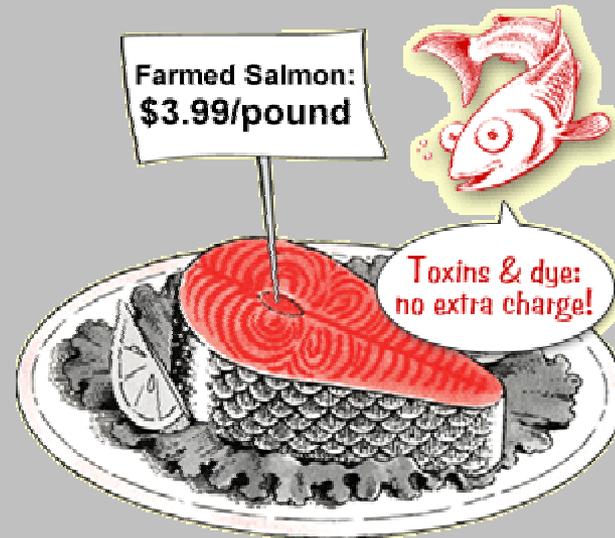


# CONTAMINANTS IN FARMED SALMON FROM AROUND THE WORLD



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**A very popular fish with high levels of omega-3 fatty acids, known to be beneficial in preventing sudden cardiac death. Farming of salmon has grown very rapidly, now at levels of over 1 million tons per year. Farmed salmon are relatively cheap and are available throughout the year.**

