

Total Mercury Content of Meat and Liver from Inshore Newfoundland-caught Harp Seal (*Phoca groenlandica*)

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During the past five years, a total of 324,219 harp seals slaughtered for pelts by inshore Newfoundland seal hunters (ANON. 1977-81) provided a total of 4,379,508 kg of harp seal meat which were available and suitable for human consumption (BOTTA et al. 1980, 1982a, b). In general, the vast majority of these seals were beaters, bedlamers, and harps (Table 1) slaughtered along the Northeast coast of Newfoundland and Labrador (ANON. 1977-81) by hunters who were out of port for only a few days; however, only a small fraction of the carcasses was actually utilized for human consumption.

Table 1. Glossary of terms concerning classes of harp seal (*Phoca groenlandica*)

Whitecoat	A newborn harp seal up to an age of about 12 days, prior to loss of the soft white natal hair.
Ragged-Jacket	A young harp seal undergoing its first moult from a whitecoat to a beater. Age ranges between 12 and 18 days.
Beater	A young harp seal in its first year of life, having completed its first moult to a spotted grey coat. Age when slaughtered ranges between 3 and 8 weeks.
Bedlamer	A juvenile seal in its second, third or fourth year of life, having a spotted coat.
Harp	A seal at least 5 years of age.

Mercury content of harp seals caught in the Gulf of St. Lawrence has been determined (FREEMAN & HORNE 1973; JONES et al. 1976; SERGEANT & ARMSTRONG 1973) but no such evaluation of harp seals caught along the Northeast coast of Newfoundland and Labrador has been reported. Consequently, as part of a program to investigate utilization of meat recoverable from the inshore Newfoundland seal hunt, the present study was undertaken to determine the total mercury content of the meat and liver of harp seals of different ages.

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EXPERIMENTAL

Beaters, bedlamers, and harps (Table 1) were shot on March 3, March 10 and April 15, 1980, in White Bay, Newfoundland. The animals were immediately bled and shortly thereafter eviscerated, skinned, placed inside heavy-duty plastic bags, and stored in flake ice until butchered 3 days later. During evisceration, the sex was determined and the liver was saved and placed inside a plastic bag (which was placed inside the gut cavity). The age of each carcass was determined by counting, under polarized light, the dentinal annuli of thinly sectioned (approximately 100 μ m thick) canine teeth (FISHER 1954). All carcasses were butchered into the various cuts shown in Fig. 1. The flank, flipper, and rump were retained, the surface fat trimmed off, and the excess blood removed by cool water rinses. The liver was also subjected to cool water rinses. All trimmed and washed carcass cuts were individually passed 3 times through a meat grinder with 7 mm diameter holes, transferred to a 450-ml capacity polyethylene tub with a tight fitting lid, then frozen and stored at -35C until analyzed. The livers were handled in an identical manner except they were passed through the meat grinder only once.

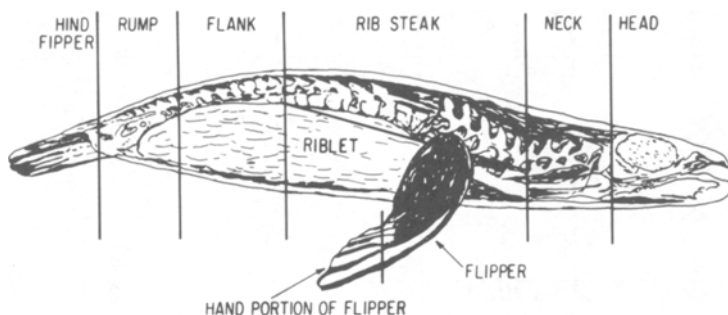


Fig. 1. Carcass cuts of the harp seal (Phoca groenlandica)

Total mercury content was determined on an acid digest of portions (0.2 to 0.5g) of these homogenates using the flameless atomic absorption method of ARMSTRONG & ETHE (1971). All samples were analyzed in duplicate, and tuna fish samples from the National Bureau of Standards and samples which had been analyzed in a Canada wide check program were included with each set of analyses. Analyses were repeated if duplicate samples varied more than $\pm 10.0\%$.

