

PCDD/F in Hair

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Abstract

Hair analysis is an established mean to determine the body burden of elements and drugs in humans¹. Recently this approach has been applied for organic environmental chemicals as polychlorinated biphenyls (PCB), dibenzofurans (PCDF), and dibenzo-p-dioxins (PCDD)³. In addition Klein et al. (1992)² found relationships between hair, blood, and milk for hair from PCB exposed cows. Thus hair seems to be an excellent material to study the human exposure of environmental organic chemicals since the surface of the hair is hydrophobic and the hair contains internal and external lipids⁴. The lipid material in the hair of humans ranges from 1% to 9%¹. Two contributions to the total concentration of a chemical have to be considered which are the exposure via the body and the contamination via atmospheric deposition. In the case of PCDD/F it has to be expected that the exposure via the body could only occur for the 2,3,7,8-congeners.

One sample from a smoker (50 cigarettes per day, three days unwashed) was divided into equal parts. One part was washed with common surfactants and the other part was left untreated. The other washed sample of a non-smoker was divided into three parts. The five subsamples were analysed by common methods described elsewhere³. The results of the non-smoker were averaged and the variation of the subsamples was in between normal analytical variations. The results are shown in figure 1 for the averaged triplicate and the washed and unwashed hair of the smoker. Although the results are based on a small amount of samples there are some striking aspects. The washing procedure affects more the lower chlorinated

congeners (Fig. 1A, Fig. 1B, Fig. 1C). The congener-pattern of the non-smoker is similar to a normal pattern of bloodfat (Fig. 1A, Fig. 1D). The pattern of the washed and unwashed hair of the smoker could not be related to a bloodfat pattern only. If a congener pattern of sidestream cigarette smoke is considered (Fig. 1E) a strong similarity especially in the range of the higher chlorinated dibenzofurans cannot be neglected. The unwashable part of the higher chlorinated dibenzo-p-dioxins and -furans is a strong hint that these compounds are not deposited particle bound via the atmosphere. The variations of the pattern from the unwashed smoker hair in the range of the lower chlorinated congeners (Fig. 1B) can be attributed to atmospheric background exposure. The results clearly show the importance and capabilities of hair analysis in the field of exposure assessment for environmental organic compounds

Aknowledgement

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Literature

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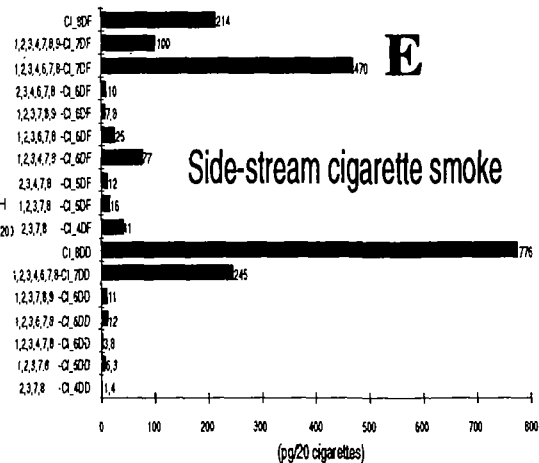
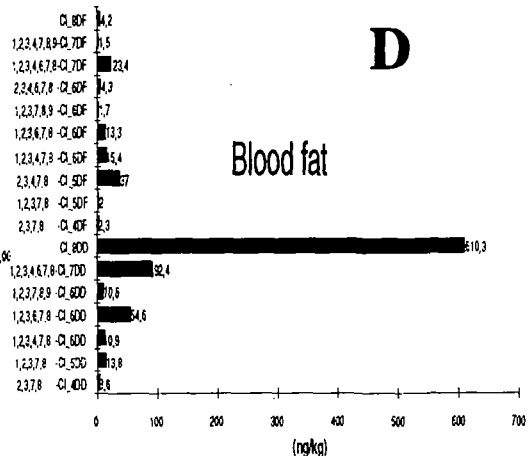
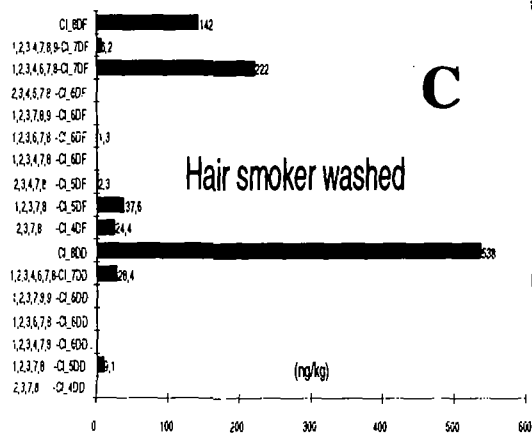
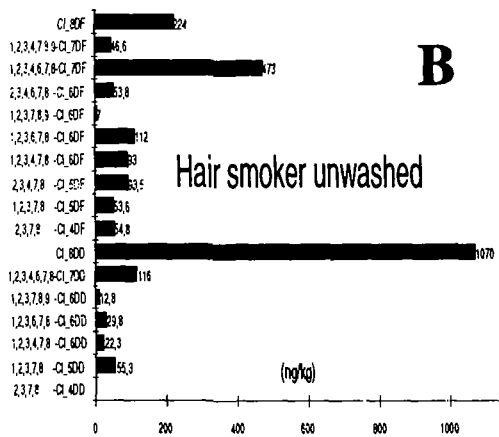
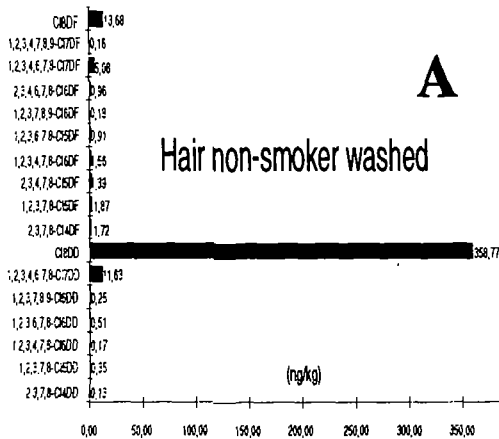


Figure 1: Pattern of 2,3,7,8-congeners in hair of smokers and non-smokers