FEDERAL INSTITUTE FOR RISK ASSESSMENT

BfR
Bundesinstitut für Risikobewertung

Food safety – about perceived and real risks

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24,3 % of the German population think that food is their highest personal health risk

18,3 % mention pollution, radiation and climate change

Unhealthy lifestyle, smoking, alcohol, drugs and pharmaceuticals are mentioned much later by only 10 – 12 %

n = 1.005, survey, BfR 2014

‘Objective risk’

The ‘objective risk’ is based on criteria of risks measurable by natural science.

Classical Criteria:

- **Probability** of an adverse effect
- **Extent** of damage

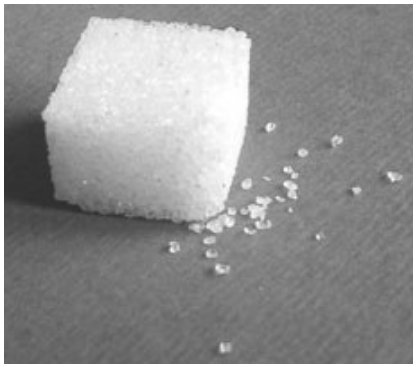
“Objective risk” = **hazard** x **exposure**

Further Criteria:

- **Ubiquity**: local distribution of the potential adverse effect
- **Persistence**: temporal extension of the possible adverse effect
- **Reversibility**: possibility of reconstitution
- **Delay**: latency between occurrence and adverse effect
- **Uncertainty**: indicator for ambiguous components

Analytical accuracy - curse or blessing?

1 sugar cube containing 5 g sugar is detectable in Lake Constance



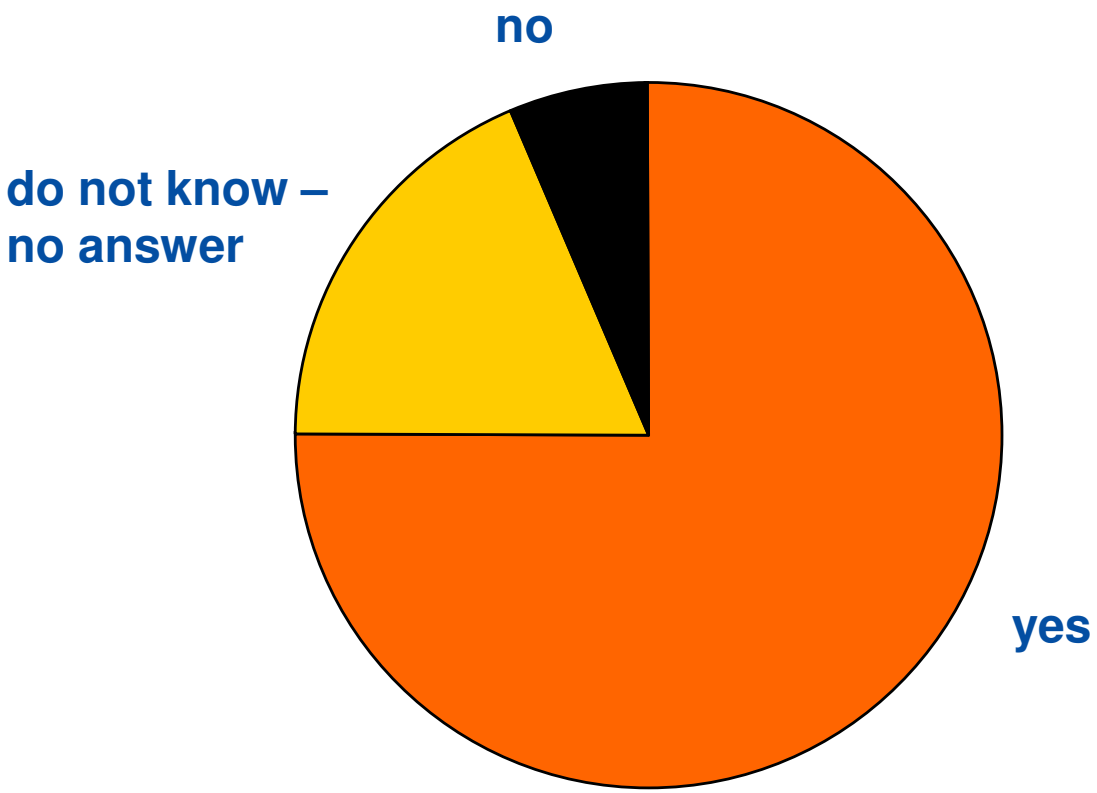
Total amount of water: about 50 trillion liters in annual average

