

RESIDUES OF PCDDs AND PCDFs IN HUMAN MILK SAMPLES IN AHMEDABAD, INDIA

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Polychlorinated dibenzo-p-dioxins (PCDDs) and Polychlorinated dibenzo furans (PCDFs) represent a class of organic environmental pollutants. They are unwanted by products of incineration, uncontrolled burning and certain industrial processes. These are persistent in nature and bioaccumulate through food chain, hence hazardous to human health and environment. The residues of these toxicants have been detected in human adipose tissue, blood and milk. Their health effects include skin disorders, induce stillbirths, cancer and also disrupting endocrine functional properties through aryl hydrocarbon receptor (AhR) mediation. The affinity for AhR has been used to build a toxic equivalency factor (TEF) list; which is used in risk assessment of these toxic halogenated aromatics. Dioxins were first identified in human milk in 1980. The concern about the presence of these compounds in breast milk and their effects on health of breast-fed infants is rising worldwide.

In Fukuoka, epidemiological studies showed that 13 women in Yusho families had given 11 live births and two stillbirths. Ten babies had

shown the characteristic grayish dark brown-pigmented skin at birth and majority of the babies were small for dates. Later it was confirmed that PCDD/Fs were transferred through females to their fetus via placenta and breast milk. It has been also reported that after 7 years of exposure the 13 children were seen to be apathetic and dull with low IQs. A low male to female sex ratio at birth was reported after the Seveso accident.

WHO has coordinated two rounds of follow up studies on levels of PCDD/Fs and PCBs in human milk and the data shows a decreasing trend during the last 30 years. However, in India there is no data available on the exposure and residues of these contaminants. This study for the first time presents the levels of dioxin and furans in human milk samples collected from the Ahmedabad city in India.

The concentration of total PCDD/Fs ranges from 2.49 pg-TEQ/g to 14.24 pg-TEQ/g with an average of 6.22 pg-TEQ/g. Average percentage of lipid in the milk samples was 2.92. The percentage of lipid ranges from 1.62 to 5.00. A positive correlation was observed between total dioxin and lipid content in milk samples ($r^2 = 0.7814$) (Fig.1). A total of 23 subjects were taken and the age of the subject's ranged from 18 to 30 years. The average height and weight of the mothers were 150.57 cm and 47.22 kg respectively.

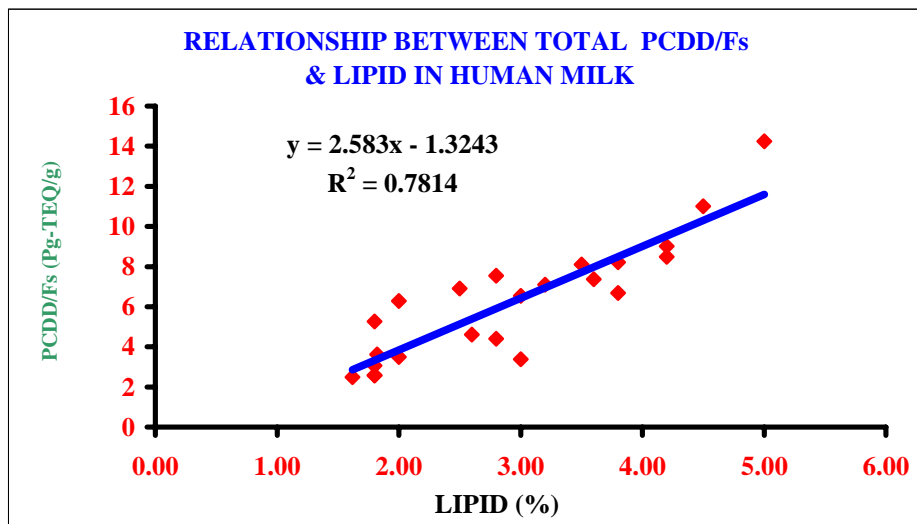


Fig. 1 : Relationship between total PCDD/Fs & Lipid in human milk

This study shows the presence of PCDD/Fs in the Indian environment. This is base line information because quite a few samples were analyzed from only one city of the country, therefore, a systematic nation wide monitoring is warranted to get the actual pattern of exposure.