

HEILSUFRØÐLIGA STARVSSTOVAN

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Diet recommendation concerning pilot whale meat and blubber - Faroe Islands August 1998

It has been more than nine years since the last diet recommendation on pilot whale meat and blubber was published in the Faroe Islands.

During these years investigations have been carried out to establish how substances such as mercury and PCBs pollute the environment. In addition researchers in the Faroe Islands are examining whether food polluted with these substances have an effect on the health of the general public.

Research results from the Faroes show that mercury, whose primary source is whale meat, is likely to slightly impair the brain development of children.

It is suspected that PCBs can have a toxic impact on for example the central nervous system and sexual organs of fetuses. Consequently new-borns in the Faroe Islands are offered to participate in thorough examinations as part of continuous scientific research to clarify the toxicity of PCBs. The examinations of the effects of PCBs are however still ongoing and cannot yet constitute the basis for specific diet recommendations.

Based on the demonstrated effects of mercury exposure and on a general assessment of PCBs, the following diet recommendation is issued:

Recommendation

Blubber

High PCBs contents in blubber lead us to recommend that adults at the maximum eat pilot whale blubber once to twice a month.

However, the best way to protect fetuses against the potential harmful effects of PCBs, is if girls and women do not eat blubber until they have given birth to their children.

Meat

The mercury content of pilot whale meat is high and is one of our main mercury sources. Therefore we recommend that adults eat no more than one to two meals a month.

Women who plan to become pregnant within three months, pregnant women, and nursing women should abstain from eating pilot whale meat.

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Diet recommendation concerning pilot whale meat and blubber

Organs

Pilot whale liver and kidneys should not be eaten at all.

The above recommendations are considered the most advisable for the present. When new information is acquired, this diet recommendation will be revised accordingly.

Compared to the diet recommendation of 1989 this recommendation holds further restrictions for women of childbearing age. More details are given in the below account.

The basis for the diet recommendation.

The recommendation is issued based on the fact that pilot whale meat and blubber contain mercury as well as PCBs. The primary source of mercury is organs and pilot whale meat while blubber is the PCB source.

In the following an account is given of these substances and their occurrence in pilot whale meat and blubber.

Mercury.

Mercury is a so-called heavy metal, which has been extensively used in the world industry. Despite considerable reduction in the use of mercury in recent years, large quantities are still discharged into nature. The source of this pollution is primarily the burning of coal and waste as well as discharges from the chemical and the electronics industries.

Yet we know that mercury has always been present in the ocean. It evaporates from the crust. Researchers do not know exactly how large quantities of mercury are attributable to pollution and how much comes from natural sources.

Mercury accumulates in the food chain and is enriched in certain tissue throughout the lifetime of the organisms. Pilot whale liver has very high mercury content. The concentration of mercury in the pilot whale meat is much lower than in the livers, but still high both in comparison to other food products and to limits applicable for instance to commercial food products. A screening of contaminants in pilot whales caught in 1997 were undertaken, the material that went into this study are shown in

Diet recommendation concerning pilot whale meat and blubber

Table 1

. The results of the mercury analyses of the sampled material are given in

Table 2.

The average mercury content of pilot whale meat sampled in 1997 was 1.91 mg/kg wet weight, with the highest average level in the adult males and the lowest in the young whales. The adult females normally had a somewhat lower concentration of mercury than the adult males, but not always.

According to the dietary survey of 1981-82 each Faroese eats an average of 12 grams of pilot whale meat per day and 7 grams of blubber per day.

Diet recommendation concerning pilot whale meat and blubber

Table 1

Outline of pilot whale schools examined in 1997 (Dam and Bloch, 1999)

Location	Date	No. of whales in the kill	Whales sampled		Hereof					
			in no.	in <i>skinn</i>	males		females		young	
					in no.	in <i>skinn</i>	in no.	in <i>skinn</i>	in no.	in <i>skinn</i>
Vágur*	16-08-97	108	49	248	8	72	24	136	17	41
Sandavágur	26-08-97	165	57	319	8	80	18	120	31	119
Bøur	28-08-97	36	35	270	6	80	15	124	14	66
Hvannasund	01-09-97	60	50	381	7	126	19	136	24	119
Tórshavn	05-09-97	39	36	285	5	67	22	164	10	54
Bøur	06-09-97	35	35	279	5	59	15	136	15	84
Bøur	20-09-97	158	50	309	7	73	20	130	23	106
Tórshavn	24-09-97	157	54	380	4	48	35	254	15	78
Tórshavn	13-11-97	81	50	409	7	92	21	168	22	149
Leynar	02-12-97	74	50	411	3	53	28	242	19	116
all 1997		913	466	3291	60	750	217	1610	190	932
proportions of the three groups in the samples					13%	23%	47%	49%	41%	28%
normal proportions α					13%	23%	40%	42%	46%	32%