10 Picogramm per Kilogramm

0,000 000 000 01 g/kg (10^{-12})

Perception of risks

„Should Dihydrogen Monoxid be banned or regulated in the EU?“



Apfelbaum Marian,1998: Risques et peurs alimentaires. Paris: Èdition Odile Jacob

Subjective Risk Perception – the daily risk bilance

Sozio-cultural factors

- **Voluntariness**: involuntary versus voluntary choice of risk
- **Controllability**: own possibility to avoid a risk
- Risk-**Benefit**-balance
- Personal **Involvement**
- **Dreadfulness** of the damage
- **Trust**: Credibility of the responsible institution
- **Responsibility**: natural versus anthropogenic risks
- **Latency** of Effects: acute versus temporally diffuse




Risk perception: over- and underestimation of risks

Differences in risk perception depend on
media reports, **usualness** or **dreadfulness** of risks

- **risk compensation**: traveling by car instead of using flights

  → 1.500 more people died from car accidents
  in the following 12 month in the USA

3.338 persons died by **road accidents**
in Germany in 2013 (= 9 **dead** persons **per day**)
'that happens to others, but not to me'

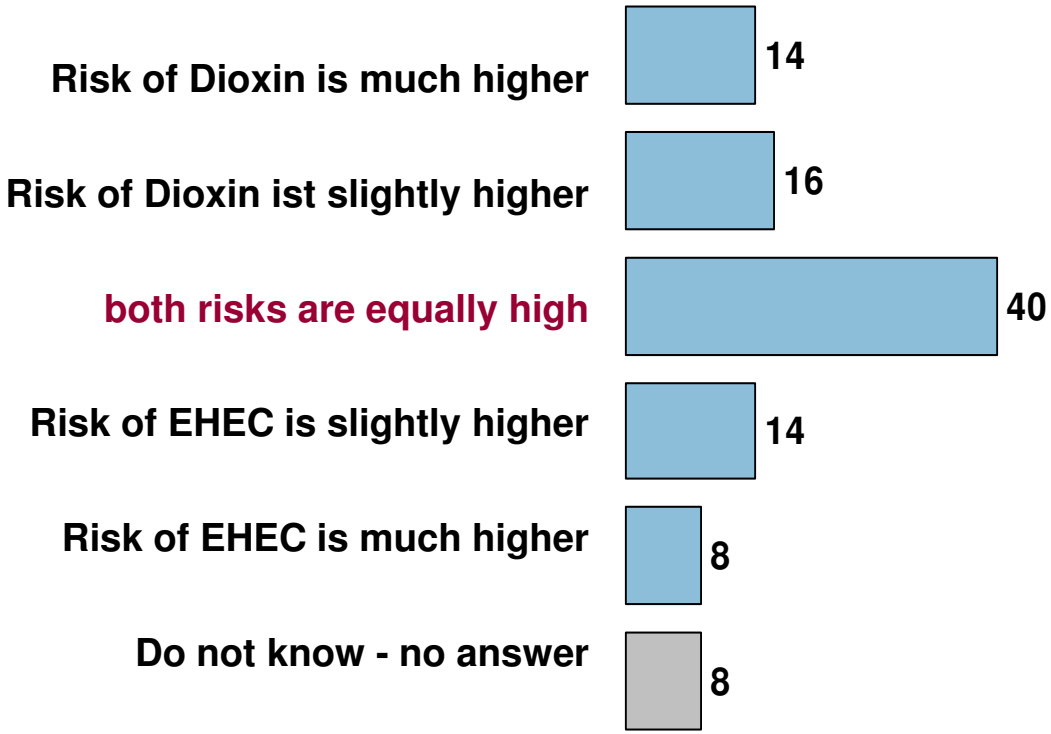
- **optimistic bias**: under-estimation of individual risks,
  often regarding unhealthy behaviour (smoking, unhealthy diet, lack of physical activity)

