



Frequently asked questions on the BfR MEAL Study

BfR FAQ, 5 January 2021

For the first time, the BfR MEAL Study (**M**ahlzeiten für die **E**xpositionsschätzung und **A**nytik von **L**ebensmitteln; "meals for exposure estimation and analysis of foods") investigates the average concentrations of different substances in food in Germany. Within the study, more than 90 percent of all foods consumed in Germany are considered. The foods are analysed in the form of prepared meals as they are typically consumed in German households.

The BfR MEAL Study is the first Total Diet Study (TDS) in Germany. Currently, over 50 countries are conducting Total Diet Studies. The Federal Ministry of Food and Agriculture (BMEL) commissioned the German Federal Institute for Risk Assessment (BfR) to implement the first TDS for Germany.

The results of the BfR MEAL Study will be used, inter alia, for better identification of potential health risks resulting from the consumption of foods. The data obtained during the study can help to give dietary recommendations. In case of a crisis, the concentration of arising undesirable substances can be compared and estimated with these data quickly and reliably.

What is a Total Diet Study (TDS)?

A Total Diet Study (TDS) is a method recommended by the Food and Agriculture Organisation (FAO) of the United Nations and the World Health Organisation (WHO) to determine the average concentrations of substances in prepared foods. These determined concentrations can be used for exposure estimations.

What are the different steps of the study?

The study is divided into six phases. In the first phase, the foods of interest are identified. These foods are purchased across Germany and prepared in a study kitchen, which was especially installed for the duration of the BfR MEAL Study. Subsequently, the prepared meals are aggregated into so-called pools, homogenised in a mixer to a uniform mass and sent to a laboratory for analysis. In the last phase, the data is evaluated and the average intake of substances is calculated (exposure estimation).

At the end of the document, a flowchart, illustrating the different steps of the BfR MEAL Study is linked.

How are the foods selected?

For food selection, already conducted consumption studies were used. The German Nutrition Survey II carried out by the Max Rubner-Institute was utilised for adults and the BfR's VELS Study for children under the age of four. Thus, foods consumed most often on average are considered in the study, leading to inclusion of over 90 percent of the foods typically

consumed in Germany. In addition, foods consumed rarely, but known to show often high levels of undesirable substances are included as well, such as mussels.

How are these foods purchased?

Since the start of the study's field phase in October 2016, the study team has purchased foods across Germany. These foods were shopped in four separate regions, and within every region cities, towns and rural areas were considered. In addition, the purchasing behaviour of the German population was taken into account representatively, while purchasing.

Based on market data from a representative household panel, the BfR MEAL Study team has determined e.g. types, brands, origins and the method of production (organic or conventional) for the foods to be purchased.

Why are prepared meals rather than basic products investigated within the study?

The aim of the BfR MEAL Study is to make realistic estimations for the intake of different substances via foods in Germany. For this purpose, the foods are analysed as they are consumed – as prepared meals. During meal preparation, substances can enter the food or occur during processing such as process contaminants (for example acrylamide). Other substances such as vitamins can be reduced during the cooking process. In the meaning of the BfR MEAL Study, preparation does not only include cooking, frying or grilling steps, but also simpler preparatory procedures (for example washing an apple or removing an apple stalk before consumption).

How are the meals prepared for the study?

The type of preparation chosen (for example grilling, baking or frying) follows the information provided by the consumption studies. For food preparation, recipes are taken from most frequently used cookbooks and internet sites. In addition, further representative surveys dealing with the consumer behaviour were conducted as part of the BfR MEAL Study: these have provided data on used kitchen utensils, the prevalence of out-of-home consumption for foods like pizza or baked goods, and individual preparation behaviours for different meals.

Why are foods pooled and homogenised?

Similar foods are aggregated into pools in order to determine average levels and to reasonably limit the effort of analysis. During this pooling process, various product types, types of consumption and cultivation methods for similar foods are considered in accordance with their frequency, such as various types of honey or rice from various sources. For a single food, more than one pool sample can also be compiled and investigated. Apples, for example, are analysed in several pools regarding different regions, seasons, methods of farming (conventional/organic) and preparation types (e.g. apple puree).

Subsequently, the prepared meals are homogenised to a uniform mass in a mixer. This homogenisation process ensures distribution of the substance of interest equally throughout the sample. The sample is then sent to the laboratory.

What are the substances of interest within the analysed foods?