* Larsen and Dam, 1999 :

α : Bloch *et al.* 1993

Table 2

The mercury concentrations in the pooled samples of males, females and young pilot whales are given. The corrected mean value was calculated by assuming that the proportion of males, females and young were the same as in an average school. (Dam and Bloch, 1999)

Location	Date	Mercury in muscle, mg/kg ww.			
		Corr. mean	males	females	young
Vágur*	16-08-97	2,13	2,66	2,46	1,55
Sandavágur	26-08-97	2,31	3,25	2,73	1,28
Bøur	28-08-97	1,73	2,30	2,03	1,06
Hvannasund	01-09-97	0,89	1,27	0,97	0,59
Tórshavn	05-09-97	2,60	3,17	2,74	2,22
Bøur	06-09-97	1,50	1,76	1,88	0,94
Bøur	20-09-97	2,24	3,10	2,58	1,34
Tórshavn	24-09-97	1,66	1,93	1,97	1,19
Tórshavn	13-11-97	2,62	2,92	3,30	1,74
Leynar	02-12-97	1,45	1,94	1,65	0,95
mean		1,91	2,43	2,23	1,29
std.dev.		0,56	0,69	0,67	0,46

* Larsen and Dam, 1999

Diet recommendation concerning pilot whale meat and blubber

Faroese are encouraged to consider the below facts before eating pilot whale meat:

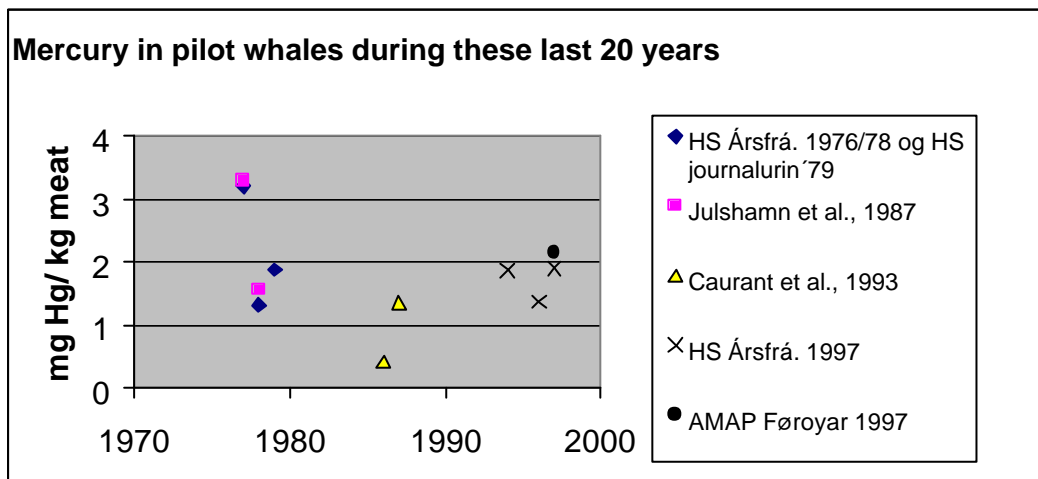
- The heavy metal mercury accumulates in the food chain and in humans.
- Foetuses and possibly also infants are particularly sensitive to mercury.
- The foetus gets mercury from the mother's blood.
- Organic mercury in the blood is reduced by 50% after approx. three months with no mercury intake.
- Breast milk also contains considerable quantities of mercury.

Other Faroese food has been examined to determine its mercury content. Preliminary results show that the average mercury content of Faroese food in general is very much lower than in pilot whale meat.

Figure 1 shows the results of the mercury analyses that have been done on pilot whale meat during the last 20 years.

