

Mercury accumulation in fishes from North-East and North-West Barents Sea during the polar night

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In this study, we quantified total mercury (Hg) concentrations and dietary descriptors in three Arctic and sub-Arctic fishes sampled during the polar night, to study their interspecific and spatial bioaccumulation patterns in the Barents Sea food web. Hg and stable isotope values of carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) were analysed in the muscle tissue of polar cod (*Boreogadus saida*), Atlantic cod (*Gadus morhua*) and capelin (*Mallotus villosus*), sampled from the North-West and North-East parts of the Barents Sea.

Hg concentrations varied greatly among individual fish, but were well below the EU-accepted threshold of fishes for human consumption of 0.5 $\mu\text{g/g}$ (wet weight). Hg concentration was found to significantly increase with relative trophic position in the food web ($\delta^{15}\text{N}$) and from pelagic to benthic fishes ($\delta^{13}\text{C}$). In the North-East Barents Sea, Atlantic cod had the highest Hg concentrations, reflecting its high trophic position and benthopelagic feeding. When comparing polar cod between the two locations, individuals from the North-East had higher Hg concentrations. These variations were partly explained by the larger size of polar cod from the North-East bioaccumulating more Hg, and partly by local influences. Atlantic cod were not spatially compared, owing to the considerable difference in sizes and trophic positions between the locations. This was the first study to quantify total Hg concentrations during the polar night and will be a valuable contribution to future studies and comparisons.

Keywords: Arctic; Polar cod; Atlantic cod; Capelin; Stable isotopes; Mercury