Potential renal acid load in the diet of German children and adolescents: Impact of food groups and trends

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Introduction: Although the impact of acid-base status on health is widely accepted, only few data on the dietary acid load in healthy people, especially children, are available. Here, we describe the PRAL of the diet of German children and adolescents from the DONALD (Dortmund Nutritional and Anthropometric Longitudinally Designed) Study , the impact of nutrients, food groups, age and time trends on PRAL.

Methods: 4710 three-day dietary records from 720 study participants (351 boys, 369 girls) aged 3-18 years, collected between 1995-2005, were analysed. PRAL (mEq/day, mEq/MJ/day) was calculated using a published algorithm including dietary protein, phosphorus, magnesium and potassium. Age and time trends were estimated using the SAS-procedure PROC MIXED.
Results: PRAL was positive in all age-groups ranging between 5.9-20.5 mEQ/day, with higher values in boys > 8 years, even after adjustment for energy intake. PRAL (mEq/day and mEq/MJ) increased with age in younger children (both sexes, 3-7 years) and boys (8-18 years). Food groups with the highest impact on daily diet acidity were meat-fish-eggs and grain-bread. Fruit-juices and vegetables yielded the highest dietary alkalinity (average of all age-groups). While %energy from fat decreased during the study period ($p<0.001$), no time trends were found for PRAL.

Discussion: Present dietary habits in children and adolescents with low intakes of cheese and higher intakes of fruit compared to vegetables, are responsible for the observed contributions of the food groups on acid base status. In this respect, boys should be encouraged to eat more base-forming foods. PRAL could have a valuable role to play along with other indices in the evaluation of dietary quality.