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An estimate of dietary exposure of acrylamide in Saudi infants

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Since its discovery in starch-rich processed foods in 2002⁽¹⁾, acrylamide, a potential carcinogen, has been widely studied both in terms of toxicity and human exposure. Using concentration data from the UK, Norway, Sweden, Switzerland and the USA, the FAO and WHO estimated the dietary intake (micrograms per kilogram bodyweight per day) for the general population to be in the range of 0.3 to 0.8 µg/kg bw/d⁽²⁾ but, for children, due to lower bodyweight, the intake estimate would generally be 2 to 3 times that of adults. However, there remains a paucity of exposure estimates for other population groups including infants. In this study, 3-day 24-hour records ($n = 150$) from healthy Saudi infants aged 4 to 24 months (separated into age differentiated groups 4–6, 7–9, 10–12, 13–16, 17–24 months) were used to estimate the dietary exposure of acrylamide⁽³⁾ using concentration data for various food groups from published studies and in particular, we included the contribution from infant milk sources. Based upon minimum, mean and maximum acrylamide concentration levels measured in 17 foods from 34 found from the survey, the mean exposure was estimated to be 5.5 µg/kg bw/d [0.44, 6.22] with the 98th percentile to be 24.62 [6.48, 42.06 low and high respectively] µg/kg bw/d. The WHO and FAO⁽²⁾ estimated the average consumption of acrylamide in infants between 6.0 µg/kg bw/d for the 98th percentile consumer, four times lower than the Saudi infant exposure estimate in this research. In the early age groups (4–6 and 7–9 months) acrylamide exposure is primarily associated with increased consumption of bottled milk and cooked vegetables, with 30.92% and 67.46% contribution of the total exposure. In contrast in the older groups (10–24 months) the primary exposure is associated with rolled bread and biscuits. In addition, across all age groups there was no significant difference between the mean exposures between female and males with average 5.5 [6.1 and 5.2] µg/kg bw/d respectively. This work will be extended to include comparative estimates with the 1992 NDNS (National Dietary Nutrition Survey) UK infant study No. 3481.

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