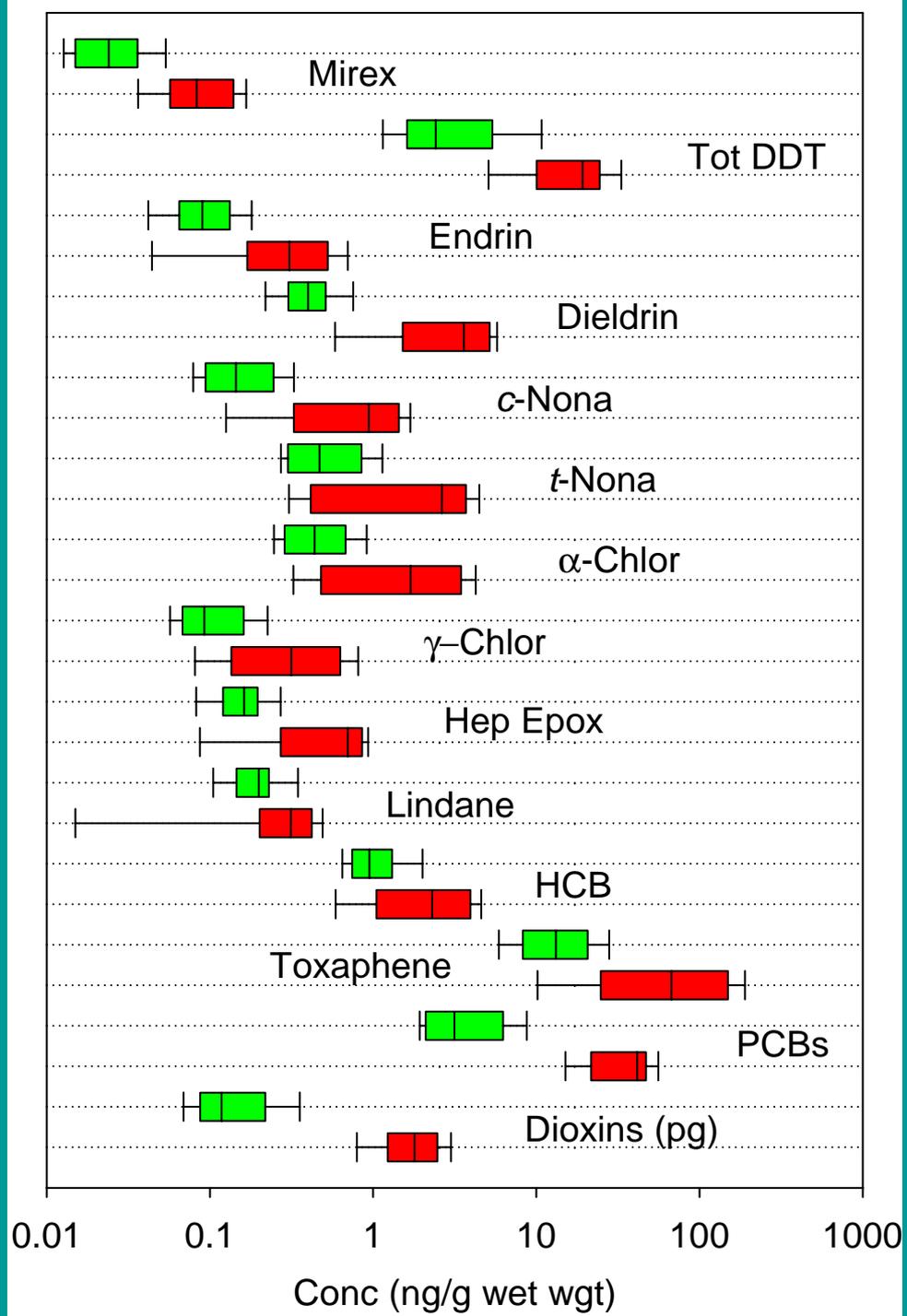
# Purpose of Our Study

To analyze Atlantic salmon from farms in eight salmon-farming regions, Atlantic salmon fillets from supermarkets in 16 cities and wild Pacific salmon of five species for the presence of environmental organic and metal contaminants.

