in the body is not so much limiting their content in muscles, as by between-organs redistribution of elements. Therefore for example the copper is concentrated by the depositing organ (the liver) and dozens times higher than in other tissues and organs, regardless of animal species.

Chukotka Natives consume intestines and meat of whales and walruses. The Russian State Sanitary, Epidemiological and Hygienic Requirements [1] are controlling and limiting the level of toxic elements of As, Cd, Hg in the marine mammals meat. The maximum permissible levels (in mg / kg mass) are As - 5; Cd - 0,2; Hg - 0,5 [1]. The concentrations of toxic elements in the studied muscle samples of gray whales and walrus did not exceed the maximum permitted levels.

REFERENCES

1. The Russian State Sanitary, Epidemiological and Hygienic Requirements for goods, subject to Russian sanitary-epidemiological control. Amended January 15, 2013. Decision of the Customs Union Commission dated May 28, 2010 number 299. Chapter II, section 1.

Table - Toxic elements' concentration in Gray whales (#1÷7) and walrus (#8), mg/kg mass

# sample	Landing date dd/mm/yy	Sex	Size, meters	Organ	Fe	Zn	Cu	Hg	As	Cd	Pb
1.	6.08.08	♂	8,1	Muscle	29,5	94,1	1,80	0,002	0,24	0,007	0,78
				Liver	373,3	46,8	112	0,010	1,97	0,317	4,20
				Kidney	28,4	10,9	3,27	0,002	0,17	0,027	2,41
				Blood	308	8,3	1,33	0,003	0,82	0,008	0,89
				Blubber	20,4	3,59	0,72	0,006	1,08	0,014	0,21
2.	31.07.08	♂	8,2	Muscle	59,4	105	1,17	0,005	2,76	0,005	0,12
				Liver	638,7	54,5	81,	0,004	2,04	0,018	0,23
				Blood	113,6	11,0	0,68	0,001	1,25	0,03	0,07
				Blubber	5,8	2,9	1,1	0,022	1,91	0,014	0,15
3.	20.07.08.	♂	8,3	Muscle	40,2	100	2,9	0,002	0,25	0,100	0,20
				Liver	420	68,4	134	0,010	1,60	0,170	0,58
				Kidney	30,8	19,0	4,2	0,002	0,21	0,040	3,80
				Blood	320	8,4	1,0	0,003	0,89	0,008	0,32
				Blubber	8,6	5,3	0,7	0,010	1,30	0,01	0,20
4.	?	?	?	Muscle	64,1	110	2,1	0,005	3,6	0,005	0,12
				Liver	650	556	79,0	0,007	2,04	0,150	0,29
				Blood	150,6	11,8	0,68	0,000	1,29	0,03	0,06
				Blubber	15,8	4,0	1,18	0,022	1,0	0,014	0,15
5.	?	?	?	Muscle	44,8	100	2,2	0,005	4,0	0,005	0,09
				Liver	590	101	83,0	0,005	3,00	0,180	0,32
				Blood	144,4	8,8	0,37	0,000	1,40	0,03	0,05
				Blubber	15,8	5,0	0,9	0,008	1,0	0,016	0,15
6.	13.08.15.	♀	13,0	Muscle	80,4	94,6	2,0	0,035	3,9	0,010	0,10
				Blubber	18,2	8,3	0,8	0,020	1,8	0,010	0,20
7.	14.07.15.	♀	9,5	Muscle	68,9	89,8	1,9	0,035	3,3	0,005	0,14
				Blubber	16,4	10,9	0,6	0,014	2,0	0,016	0,20
				Liver	623	110	90,0	0,048	4,0	0,230	0,39
8.	Walrus ?	?	?	Muscle	70,1	86,6	1,1	0,005	3,6	0,004	0,08
				Liver	500	350	1200	0,007	2,0	0,150	0,43
				Blood	130,7	10,8	0,48	0,000	1,40	0,030	0,04
				Blubber	10,0	4,7	0,8	0,025	0,9	0,020	0,13