

What's in your food – the BfR MEAL Study



**BfR
MEAL Study**
What's in your food

What is in our food?

The BfR MEAL Study is investigating the answers to this question

(**M**ahlzeiten für die **E**xpositionsschätzung und **A**lytik von **L**ebensmitteln – meals for exposure estimation and analysis of foods).

Experts at the German Federal Institute for Risk Assessment (BfR) examine on a large scale how much of which substances are contained in prepared food.

The BfR MEAL Study is a so-called **Total Diet Study**. It is a method recommended by the Food and Agriculture Organisation (FAO) of the United Nations and the World Health Organisation (WHO) to determine mean levels of substances in the average diet for intake estimation.

The aim is to identify possible food-related health risks for the population in Germany even better.

The BfR MEAL Study is the first Total Diet Study in Germany and very comprehensive by worldwide comparison. In the course of the study, around **60,000 foods** are examined for almost **300 desired and undesired substances** including heavy metals, mycotoxins, plant protection residues and nutrients.

In combination with information from consumption studies, which determine the average consumption of foods of the population in Germany, the average total intake amounts of substances via food can be determined reliably and in detail.



The three basic principles of a Total Diet Study

1. Consideration of entire food range

A Total Diet Study is representative for the consumption habits of the population. In the case of the BfR MEAL Study, at least 90 per cent of foods most commonly consumed in Germany are considered. In addition, rarely consumed foods are involved, such as cod liver or boletus mushrooms, which can have particularly high levels of some undesired substances.

2. Preparation of foods

Before being analysed, the foods are prepared as they are usually consumed in German households – potatoes, for example, as mashed potatoes, chips or fried potatoes. The reason: levels of substances can change during preparation. Vitamins can degrade during cooking, while some potentially harming substances such as acrylamide only occur during preparation through intense heating. Additionally, substances can be leaching into the water for example arsenic compounds during washing and cooking of rice.

3. Pool samples for average concentrations

In order to establish the average levels of the investigated substances for each food, the foods are pooled. This means that multiple samples – for example from different varieties of the food in question, different regions or different production methods – are grouped together to form a representative sample, which is then analysed.

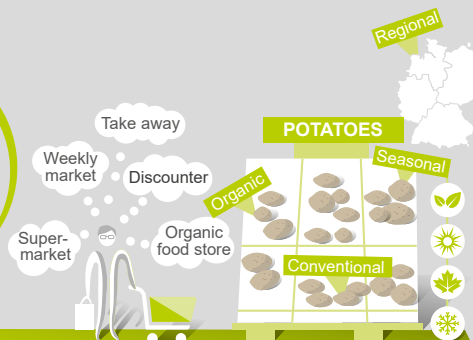
Potatoes ✓
 French fries ✓
 frozen ✓
 Other ingredients



Shopping list

To compile the BfR MEAL shopping list, it was determined which food products are eaten most frequently by consumers in Germany.

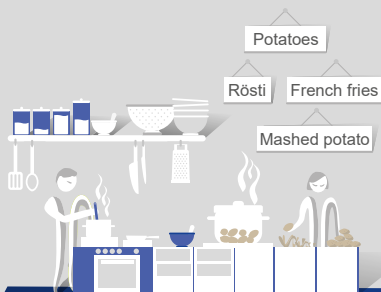
1



Shopping

The BfR MEAL team takes varying shopping habits into account: Regional and seasonal food products are bought in supermarkets, at weekly markets or at a discounter.

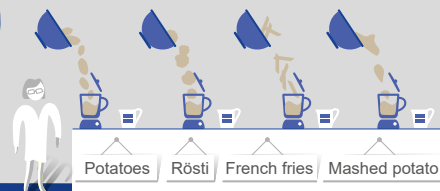
2



Cooking like at home

In the BfR MEAL kitchen, meals are prepared by using typical kitchen utensils and recipes the same way German consumers do in their private households.

3



Homogenisation / Pooling

The BfR MEAL team prepares common samples of similar foods for analysis in the lab. Those samples are homogenised – in other words, mixed as in a smoothie blender.

4



Potatoes	Rösti	French fries	Mashed potato
✓ Nutrients	✓ Nutrients	✓ Nutrients	✓ Nutrients
✓ Heavy metals	✓ Heavy metals	✓ Heavy metals	✓ Heavy metals
✓ Mycotoxins	✓ Acrylamide	✓ Acrylamide	✓ Additives



Analysis in the laboratory

Couriers transport the samples to the lab, where they are analysed for nine substance groups – including nutrients, additives and substances migrating from food packaging.

5



6



Evaluation

At the BfR, the BfR MEAL team assesses which concentrations of substances consumers take in daily. The findings are used to derive recommendations for consumers.



The nine modules of the BfR MEAL Study

The nearly 300 substances examined in various foods in the course of the BfR MEAL Study are divided into nine substance groups – so-called modules.

The modular structure of the BfR MEAL Study allows to focus on the specific features of the substance group and to address a variety of questions.

Core module	Process contaminants	Pesticide residues
		
Pharmacologically active substances	Nutrients	Mycotoxins
		
Perfluoroalcy substances	Food additives	Food contact materials
		



Partners of the BfR MEAL Study

Commissioned by the German Federal Ministry of Food and Agriculture (BMEL)

The German Federal Institute for Risk Assessment (BfR) was commissioned by the German Federal Ministry of Food and Agriculture (BMEL) to conduct the first Total Diet Study for Germany starting in 2015.

Advisory Board and expert groups accompany the BfR MEAL Study

Total Diet Studies have already been conducted in numerous countries worldwide. Thus, expertise already exists on an international level and provides essential input for the BfR MEAL Study. This is why an international scientific Advisory Board has been set up for the BfR MEAL Study advising the study team on the design of the German Total Diet Study and ensuring the exchange of scientific knowledge.

Alongside the Advisory Board, expert groups of national scientists accompany the modules. With their expertise on the substances, they support the planning of the modules and the discussion of the results.

In case of interest, please contact

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