- ***defensive*** **optimism**: to **deny** hazards, believe in **mother nature** (safe and gracious)

- ***functional*** **optimism**: over-estimation of own (re)action possibilities (illusoric control)

Comparative Risk Estimation: EHEC vs. Dioxin 2011

How would you estimate your own personal risk of damaging your health when comparing the two incidents, dioxin in foodstuffs and EHEC in 2011?



n = 803

Information in percent

Mikrobial Risks – often underestimated

68% of the population are afraid
of **unhygienic** conditions
outside of their home

‘My home is my castle‘

only **27%** of the population are
afrias of **unhygienic** conditions
in their **own kitchen**

Source*: Special Eurobarometer (EU)* Risk Issues

Underestimated versus overestimated risks

Eurobarometer 2010 – risks associated with human nutrition

Pesticide residues in food (19%)

Food pathogens (12%)

Gene technology (8%)

New technologies (1%)

‘Intuitive Toxicology‘

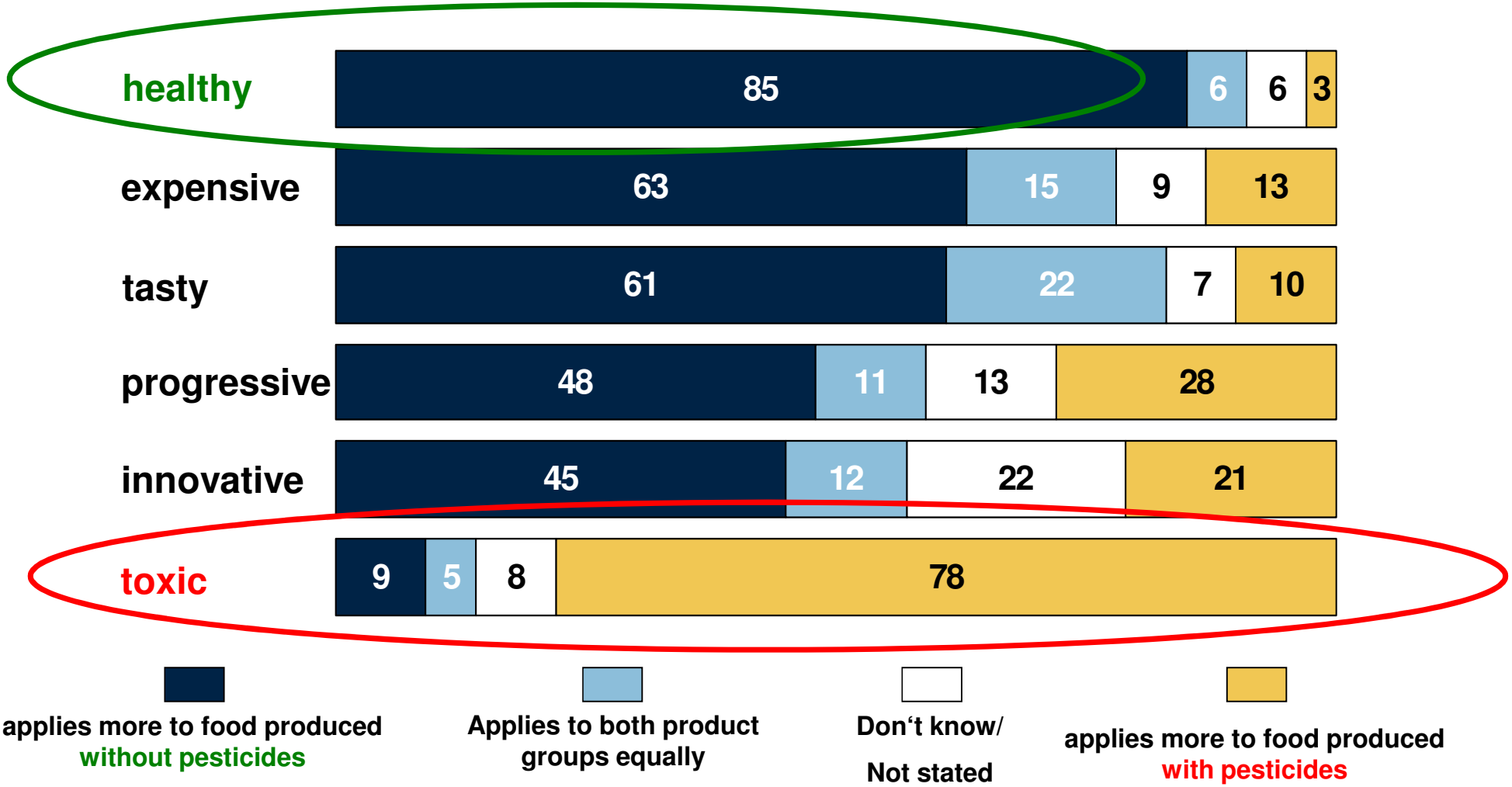
Underestimation of natural risks like mildew toxins

