CONTENTS OF DIOXINS, PLANAR AND OTHER PCBs IN HUMAN MILK FROM THE ROTTERDAM AND GRONINGEN AREA

L.G.M.Th. Tuinstra[A)], C. Koopman-Esseboom[B)], P.J.J. Sauer[B)], M. Huisman[C)], E.R. Boersma[C)],

[A)] State Institute for Quality Control of Agricultural Products (RIKILT-DLO)
P.O. Box 230, 6700 AE Wageningen, the Netherlands.

[B)] Sophia's Children's Hospital and Erasmus University
Department of Pediatrics
P.O. Box 70029, 3000 LL Rotterdam, the Netherlands

[C)] Academisch Ziekenhuis
Kliniek voor Obstetrie en Gynaecologie
P.O. Box 30001, 9700 RB Groningen, the Netherlands

INTRODUCTION

Seven institutes in the Netherlands: Academisch Ziekenhuis (Groningen); Sophia Kinderziekenhuis (Rotterdam); Landbouwuniversiteit (Wageningen); MBL-TNO (Rijswijk); IBC-TNO (Zeist); ITV-TNO (Zeist) and RIKILT-DLO (Wageningen) are working on a project: "Long term effects of early (foetal/neonatal) exposure to toxic substances (polychlorinated biphenyls (PCBs) and dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs))". The project is subsidised by "Stimuleringsprogramma Gezondheidsonderzoek" (SGO) and "Programma Commissie Toxicologisch Onderzoek" (PCT).

In the frame work of this project RIKILT-DLO determines the contents of these compounds in human milk. For practical reasons only all the samples of the first sampling period and about 20% of the second sampling period should be analysed for dioxins and planar PCBs. All samples (1st and 2nd sampling) should be analysed for other PCBs.

MATERIALS

Human milk samples were collected at the 10^{th} (9-17) and 42^{th} (40-45) day after delivery. Before each suckling both breasts were emptied with an electrical breast pump (type Kaweco, Babyluxus 2). The obtained milk was mixed thoroughly and a 10% aliquot was taken to make up a 24 hours sample. This 24 hrs sample was deep frozen (-20 o C) till analysis was performed. Human milk sample volumes ranged from 20 - 100 ml's per day. In each area more than 100 mothers participated.

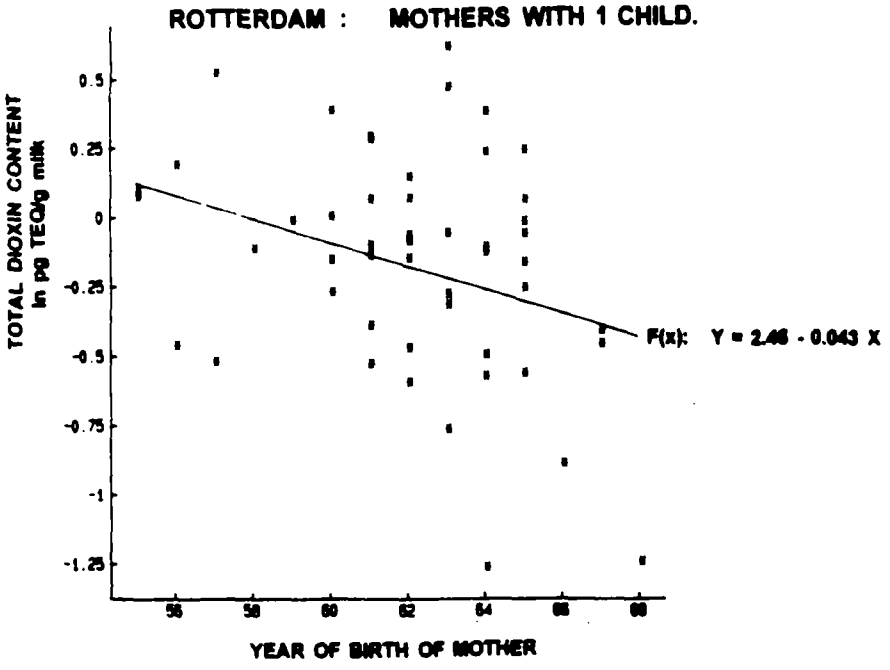
METHOD

See poster "Method for the determination of dioxins, planar and other PCBs in human milk" (Authors: L.G.M.Th. Tuinstra, J.A. van Rhijn, W.A. Traag, P. v.d. Spreng, T. Zuidema, H.J. Horstman).

RESULTS

In table 1, expressed as I-TEQ pg/g milk, overall mean values and ranges are given for the more important compounds found in human milk from the Rotterdam and Groningen area. "Overall" means that results of the second sampling are included. Not all mono-ortho PCBs were available as standard and therefore could not be checked for their presence in milk. There are no differences between the two areas with respect of the concentration of planar compounds. This is also true for mono-ortho PCBs.

