

ALUMINIUM INTAKE THROUGH THE CONSUMPTION OF SELECTED BABY FOODS AND RISK CHARACTERISATION IN A POPULATION OF BRAZILIAN AGED 12-36 MONTHS

Main author: Adriana Arisseto-Bragotto (University of Campinas - UNICAMP)

Co-authors: Esther Paiva, Sandy Lima, Renata Marques, Marcelo Morgano, Adriana Arisseto-Bragotto

INTRODUCTION

Aluminium (Al) is the third most abundant constituent element of the Earth's crust and can be found in plants, food and underground water sources, including drinking water. The occurrence of Al in infant foods such as infant formula is well known and may pose risks to health. Increased susceptibility to the toxic effects of Al, which include anaemia, impaired bone formation, disorders of the digestive, respiratory and immune systems and neurotoxic effects, is observed in the early stages of life, foetal and early postnatal periods. In this project, Al dietary intake from selected baby foods was estimated for Brazilian infants from the São Paulo State aged between 12 and 36 months in order to allow a risk characterisation.

METHODOLOGY

The exposure assessment was carried out by combining levels of Al in 171 samples of baby foods (infant formula, meat/vegetable purees, fruit purees, petit-suisse and cereals), analytically determined by inductively coupled plasma optical emission spectrometry, with individual food consumption data of these products, using a deterministic approach. Data on food consumption were generated using a duplicated 24 h recall applied to the parents of 95 infants aged from 12 to 36 months, between January and May 2019. Two parameters were used to evaluate the potential risk of exposure to Al: the Provisional Tolerable Weekly Intake (PTWI) of 2 mg/kg body weight (bw) established by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the Tolerable Weekly Intake (TWI) of 1 mg/kg bw set by the European Food Safety Authority (EFSA).

RESULTS

The mean Al intake, calculated using mean Al concentrations, was estimated to be 0.153 mg/kg bw per week, corresponding to 7.6 % of the PTWI and 15.3 % of the TWI. When maximum Al concentrations were used, the obtained mean intake was 0.460 mg/kg bw per

week, which corresponds to 23.0 % and 46.0 % of the PTWI and TWI, respectively. In addition, in this critical scenario, estimated Al intake at 95th percentile was 1.323 mg/kg bw per week, corresponding to 66.1 % of the PTWI and 132.3 % of the TWI. The food with the highest frequency of consumption was infant formula (50.7 %) whilst the highest daily consumed amount was observed for meat/vegetable puree (85.3 g/day). The contributions of the selected baby foods to the mean Al intake were: infant formulas (36.2 %), petit-suisse (25.4 %), meat/vegetable purees (24.5 %), cereal (12.1 %) and fruit purees (1.9 %).

DISCUSSION

It should be noted that the results reported in this study may be underestimated, for several reasons. For infant formulas, Al concentrations are related to the powder (non-reconstituted) product and, consequently, water contamination was not considered. In addition, for children over 6 months, other foods that were not analysed in this study (e.g. fruit juices, rice, beans, pasta, cassava and biscuits) are incorporated into the diet and may increase the intake of Al. In conclusion, this study suggests potential concern regarding consumers of highly Al-contaminated products and may be used as a basis for the establishment of risk management actions in Brazil.