Figure 1

Mercury content of pilot whale meat these last years (Dam and Bloch, 1999)



Examinations of Faroese during these last years have demonstrated that their blood and hair contain high quantities of mercury. It is most likely that the high mercury content is due to pilot whale meat consumption. Extensive research in the Faroe Islands also indicates that mercury is likely to slightly impair the development of the central nervous system of Faroese infants. Researchers have however not established whether this impact disappears in time.

PCB.

PCB (polychlorinated biphenyls) is a group of substances which due to its properties, such as resistance to heat and other substances, was very popular in the sum 50s and the 60s. PCB is for example common in condensers and transformers, and is also used in the production of joint fillers, rubber and plastic. However, following growing concern over environmental pollution by PCBs, production has been significantly reduced since 1970.

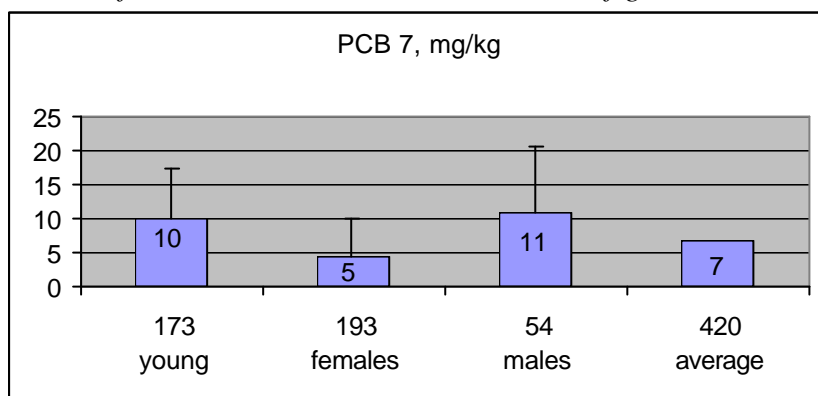
Diet recommendation concerning pilot whale meat and blubber

PCB is in general resistant to biodegradation and dissolve easily in fat. Consequently, PCB accumulates in the food chain and with longevity of the organisms. In whales the PCB accumulates in the blubber tissue, and this makes blubber a major PCB source for the Faroese population.

Recent research on contaminants loads in pilot whales taken in the regular catch in 1997 demonstrates that the average content of PCB 7 in pilot whale blubber is 7 mg/kg, see Figure 2.

Figure 2

Sum of seven PCB congeners CB 28, 52, 101, 138, 156 and 180, in blubber. The number of whales represented by each bar is given below the bars with group characteristic. The average values of the sum of the seven CBs, PCB 7, are shown in figures within the bars.



It is not straightforward to compare the PCB content of the 54 male whales, the 193 female whales and the 173 juvenile whales with results from samples taken some years ago, in 1986 to 1988. The main obstacle to comparisons with earlier results are the differences in analytical methods used with the earlier PCB values being quantified against an internal standard of commercial PCB, whereas the present data are quantified as single congeners using standards of individual CBs. There were also certain differences in the criteria applied for the sorting of the samples in the earlier study as compared to those used in the present study, and this also needs to be taken into consideration because the sex and age distribution of the individuals making up the groups has significant influence on the results as is also indicated in Figure 2.

Work is presently underway at the Food and Environmental Agency which aims at establishing whether there has occurred a decrease in the concentrations of PCB as could be expected following the restrictions on the application of PCBs which have been in force in most countries in the early ninety seventies.

When the PCB content of the Faroese population is examined, it is obvious that the blubber we eat is a major PCB source. Recent examinations have demonstrated that the Faroese population in average has a PCB intake, which is 5-10 times higher than that of for example Danestað. In addition it has been established that the PCB content of the breast milk of Faroese women is very high compared to breast milk in other Western European countries.

If considerable quantities of PCB have accumulated in women's fat tissue researchers suspect that foetuses as well as new-borns can be affected as relatively large quantities of PCB are transferred via breast milk. PCB can affect the central nervous system and cause endocrine disruption. New-borns in the Faroe Islands are as a consequence invited to participate in thorough examinations as part of continuous scientific

Diet recommendation concerning pilot whale meat and blubber

research to clarify whether PCB has a harmful effect on people who eat marine mammals. The examinations, which began in 1994, still remain to prove any harmful effects caused by PCB. It will however be necessary to follow the children until they reach the age of 7 before any firm conclusions can be drawn from this research.