RESULTS AND DISCUSSION

The total mercury content of carcass meat and liver are presented in Table 2. Within each age class, there was very little difference among the three different carcass cuts, but the content in the liver was always far greater. With all three types of carcass cuts and with the liver, there was a definite increase with the age of the seal. Although there were some observable differences between the sexes, these differences were not consistent

Table 2. Total mercury content of harp seal (*Phoca groenlandica*) meat and liver.

Age	Sex	Total mercury content (ppm)			
		C a r c a s s C u t			Liver
		Flank	Flipper	Rump	
Beater	F	0.04	0.03	0.02	0.26
	F	0.03	0.05	0.05	0.74
	F	0.04	0.02	0.02	0.24
	M	0.02	0.02	0.01	0.37
	M	0.10	0.06	0.08	0.48
	M	0.06	0.03	0.04	0.89
	Mean	0.05+0.03	0.04+0.02	0.04+0.03	0.50+0.27
One Year	F	0.12	0.16	0.10	0.72
	F	0.14	0.15	0.13	0.82
	M	0.14	0.11	0.13	2.24
	M	0.14	0.14	0.11	2.10
	M	0.15	0.15	0.14	2.71
	M	0.20	0.22	0.21	1.41
	Mean	0.15+0.03	0.16+0.04	0.14+0.04	1.67+0.81
Two Years	F	0.16	0.18	0.12	0.86
	F	0.17	0.16	0.14	2.20
	F	0.14	0.14	0.11	2.38
	F	0.12	0.16	0.14	1.25
	M	0.16	0.16	0.14	5.07
	M	0.19	0.17	0.16	2.78
	Mean	0.16+0.02	0.16+0.01	0.14+0.02	2.42+1.48
Three Years	F	0.23	0.24	0.23	4.16
	F	0.22	0.21	0.22	5.87
	F	0.14	0.13	0.14	1.88
	F	0.18	0.20	0.17	3.77
	F	0.18	0.16	0.21	3.47
	M	0.32	0.30	0.26	4.62
	Mean	0.22+0.06	0.21+0.06	0.21+0.04	3.96+1.32
Four Years and Older	F	0.30	0.26	0.28	3.60
	F	0.32	0.25	0.28	4.65
	F	0.23	0.28	0.22	2.30
	F	0.21	0.20	0.20	0.76
	M	0.30	0.28	0.26	4.71
	M	0.27	0.28	0.22	2.47
	Mean	0.27+0.04	0.26+0.03	0.24+0.03	3.08+1.53
Overall Mean (n=30)		0.17+0.08	0.17+0.08	0.15+0.08	2.33+1.63

with either the carcass cut or the liver.

The concentration of mercury in the meat of the beaters was far less than that reported for harp seal pups (1-5 days old) taken off ice flows in the Gulf of St. Lawrence (FREEMAN & HORNE 1973). Meat of 3-year-old seals contained only moderately less than that reported for 3-year-old harp seals caught in the Gulf of St. Lawrence (SERGEANT & ARMSTRONG 1973). The concentration in liver of 3-year-old seals was quite similar to that observed by SARGEANT & ARMSTRONG (1973).

With the carcass cuts, the differences between the values reported in the present study and those reported by FREEMAN & HORNE (1973) and SERGEANT & ARMSTRONG (1973) are probably not related to differences in the stocks of harp seals as LAVIGNE et al. (1978) have shown that harp seal pups caught in the Gulf of St. Lawrence are not genetically different from those caught off the Northeast coast of Newfoundland and Labrador. Also tagging studies have indicated that there is some intermixing of harp seals between the two locations (BOWEN 1982). The lower values observed in the present study may be related to year of catching, as the results of JONES et al. (1976) also differed from those of FREEMAN & HORNE (1973). The differences may also be related to differences in feeding habits.

Even with the carcass cuts of harp seal 4 years and older, the total mercury content was always well below the acceptable Canadian limit of 0.5 ppm. Except for samples from some beaters, the liver samples always exceeded this limit by a very wide margin. Thus, meat, but not liver, from the inshore Newfoundland seal hunt was definitely acceptable for frequent human consumption.

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