

Levels of Polychlorinated Dibenzo(p)dioxins, Dibenzofurans and Dioxin-like PCBs in Irish Farmed Salmon

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Introduction

A recent survey published by Hites in the journal Science compared the level of organochlorine contaminants including PCBs and dioxins in farmed versus wild salmon collected from around the world¹. Most organochlorine substances analysed in the study show a significantly higher concentration level in farmed than in wild salmon. While dioxin and PCB levels of wild fish mainly reflect the contamination level of the environment in which the fish is grown, the dioxin and PCB concentration in farmed fish may mainly be attributed to the fish feed used.

As a consequence to the Belgian "chicken scandal" in 1999, the EC Commission enacted maximum levels for dioxins and furans (PCDD/F) in food and feed valid from July 1st, 2002 throughout Europe (Council Directive 2003/57/EC and Council Regulation EC/2375/2001). For muscle meat of fish and fishery products a dioxin maximum level of 4 pg WHO-PCDD/F-TEQ/g fresh weight was set. The levels of dioxins reported in the study cited above are all below this limit value². Latest until the end of 2004, the maximum levels will be reviewed in particular regarding the inclusion of dioxin-like PCBs.

In January 2004, the Irish Sea Fisheries Board (BIM) conducted the present study on the concentration of Polychlorinated Dibenzo(p)dioxins (PCDDs), Dibenzofurans (PCDFs) and dioxin-like PCBs (WHO-PCBs) in farmed salmon from two locations in Ireland. The present study should examine whether the PCDD/F and WHO-PCB levels of Irish farmed salmon correlate to the dioxin data for farmed Atlantic salmon from other countries in Northern Europe (e.g. Scotland, Faroe Islands and Norway) presented in the study by Hites.

In the Hites survey, raw salmon filets with skin on were tested. Since PCBs, dioxins and other organic pollutants are mainly bound to the fish fat, a reduction of fat content by removal of the skin was supposed to lower the amount of organic contaminants. Thus, the effect of skin removal on the dioxin and PCB levels was also examined in the present study. In addition, the influence of cooking the fish meat was investigated.

Materials and Methods

Within the present study, 13 salmons were caught in January 2004 at two fish farms in different areas of Ireland. As specified by BIM, the six salmons from one of the fish farms (Area 1) had an average filet weight of 529 g and the seven salmons from the other location (Area 2) showed an average filet weight of 1.069 g. One part of each salmon filet was not further pretreated while from another part, the skin was removed. Furthermore, a part of each raw salmon meat was cooked. Thus, four different sample materials from each fish were provided for analysis.