In fig.1 and 2 for dioxins a wellknown effect is again illustrated for mothers with one or two children from the Rotterdam area. The content in human milk is higher when the nursing mother is older.


ROTTERDAM : MOTHERS WITH 1 CHILD.
TOTAL DIOXIN CONTENT
In pg TEQ/g milk
0.5
0.25
0
-0.25
-0.5
-0.75
-1
-1.25
F(x): Y = 2.46 - 0.043 X
YEAR OF BIRTH OF MOTHER

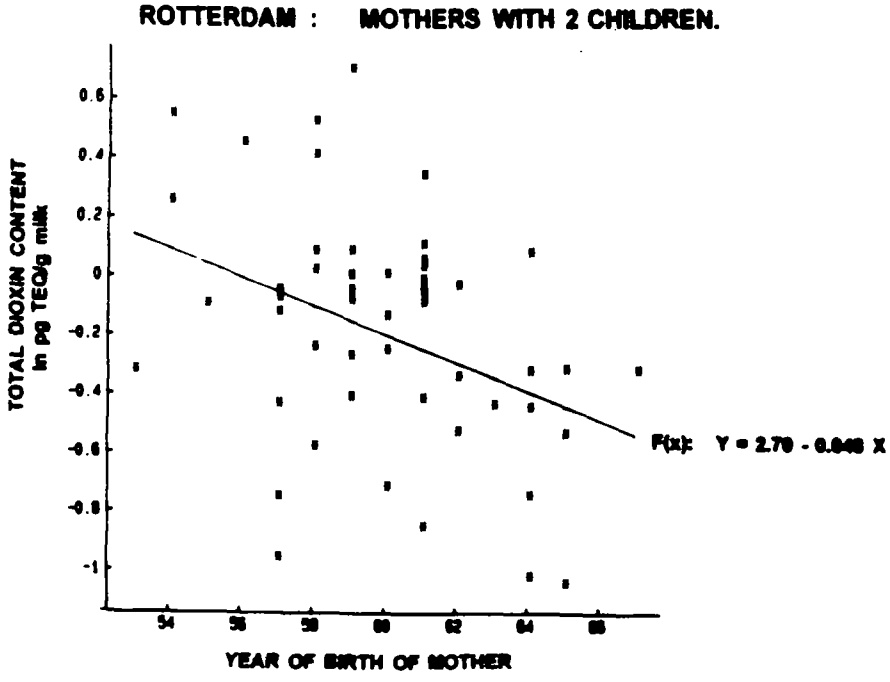

ROTTERDAM : MOTHERS WITH 2 CHILDREN.
TOTAL DIOXIN CONTENT
In pg TEQ/g milk
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
F(x): Y = 2.70 - 0.048 X
YEAR OF BIRTH OF MOTHER

Table 1 Amount in pg I-TEQ/g milk

Component	TEF	Rotterdam			Groningen		
		n	x	range	n	x	range
dioxins							
Total	-	126	0,895	0,27-2,10	117	0,853	0,44-2,70
D48 (2,3,7,8 TCDD)	1,0	126	0,125	0,00-0,29	117	0,108	0,00-0,30
D54 (1,2,3,7,8 PCDD)	0,5	126	0,160	0,00-0,67	117	0,169	0,01-0,83
D67 (1,2,3,6,7,8 HxCDD)	0,1	124	0,136	0,02-0,32	117	0,131	0,04-0,37
F114 (2,3,4,7,8 PCDF)	0,5	126	0,330	0,09-0,97	117	0,316	0,08-0,62
planar PCBs							
Total	-	126	0,462	0,13-1,25	117	0,438	0,13-1,09
CB77 (3,4'-4,4' PCB)	0,01	126	0,005	0,00-0,04	117	0,005	0,00-0,02
CB126 (3,3'-4,4'-5 PCB)	0,1	126	0,445	0,12-1,20	117	0,422	0,12-1,06
CB169 (3,3'-4,4'-5,5' PCB)	0,005	126	0,011	0,00-0,03	117	0,011	0,00-0,02
mono-ortho subst. PCBs							
Total	-						
CB105 (2-3,3'-4,4' PCB)	0,001	190	0,00025	0,-0,00064	192	0,00026	0,-0,00057
CB118 (2-3'-4,4'-5 PCB)	0,001	190	0,00095	0,00018-0,00247	192	0,00098	0,00028-0,00241
CB156 (2-3,3'-4,4'-5 PCB)	0,001	190	0,00055	0,-0,00162	192	0,00061	0,00020-0,00160