Mildews produce aflatoxins,

which cause liver cancer

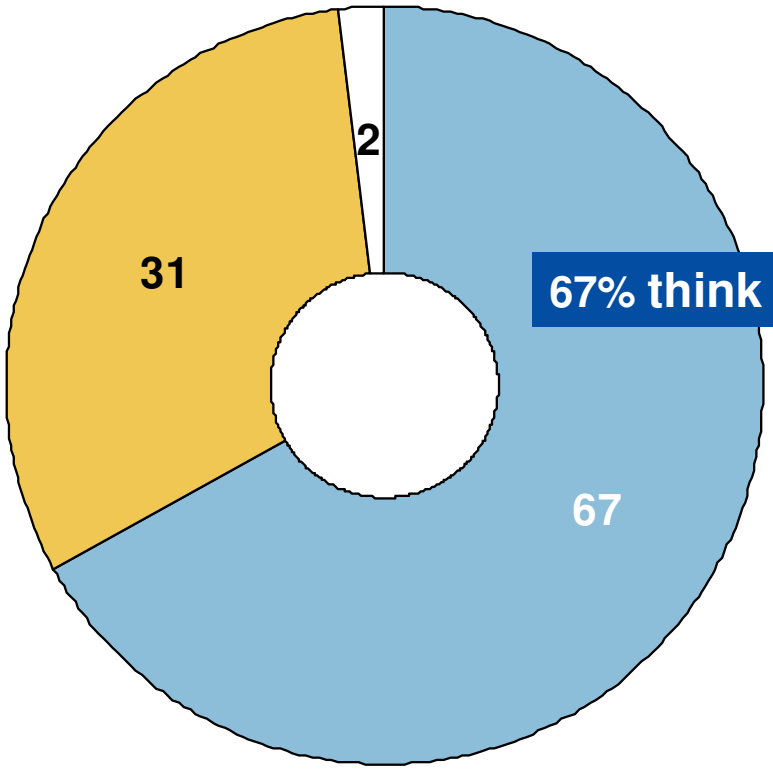
Legend of the gracious mother nature

For each characteristic, please tell whether it applies to food produced with or without pesticides



All respondents; n = 1.003; frequencies (%)

To your knowledge, are pesticide residues generally allowed in food?