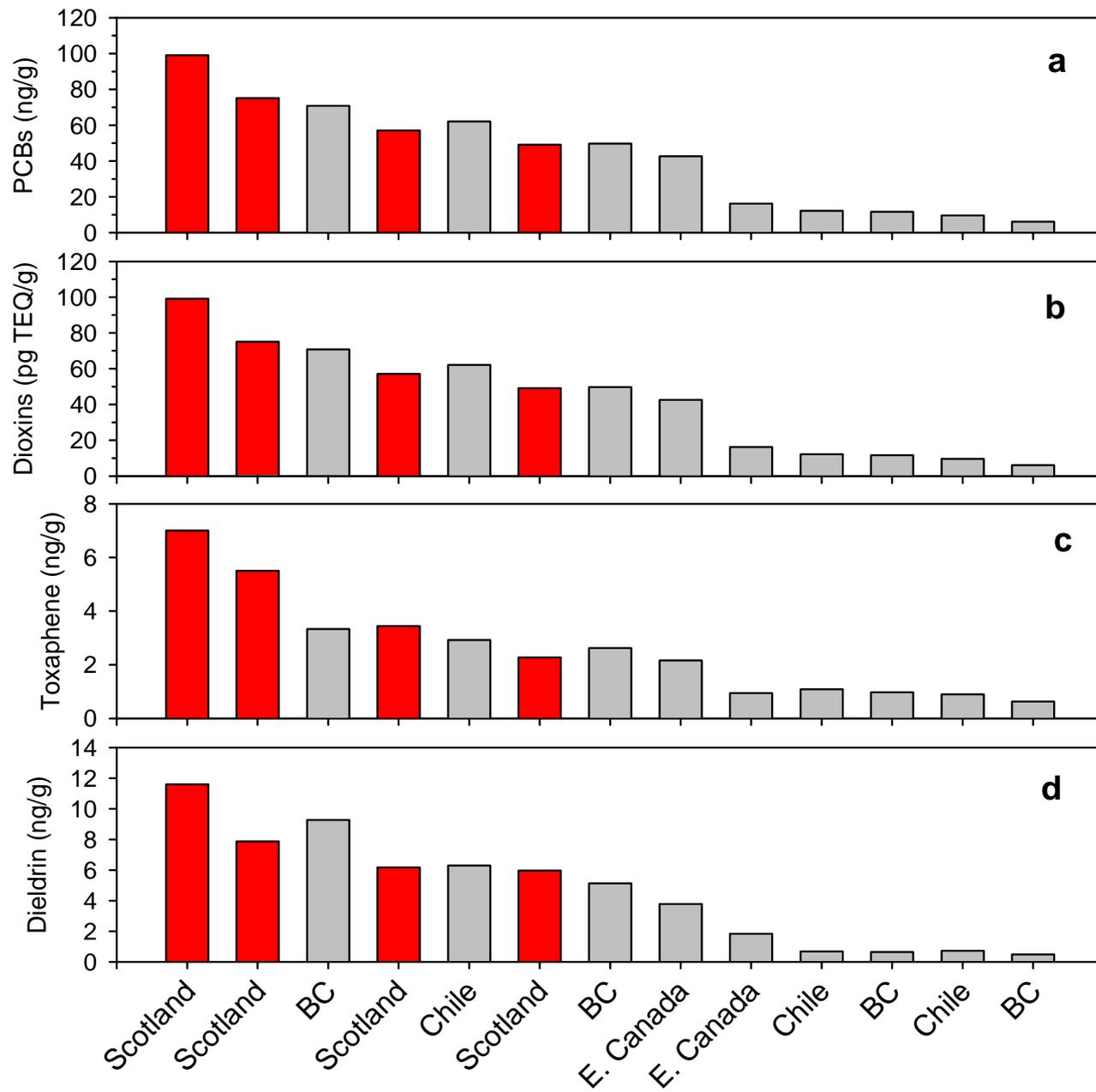


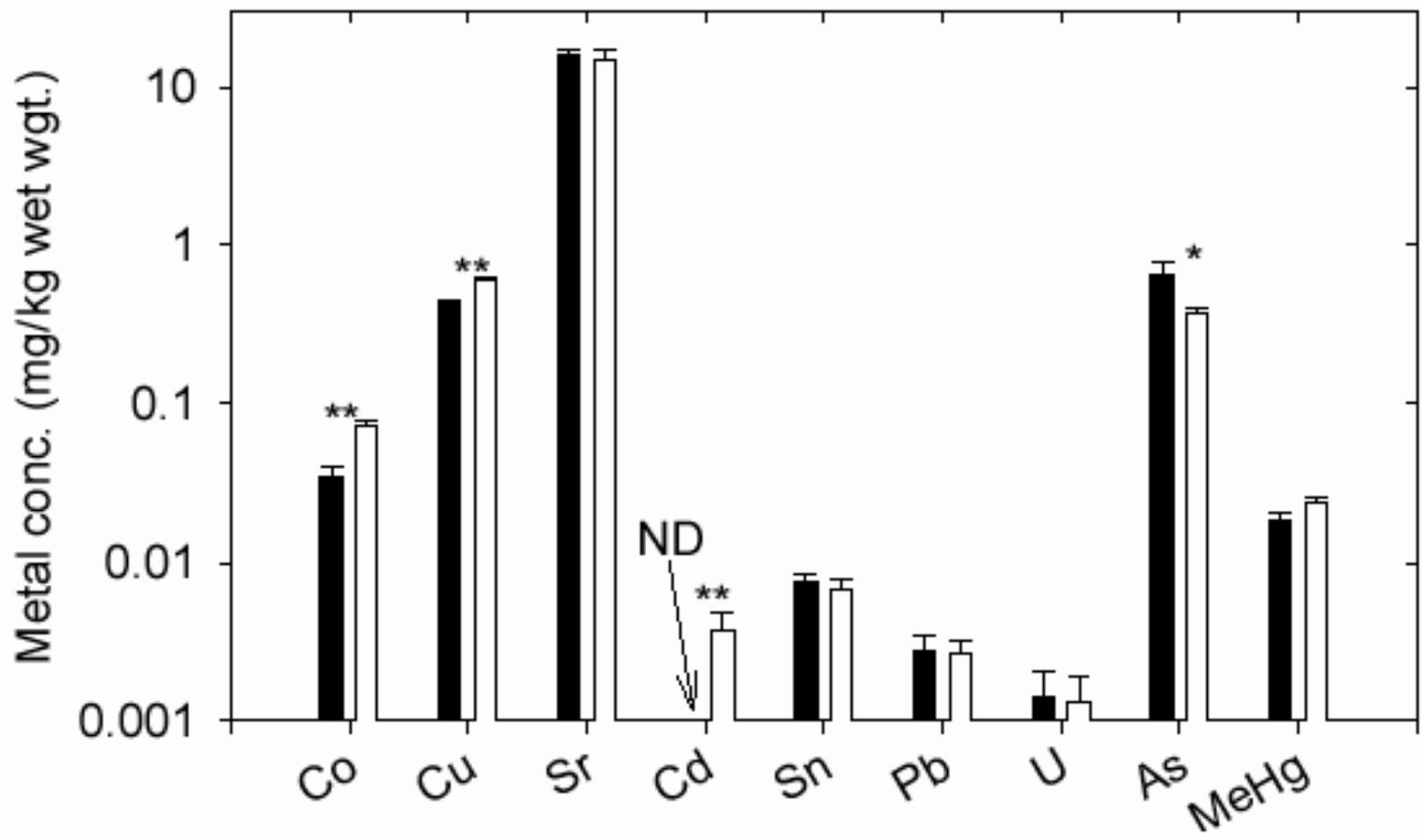


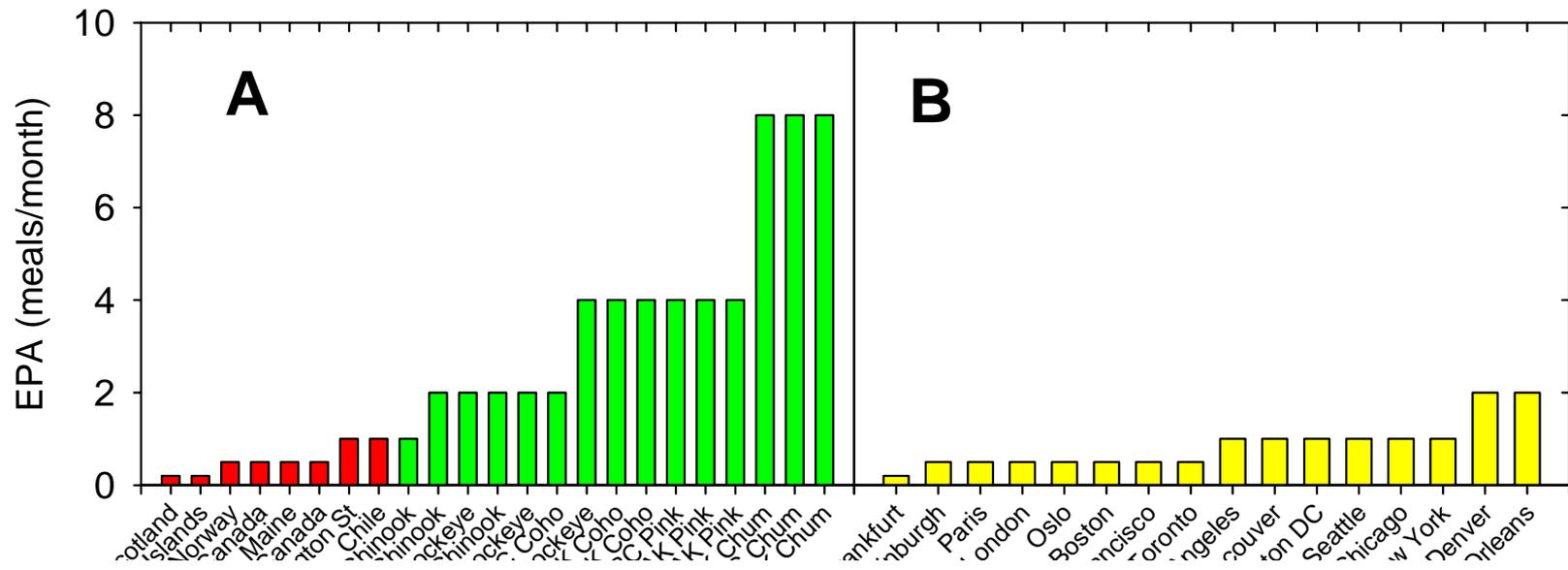
- We purchased 459 whole farmed salmon from 51 farms in eight farming regions in six countries (Scotland, Norway, Faroe Islands, Eastern Canada, Maine, Western Canada, Washington State, Chile).
- We purchased 135 wild Alaskan salmon, including chum, coho, chinook, pink and sockeye, from suppliers in Alaska and Western Canada.
- We purchased salmon fillets in supermarkets in 16 North American and European cities (Vancouver, Seattle, Los Angeles, San Francisco, Denver, Chicago, Toronto, New Orleans, Washington, D.C., New York, Boston, London, Edinburgh, Paris, Frankfurt, Oslo).
- Composites of three fish or three fillets (for a total of 246 samples) were analyzed for 14 organic contaminants, and nine metals.
- We purchased nine samples of farmed salmon feed from different parts of the world for analysis.













## The presence of contaminants may counteract the beneficial effects of omega-3 fatty acids:

- Omega-3 fatty acids are well documented to prevent cardiac arrhythmias, especially in persons who have had one heart attack. They do not protect against cancer. However, PCBs and dioxins cause an elevation of serum lipids, which is the greatest risk factor for a heart attack.
- Although less well established, there is some evidence that intake of omega-3 fatty acids during gestation increase cognitive function in children. But PCBs and dioxins are very well documented to cause deficits in IQ.
- Therefore, while eating uncontaminated salmon is healthy, eating contaminated salmon or any other fish is going to counteract the beneficial effects.

# CONCLUSIONS

Farmed salmon have significantly greater levels of organochlorine compounds than do wild salmon, and the source appears to be the fish food. Farmed salmon from Northern Europe have significantly higher levels than those from Chile and Washington State.

Salmon are known to have relatively high amounts of omega-3 fatty acids, but the beneficial effects of omega-3 fatty acids on sudden cardiac death must be balanced against the increased risk of cancer from the contaminants.

Using EPA cancer risk assessment methods for PCBs, dieldrin and toxaphene and WHO dioxin TEQ methods for cancer risk assessment, farmed salmon from all regions studied elicited highly restrictive fish consumption advisories, while those for wild salmon are much less stringent. However, even this advisory does not consider other carcinogenic substances found to present, nor does it consider all non-cancer endpoints. Some of the non-cancer endpoints may be of greater importance from a public health perspectives.