BfR MEAL Study
What's in your food

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BfR MEAL Study – First Total Diet Study for Germany

Total Diet Study (TDS) denotes an internationally recognised method to establish the average concentration in which substances are contained in prepared foods, the results provide a basis for detecting possible chronic risks from contaminated foods. With the results, dietary recommendations can be derived for high exposed population groups or in relation to specific foods. The first ever Total Diet Study for Germany, which has just been launched, is entitled BfR MEAL Study (meals for exposure estimation and analysis of foods).

Three criteria of a Total Diet Study

Criterion 1

- Representative for the German Population
- Covers 90 % of the German diet
- Includes highly contaminated foods, although they are consumed rarely (< 10 %)

Criterion 2

- Foods are prepared as consumed

Criterion 3

- Similar foods are pooled together to one sample to reduce the number of samples

Steps of the BfR MEAL Study

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Selection of foods	Shopping on a national level	Preparation and processing	Pooling and homogenisation	Analysis	Evaluation and exposure assessment

BfR
Bundesinstitut für Risikobewertung

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Nominated Substances for the BfR MEAL Study

Core module	Aluminum, arsenic, barium, lead, cadmium, chromium, cobalt, gallium, germanium, iodine, copper, lithium, mangan, molybdenum, nickel, palladium, mercury, methyl mercury, selenium, silver, strontium, tellurium, vanadium, zinc, tinn
	organotin compounds (tetrabutyltin (TeBT), tributyltin (TBT), dibutyltin (DBT), monobutyltin (MBT), triphenyltin (TPT), diphenyltin (DPT), monophenyltin (MPT))
	Nitrate
	Dioxins/Furans, dioxin-like polychlorinated biphenyls (dl-PCB), non-dioxin-like polychlorinated biphenyls (ndl-PCB)
	Polybrominated diphenyl ethers (PBDE)
Perfluorated tensides (PFT)	Perfluorinated alkylated acids (PFOS, PFOA)
Mycotoxins	Aflatoxins, ochroatoxin A, type B trichothecenes (deoxynivalenol), type A trichothecenes (e.g. T-2 toxin, HT-2 toxin), fumonisins, zearalenone, ergot alkaloids, patulin
Process contaminants	Polycyclic aromatic hydrocarbons (PAH), acrylamide, nitrosamines, 2- and 3-MCPD
Food additives	Sulphur dioxide and sulfides, potassium nitrite, sodium nitrite, aluminum, aluminum compounds, aluminum lakes from colourants, butyl hydroxytoluene (BHT), tertiary butyl hydroquinone (TBHQ), phosphates, quinoline yellow, aspartame, acesulfame K, cyclamate, polysorbates
Nutrients	Vitamins (Vitamins K1/K2, vitamin E, retinol (vitamin A), folic acid)
	Minerals (sodium , potassium, calcium, manganese, phosphorus, chloride, fluoride)
Pesticides	Benzalkonium chloride (BAC), bifenthrin, boscalid, biphenyl, chlordane, chlorothalonil, chlorpyrifos, chlorpyrifos-methyl, cypermethrin, cyprodinil, didecyldimethylammonium chloride (DDAC), deltamethrin, dicloran, difenoconazole,dimethoate / omethoate, emamectin, ethylenethiourea (ETU), fenbuconazole, fenbutatin oxide, flufenzin
	Heptachlor, hexachlorobenzeen, hexachlorocyclohexane (HCH), hexythiazox, imazalil, indoxacarb, iprodion, lambda-cyhalothrin, myclobutanyl, pirimicarb, Pirimiphos-methyl, perchlorate, propargit, propylene thiourea (PTU) pyraclostrobine, pyrimethanil, spinosad
	Tebuconazole, thiabendazole, thiacloprid, 1,2,4-triazole, triazole alanine, triazole acetic, triflumuron
Veterinary drug residues	Aminoglycosides (streptomycin, dihydrostreptomycin, spectinomycin, gentamycin, neomycin, apramycin, kanamycin, paromomycin)
	Macrolides (erythromycin, tylosin, spiramycin, silmicosin, tilmicosin, tulathromycin, marker residue of tulathromycin, josamycin, 3-ortho-acetyltylosin, tylvalosin (acetylisovaleryltylosin))
	Lincosamides (lincomycin, pirlimycin)
	Quinolones (danofloxacin, flumequin, enrofloxacin, ciprofloxacin, marbofloxacin, difloxacin, sarafloxacin, oxolinacid)
	Tetracycline (chlortetracycline, tetracycline, oxytetracycline, epi-chlortetracyclin, epi-tetracycline, epi-oxytetracycline, doxycycline)
	Pleuromutilins (tiamulin, 8-alpha-hydroxymutilin, valnemulin)
	Sulfonamides (sulfanilamide, sulfathiazol, sulfamerazine, sulfamethoxypyridazine, sulfadimidine, sulfamethazine, sulfadiazine, sulfadoxine, sulfamethoxazole, sulfadimethoxine, sulfaquinoxaline, sulfaclozine, sulfachloropyridazine)
	Diaminopyrimidine derivatives (baquiloprim, trimethoprim)
	Penicillins (amoxicillin, ampicillin, benzylpenicillin, cloxacillin, dicloxacillin, oxacillin, nafcillin, penicillin V)
	cephalosporins (cefalexin, cefapirin, desacetyl-cephapirin (DACP), cefoperazon, cefquinom, ceftiofur, desfuroylceftiofur (DFC))
	coccidiostats (nicarbazin, monensin, salinomycin, lasalocid, narasin, maduramicin)
Substances migrating from food packaging	Mineral oil saturated hydrocarbons (MOSH), mineral oil aromatic hydrocarbons (MOAH)
	oligomers from polyamides (PA): dimers; trimers; tetramers; pentamers
	benzophenone, antimony, 2,4-di-tert-butylphenol, plasticizers (optional)