In the BfR MEAL Study, foods are analysed for desirable as well as undesirable substances. The substance groups include elements and environmental contaminants (core module), nutrients, additives, pharmacologically active substances, mycotoxins, pesticide residues, perfluoroalkyl substances (PFAS), substances migrating from food contact materials and substances that are formed during food preparation (process contaminants). In total, around 300 substances have been selected for analysis. A link to the substance list is given at the end of this document.

How long will the study run for?

The study has run since 2015 and was planned for seven years. The experimental part of the BfR MEAL Study began in autumn 2016 and has been divided into two phases. During the first two years, work focused on the core module (elements and environmental contaminants), nutrients, perfluoroalkyl substances (PFAS) and mycotoxins. Process contaminants, additives, pesticide residues, pharmacologically active substances and substances migrating from food contact materials have been analysed since 2019.

Where will the results be published?

The BfR is communicating progress and results of the MEAL Study to the scientific community, political actors such as the German Federal Ministry of Food and Agriculture (BMEL) and to consumers. The channels used for communication include publications in scientific journals, BfR opinions and a dedicated study website. Current developments of the study, background information and a newsletter can be found at www.bfr-meal-studie.de.

How does the study benefit consumers?

Consumers benefit both directly and indirectly from the study. On the one hand, different food preparation types or procedures, such as using a wood, gas or electric grill for the barbeque are compared during the study, allowing to give recommendations for healthy meal preparations. On the other hand, the basic scientific research conducted also benefits the population indirectly. If the intake of undesirable substances are known, this information can be used to derive recommendations for political decision-makers. Exemplarily, these recommendations can be the adjustment of maximum levels, the increase the frequency of inspections for certain foods or the information of risk groups (children, older people, sick individuals, pregnant women) about potential nutritional risks. In addition, in case of a sudden occurrence of undesirable substances, the health risk posed by these substances can be better determined if the average intake of a substance is known.

What does the study cost, and how is the study financed?

On the basis of a resolution adopted by the German Bundestag, the German Federal Ministry of Food and Agriculture (BMEL) is providing a funding of around 13 million euros for the study, which was planned for seven years.

How widespread are TDS studies?

To date, over 50 countries worldwide have conducted a Total Diet Study (TDS). Therefore, expertise on an international level is available which is indispensable for the BfR MEAL Study. For this reason, an international scientific advisory board with experts from Canada, France, New Zealand and the USA has been set up for the BfR MEAL Study. The advisory board advises the BfR MEAL Study with respect to the design of the German Total Diet Study and is available for scientific exchange.

How does the BfR MEAL Study differ from food monitoring programmes?

Both data sources, the BfR MEAL Study and the food monitoring, complement each other by using different methodological approaches and by answering different questions. Food monitoring programmes focus on the analysis of foods for which legal maximum levels have been set in order to check their compliance.

In contrast to the food monitoring, the BfR MEAL Study does not analyse raw foods but analyses foods as eaten. For the first time, the BfR MEAL Study allows reliable statements to be made about substance contents that change during preparation. The BfR MEAL Study also includes foods for which no data about substance levels had been provided by the food monitoring so far. Reasons for this are the lack of maximum levels for these foods or that they have not yet been noticed due to high levels.

What is exposure assessment?

The exposure assessment forms the basis for estimation of a health risk. It determines the average intake of a substance or a microorganism for consumers. The exposure can occur via foods, consumer products or chemicals. For the estimation of intake via food, consumption data and concentration data are combined for data evaluation.

What is the difference between consumption and composition studies?

In a composition study such as the BfR MEAL Study, the average level of substances in consumed foods are determined. Consumption studies aim to determine which foods are consumed on average by consumers. For this purpose, a representative proportion of the population is surveyed about their eating behaviours. Several consumption studies have provided representative data on consumption behaviours in Germany. For the food selection of the BfR MEAL Study, data collected by the Max Rubner Institute during the German National Nutrition Survey II (NVS II) were used for adults. In addition, data on the consumption behaviour of children from 2002 were utilised (VELS Study).

For further information, please visit: www.bfr-meal-studie.de

Subscribe to the newsletter:

<http://www.bfr-meal-studie.de/en/meal-newsletter-en.html>

Current list of substances investigated in the BfR MEAL Study:

http://www.bfr-meal-studie.de/cm/343/MEAL_Stoffliste_2020_eng.pdf

Infographic BfR MEAL Study:

http://www.bfr-meal-studie.de/cm/343/MEAL_Infografik_EN_web.43119716.pdf

Information about the TSD Exposure pilot study:

<https://www.tds-exposure.eu>