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Report on the results of

Group Discussions on the Topic of Food Contact Materials

for

Federation of German Consumer Organisations

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1. Objective of the survey

Materials that come into contact with food are subject to general requirements that have been laid down in a European framework regulation. In an online survey¹, the Federation of German Consumer Organisations (Verbraucherzentrale Bundesverband e.V., vzbv) determined that the current labelling of the use of food contact materials often goes unnoticed or is misinterpreted. Based on these findings, the qualitative survey presented here was conducted to obtain detailed insights into the level of awareness and the views of consumers and to substantiate the results of the previous online survey.

2. Survey design

The survey was conducted by Info GmbH in the form of focus group discussions lasting approximately two hours at test studios in four different cities in Germany. The locations chosen were Berlin, Hamburg, Leipzig and Mannheim.

For the study, Info GmbH chose a sample that consisted of consumers aged eighteen years and older. Where possible, the sample reflected a representative distribution in terms of age, gender and level of education. The vast majority of participants was supposed to be in paid employment. In addition, participants from surrounding areas of each city were also to be included in the discussion groups. In order to have a large variety of content, at least six participants per discussion group were supposed to buy packaged food at least occasionally and four participants to buy take-away food or beverages at least occasionally. A random phone sample and subject pools were used as the basis for recruitment. It was ensured that the participants had not taken part in a survey within the previous twelve months.

The evaluation and analysis was conducted in the form of a content analysis.

3. Description of the sample

A total of thirty consumers were interviewed. Eight participants attended each discussion round with the exception of the discussion round in Mannheim, which was attended by six people.

A total of thirteen women and seventeen men were surveyed. The majority of interviewees were younger than 55 years, seven persons were 55 years old or older. Slightly less than one in two interviewees had an advanced school qualification (certificate of general qualification for university entrance; "Abitur" or "Fachabitur"). A total of nineteen respondents lived in the cities, eleven people lived in the surrounding areas of the survey locations.

¹ Federation of German Consumer Organisations: Food Contact Materials Survey, 2020, <https://www.vzbv.de/sites/default/files/downloads/2020/09/25/20-08->

Overall	n = 30
Berlin	n = 8
Hamburg	n = 8
Leipzig	n = 8
Mannheim	n = 6
Women	n = 13
Men	n = 17
18 to 39 years old	n = 12
40 to 54 years old	n = 11
55 years of age and older	n = 7
no advanced school qualification	n = 17
advanced school qualification (Abitur)	n = 13
strong interest in the topic	n = 21
moderate interest in the topic	n = 9
frequently buy food	n = 13
regularly buy food	n = 16
occasionally buy food	n = 1
buy at the market	n = 18
buy from direct producer	n = 7
frequently/occasionally buy packaged foods	n = 23
frequently/occasionally buy take-away food/beverages	n = 17
frequently/occasionally cook for themselves	n = 27

Table 1: Sociodemographic breakdown

4. Summary of results

When asked, participants indicated that the safety of food contact materials plays only a minor role in their daily lives. Their decision in favour of a food contact material is based on learned behaviour and everyday routines, frequently unconscious perceptions as well as intuition. They indicate that considerations regarding the impact of the materials on the environment and the climate clearly are of greater importance to them. The desire of the respondents to live in a climate-friendly manner outweighs the desire to protect themselves

against health risks when using food contact materials. The reasons for the presumed low relevance are the need to reduce the complexity of decisions they make every day and the belief that no food contact material meets every requirement. In addition, some participants assume that an official authority tests products before they enter the German market. Moreover, in the view of the participants, food contact materials are often bought and used in a rather unconscious manner. The decision in favour of a food contact material is largely made without prior consideration. For this reason, participants indicate that they have not yet regarded this product group as being of great importance. Most of the participants had scarcely considered the criteria for their buying decision.

The sustainability aspect and the intended use, e.g. for transporting or heating as well as the duration of contact with the food and hygienic aspects are criteria for the selection and use of food contact materials. Analysing their behaviour retrospectively, participants indicate that they significantly reduced the use of products made of soft plastic, single-use plastic products and aluminium foil. They now use these materials more consciously than in the past.

Interviewees trust traditional materials such as glass, ceramics and porcelain more than other materials, but avoid them when transporting food. Natural products such as wood and paper also enjoy a comparatively high level of trust due to their natural origin. The use of chemicals in their manufacturing process, however, undermines that trust. These products are not seen as equivalent substitutes for glass, ceramics and porcelain for hygienic reasons or due to the impossibility to clean these materials. Organic plastic enjoys greater acceptance by the respondents because of the word "organic", but some of the consumers surveyed responded hesitantly because hardly any long-term study has been conducted on this material so far. The lowest levels of trust expressed are directed towards single-use plastic and aluminium.

The respondents consider a food contact material to be of concern if the use of a particular material alters the taste or odour of food. The basis for the comparison is the taste of food when used with glass or ceramics. Respondents express the same concerns if materials undergo changes during use, if for example deformation or melting is observed. The respondents indicate that they learn about the health risks of individual materials through traditional consumer media, but also via the internet.

Overall, interviewees know little about existing warnings and information relating to the suitability of food contact materials. Existing warnings provide little guidance. Warnings about the use of aluminium foil and the "food safe symbol" are most widely known. The interviewees do not understand the dishwasher safe symbol. Only a minority is aware of the

risks associated with melamine.

The respondents take the view that warnings should be mandatory. They expect that such information is recognisable on the packaging as well as on the products. In their view, the warnings should at least be legible and easy to understand. Ideally, internationally recognised symbols should be used, similar to the labels used on clothing. Legends for the symbols could also be printed on kitchen equipment to give additional support.

