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Polycyclic aromatic hydrocarbon concentrations in commercially available infant formulae in Nigeria: Estimation of dietary intakes and risk assessment

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The concentrations and profiles of polycyclic aromatic hydrocarbons (PAHs) in commercially available infant formulae and follow-up formulae in Nigeria were determined with a view to providing information on the health risks to children from the consumption of these infant foods. The concentrations of PAHs were measured by means of gas chromatography-mass spectrometry (GC-MS) after extraction by ultra-sonication with acetone/dichloromethane and clean-up. The concentrations of the $\Sigma 16$ PAHs in these infant formulae ranged from 0.102 to 1.98 $\mu\text{g kg}^{-1}$, 0.054-1.98 $\mu\text{g kg}^{-1}$, 0.081-2.54 $\mu\text{g kg}^{-1}$ and 0.51-0.70 $\mu\text{g kg}^{-1}$ for infants of ages 0-6 months, 6-12 months, 1-3 years and 0-12 months respectively. The concentrations of benzo(a)pyrene (BaP) in all samples investigated were below the 1 $\mu\text{g kg}^{-1}$ European Commission permissible limit for BaP in foods meant for infants. The estimated daily intake of PAHs based on the European Food Safety Authority (EFSA) suggested indicators of occurrence and effects of PAHs in foods were not detected (nd) to 2.67 ng BaP kg^{-1} bw day $^{-1}$, nd-5.29 ng PAH2 kg^{-1} bw day $^{-1}$, nd-11.20 ng PAH4 kg^{-1} bw day $^{-1}$, and nd-34.96 ng PAH8 kg^{-1} bw day $^{-1}$. The estimated margin of exposure (MOE) values: BaP-MOE, PAH2-MOE, PAH4-MOE and PAH8-MOE values were greater than 10,000 which indicates that there are no health risks from the consumption of these products by infants. The concentrations and dietary exposure to PAHs from these products were similar to values reported in the literature for European Communities.

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