All respondents; n = 1.003; figures (%)

Toxic plant ingredients

Nature offers a lot of poisons, e. g. as stomac insecticide -

these should only be eaten in small amounts

- **coumarin – cinnamon, woodruff**
- **estragole, methyleugenol – tarragon, basil, fennel**
- **amygdalin – almonds, marzipan**
- **safrole – nutmeg, cinnamon, anise, black pepper**

Early risk detection – new cooking methods

‘Beer can chicken‘

Preparation

‘Wash the **chicken**, flush it thoroughly with water inside und dry it with paper towels.
Open up a **beer can** and throw away 3 tablespoons of the beer.

Heat up the **oven** up to 150 degree.
Put the chicken onto the beer can.
Place it into the oven (on a backing sheet) and **bake** it for 1 hour. That fits very well with **potatoes** or a **nice salad**.‘

Possible health risks from printing inks rsp. from aluminium

BfR-information 01.07.2014:
‘BfR advises against beer can chicken‘

Adequate Risk Communication

- check **target group affiliation** beyond demography
- clarify **maturity regarding risks** and **willingness to decide**
- analyse **motivation** and **interest** of the involved parties
- evaluate your own **communication:** what do people understand?

- **assess** risks **mathematically**
- choose acceptable **visual parallels**
- give concrete **recommendations** for every day life
- neither **appease** nor **monger panic**
- create **transparency**, name **uncertainty**

- name the **population group** **which is affected** **by the risk**
- concretise the **severity and** **(ir-)reversibility** of the potential **health impairment**
- offer practical **possibilities** for **compensation** of risks
- **translate science** **comprehensibly** for everyday life

Risks at a glance: the BfR Risk Profile

	BfR risk profile on …				
A	**Affected** group	Group of persons			
B	**Probability** of health impairment	Practically impossible	Improbable	Possible	Probable	Certain
C	**Severity** of health impairment	No impairment	Slight impairment	Moderate impairment	Serious impairment	[reversible / irreversible]
D	**Validity** of available **data**	**High**: the most important data is available and there are no contradictions	**Medium**: some important data is missing or contradictory	**Low**: much important data is missing or contradictory		
E	**Controllability** by the consumer	Control not necessary	Controllable through precautionary measures	Controllable through avoidance	Not controllable	

BfR Risk Profile: Cleaning products with nitric acid

BfR Risk Profile:
Cleaning Products with a Concentration of 20-30% Nitric Acid
(Opinion No. 041/2010)

A	**Affected**	**General public** **Children**				
B	**Probability of health impairment through contact with cleaning products with a concentration of 20-30% nitric acid**	Practically excluded	Unlikely	Possible	**Probable (through skin contact or inhalation of vapours)**	**Certain (through oral intake)**
C	**Severity of health impairment through contact with cleaning products with a concentration of 20-30% nitric acid**	No impairment	Slight impairment	Moderate impairment		**Severe impairment, reversible or irreversible**
D	**Validity of available data**	**High:** **The most important data are available and consistent**	Moderate: Some important data are missing or inconsistent		Low: Numerous data are missing or inconsistent	
E	**Controllability by consumers [1]**	Control not necessary	Controllable through precautionary measures	**Controllable by avoidance**	Not controllable	

Food safety in the future

Crises in the field of **food safety** will rather **increase**

Problems

- **transfer** of **pathogens** from **animals** to **humans (zoonoses)**
- especially **microorganisms** as **bacteria** and **virus** in focus
- **increasing** development of **resistent pathogens**
- **global trade** with different **standards** of **quality**
- **global forwards** and **backwards tracking** of **food** so far **insufficient**

Possibilities for solution

- **export** of **know-how** to establish analogous risk assessment **institutions worldwide**
- further enlargement of **rapid alert systems** (**RASFF**, **RAPEX**)
- international **harmonisation** of **quality standards**
- **prevention** of further **antibiotic resistence**
- **sensibilisation** of **consumers** regarding **kitchen hygiene**

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Thank you for your attention!

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