Based on the high PCB content of blubber, researchers recommend that blubber intake is limited and the Faroese are encouraged to consider the following factors:

- Some manmade substances, such as PCB, are stored in the body throughout life. The foetus gets these substances from the umbilical cord, the new-born baby through the breast milk and as it gets older, by blubber intake.
- If the PCB content of the body is to be low when a woman is pregnant, her blubber intake must have been low throughout her life.
- The best way to protect the foetus from the potential harmful effects of PCB is if girls and women abstain from eating blubber until they have given birth to their children.

Assessments.

Pilot whale meat and blubber have for many years been considered healthy for human consumption and in recent years it has been stated again and again that the marine fat, as in blubber, can prevent cardiovascular diseases. We will not claim that pilot whale meat and blubber are unhealthy but rather point out that pilot whale meat and blubber contain substances, which according to international authorities in this field can cause health problems.

Mercury

If pilot whale meat on average contains 1.9 mg/kg (corresponding to 1.9 ppm) the following results are reached:

Normally 1 ppm is considered the advisable maximum level for mercury content in food. The average mercury content of pilot whale meat substantially exceeds this maximum level.

FAO/WHO recommend that PTWI (Provisional Tolerable Weekly Intake) is 0.300 mg. If pilot whale meat contains 1.9 mg/kg wet weight, it gives a tolerable pilot whale meat intake of 157 grams a week, or about 300 grams of pilot whale meat every two weeks¹. As a consequence researchers recommend that pilot whale meat shall not be consumed more than once to twice a month. Women who plan to become pregnant within 3 months and pregnant women should abstain from eating pilot whale meat due to the uncertainty which prevails regarding impacts on foetuses and to what extent it can impair the development of the children when they get older. Women are encouraged to quit eating pilot whale meat three months before they plan to become pregnant as organic mercury in the blood is reduced by 50% after approx. three months if the mother stops eating food containing mercury. By this recommendation the majority of the foetuses should be protected from the potential harmful effects of mercury exposure.

¹ This corresponds to 21 grams of pilot whale meat a day. The dietary survey from 1981-1982 demonstrated that each Faroese had an average daily intake of pilot whale meat of 12 grams.

Diet recommendation concerning pilot whale meat and blubber

PCB

The PCB limit in food is normally 2 mg/kg. Consequently, the average PCB content of blubber by far exceeds this limit.

The PCB content, as shown in the “average” bar in **Fejl! Henvisningskilde ikke fundet.**, corresponds to 7 mg/kg in blubber.

The U.S. Food and Drug Administration has recommended that ADI (Acceptable Daily Intake), shall be $1 \mu\text{g PCB/day/kg}$ body weight. On average blubber contains 7 mg PCB/kg. Consequently an adult can consume approx. 7 to 10 grams of blubber./day, corresponding to approx. 100 grams. of blubber every two weeks. The recommendation to limit blubber intake to one to two meals a month is based on these figures.

As PCB remains in the human body for so many years, it is not adequate to give diet recommendations only in connection with pregnancies and the period preceding the pregnancies. The best way to protect the foetus from the potential harmful effects of PCB is if girls and women abstain from eating pilot whale meat until they have given birth to their children.

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Food and Environmental Agency
Department of Occupational Health
Chief Medical Officer

References

Dam, M. and Bloch, D. 1999. Screening of mercury and persistent organic pollutants in long finned pilot whale (*Globicephala melas*) in the Faroe Islands”. Submitted to Marine Pollution Bulletin.

Larsen, R.B. and Dam, M. 1999. AMAP phase I the Faroe Islands, Food and Environmental Agency of the Faroe Islands.

Bloch, D., Desportes, G., Mouritsen, R., Skaaning, S. and Stefansson, E. 1993. An introduction to studies of the ecology and status of the Long-finned Pilot whale (*Globicephala melas*) off the Faroe Islands, 1986 – 1988. In: Donovan, G.P., Lockyer, C.H. and Martin, A.R. (Eds.). Biology of northern hemisphere Pilot whales. Report of the International Whaling Commission, Special issue 14.