

LEVELS OF NUTRIENTS IN PREPARED FOODS ANALYSED WITHIN THE FIRST GERMAN TOTAL DIETS STUDY (BfR MEAL STUDY)

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INTRODUCTION

Data on dietary exposure assessment for substances in prepared foods are scarce. To improve the knowledge available regarding levels of substances in foods prepared as consumed, the first German Total Diet Study (TDS), the 'BfR MEAL Study (meals for exposure assessment and analytics in foods)', was initiated in 2015 at the German Federal Institute for Risk Assessment (BfR). A TDS is a cost-effective and reliable method used worldwide for the analysis of substances in foods for dietary exposure assessment. Foods are prepared as typically consumed and analysed for a broad spectrum of substances. The German BfR MEAL Study TDS is one of the most extensive in the world, based on the combination of foods and substances so far. The design of the BfR MEAL Study and the first results regarding nutrient levels will be presented.

METHODOLOGY

The BfR MEAL Study investigates levels of substances in 356 MEAL foods, categorised into 19 main food groups representing at least 90 % of the German diet. Rarely consumed (<10 %) but potentially highly contaminated foods were also included. The MEAL food list was developed based on available food consumption data and market data collected from 30 000 households over one year. Foods were purchased at retail level in different types of shops (e.g. market, discounter), stratified – when relevant – by production type (conventionally or organically produced), type of packaging and storage condition (e.g. fresh, frozen, canned) and/or origin (e.g. EU, non-EU, region in Germany). Foods are prepared as eaten, mimicking consumer behaviour in households as closely as possible. Prior to substance-specific analysis, similar foods were homogenised and pooled to 493 or 869 pooled samples, depending on the substances relevant for this presentation. If considered relevant, regionality, seasonality and types of production were taken into account. Each pooled sample was composed of 15 to 20 subsamples representing different food types available on the market and different preparation methods.

RESULTS

The study is designed for seven years and will examine around 60 000 foods for almost 300 desired and undesired substances, including nutrients. Levels of substances were investigated in foods as commonly consumed. Food preparation might reduce certain substances such as vitamins, as well as forming potentially harmful substances such as acrylamide. Some foods are highly concentrated and contain high levels of nutrients – due to the reduced water content after drying, high levels of substances were determined in cocoa powder and spices, for instance. Spices were investigated as a dry MEAL food, but also as an ingredient added during food preparation. Thus, the BfR MEAL Study provides substance levels of food ingredients in themselves but also in composite dishes. Moreover, rarely consumed foods such as chewing gum were investigated according to prior expert knowledge. Different levels of substances in foods sampled according to regional and seasonal varieties as well as types of production were observable for specific foods. No differences were observable for specific food groups or similar foods.

DISCUSSION

The BfR MEAL Study provides information on levels of nutrients and several other substances in foods typically consumed by the German population. The influence of food preparation and sampling by regionality, seasonality or types of production will be discussed. Substances were analysed in typically consumed foods, leading to an expanded data set for exposure assessment. This will enable the confirmation of recommendations in dietary guidelines, and the closing of gaps in knowledge pertaining to substance levels in foods. The BfR MEAL Study data will be combined with national consumption data to estimate total dietary exposure, in order to increase consumer safety. To conclude, this data set enables assessment of dietary exposure for approximately 300 substances, covering more than 90 % of foods consumed in Germany. Due to its modular study design, the BfR MEAL Study is able to respond to the needs of exposure assessment in terms of trends in both consumption and occurrence patterns of substances in food. The BfR MEAL Study extends existing data sets by investigating foods prepared using various food processing methods at home, mimicking consumer behaviour. Representativeness is one main advantage of the BfR MEAL Study.