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Estimation exposure to dioxin and dioxin-like compounds from seafood and other dietary sources using a bioassay method

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In this study we looked the correlation of dioxin and dioxin-like compounds with seafood and other dietary components in a selected group of women from the Danish National Birth Cohort. Due to limited volume of bio-material, the objective was to investigate the feasibility of using a bioassay method to estimate exposure. Samples were measured using the Dioxin Responsive Chemically Activated LUCiferase eXpression (DR CALUX) assay from BioDetection Systems, Amsterdam. Out of 70,188 women who filled in a food frequency questionnaire between 1998-2002, we randomly selected 50 women (2mL serum/sample) with restrictions on age (25-35 years), body mass index (18.5-25 kg/m²), and parity (nulliparous), to limit variation due to maternal factors. Quantified intake of foods was estimated using assumptions on portion sizes and quantification of nutrients additionally relied on food composition tables. Due to relatively infrequent seafood consumption in Denmark, women were selected based on low, medium and high consumption to achieve sufficient variation in intake. Out of 50 samples, five fell below limit of detection. The average dioxin toxic equivalents (TEQ) in the samples were 32.0 pg TEQ/g serum lipid (standard deviation: 15.6). Seafood consumption did not correlate with levels of TEQ, spearman correlation coefficient $r=-0.13$ ($p=0.38$) while quantified intake of fat showed a positive correlation $r=0.39$ ($p=0.005$). Apart from fat, other dietary components did not correlate significantly with the measured levels of TEQ in this small study. The results indicate that estimating dietary exposures to dioxin and dioxin-like compounds using a bioassay method is a feasible option.