Respondents express that the threshold for providing warnings should be set to protect the most vulnerable members of the public. At the same time, they take the view that products which are associated with health risks should not be sold in the first place. This includes, for example, products made of melamine that are exposed to intense heat during their intended use, such as cookware.

The interviewees are of the opinion that manufacturers of food contact materials and the German authorities are responsible for the application of warnings and suitability information. Manufacturers of packaged foods and retailers of tableware and cooking utensils are only partly responsible in their view. Consumers, however, should only be held responsible for the safe use of food contact materials when the information required to decide for or against the use of food contact materials is available.

All of the consumers interviewed expect functioning and transparent monitoring and warning mechanisms with regard to food contact materials to be in place. However, each of the focus groups handles these expectations differently.

The results show that different opinions and needs cannot be associated with sociodemographic characteristics. Instead, the consumers interviewed can be divided into three groups. The first group consists of responsible consumers who are very conscious of their diet and do not want to do anything wrong. This group has a basic level of scepticism and is reluctant to rely on statements from authorities or official bodies, even if they always expect market surveillance tests to be carried out. When in doubt, this target group proactively investigates on their own in order to form an opinion. The second group follows major trends, for example, by going without aluminium foil. This group relies on the veracity of the trend, but rarely questions their own behaviour and the validity of the trend. The third group consists of carefree consumers with a high level of basic trust. This group is convinced that monitoring mechanisms work and trusts that food contact materials are not associated with serious and immediate consequences for health. Both group two and group three are confident that official monitoring and warning mechanisms regarding food contact materials are in place and working effectively. As a result, these consumers feel less compelled to address this issue.

5. Results

5.1. Use of food contact materials

The respondents consider different criteria when selecting food contact materials. In addition to sustainability aspects, these include the intended use and the duration of contact with the food, but also hygienic considerations. Single-use products and aluminium foil are used only in individual cases.

The respondents use different materials to store and transport food and beverages. They mainly use solid plastic or Tupperware containers, plastic film or aluminium foil for covering, but also glass and ceramics. Reusable plastic bottles and glass bottles are used when transporting beverages, mainly thermos containers. Lightweight PET bottles are almost never filled a second time. Instead, the respondents prefer a new bottle.

Overall, respondents try to avoid aluminium foil and single-use plastic products for reasons of sustainability. Respondents feel that reusable products intended for continuous use, such as coffee mugs and drinking bottles have become more important to them when reflecting their own behaviour. Single-use cups or containers are reused less frequently, and if so, then only a few times. A typical thought is expressed in the following quote: *"I am concerned, even with the plastic bottle here, about refilling it too often. I don't really know what's being released over time."* (Hamburg).

According to the respondents, the choice of the food contact materials used depends on the purpose and duration of storage, but also on hygienic considerations. The focus is on preventing spills, but also on the weight and value of the material when transporting food.

The interviewees use different containers for coffee and water to prevent the taste from being affected. If a material is used while heating food, the participants usually give consideration to the heat resistance of the material. For example, they remove plastic films that have been used for covering the food and choose containers that they believe to be heat resistant. Lightweight plastic packaging and packaging in which chilled or frozen food is stored are deemed not to have this characteristic.

If there is a risk that the storage container might get lost, the respondents prefer a less valuable alternative, for example a single-use product. A participant provided an example of this: *"My mother doesn't like it when she gives someone a Tupperware container and doesn't get it back. My family doesn't pay much attention to plastic when they go shopping and we sometimes have ice cream tubs left over. And she keeps them so she doesn't have to give things away in a Tupperware container."* (Berlin).

The respondents also use materials known to be associated with potential risks for short-term use or for practical reasons. This is particularly the case with the use of aluminium foil. *"I also have aluminium foil at home and I use it to wrap up my lunch (...) and that is the most effective way and everything else makes no sense at all, it makes a hell of a mess. I will use it as long as I have no other alternative."* (Berlin). Respondents are, however, trying to limit their use of plastic and aluminium foil, especially for reasons of sustainability. Regarding the reduced use of aluminium foil and plastic, respondents describe a change in their habits compared to their former behaviour, as can be seen from the following quote: *"What is really noticeable is the taste, and when you drink cola from a glass bottle, it actually tastes better."* (Berlin).

5.2. Safety of food packaging

Respondents often refer to sustainability aspects and the aspiration to act in an environmentally and climate-friendly way rather than concerns about the safety of food when asked about food contact materials. The low priority of this topic is associated with the need to reduce the complexity of daily decisions. In addition, many of the consumers interviewed rely on effective monitoring and warning mechanisms at national level. Respondents learn about health risks of individual materials from traditional consumer media, but also on the internet.

The discussion about trust in food contact materials is heavily overshadowed by the debate on the climate and environmental impact of individual materials. The interviewees have given barely any thought to such materials, and if they have, then their effects on health played only a marginal role compared to the impact on the environment.

One reason for this is the perceived high level of complexity of everyday decisions. In the area of food, the selection process for suitable food in the context of a healthy diet is already perceived to be challenging for participants. In addition, the degree to which the interviewees want to act in a climate-friendly way varies from person to person. Participants feel the need to reduce this complexity. They therefore see other aspects that need to be taken into account as less relevant or deliberately ignore them. This is expressed in the following quote: *"Everything we eat or touch has an element of harmfulness in it. They are approved by the EU based on its standards because they are safe for humans. If I start worrying about how Knoppers are packaged, or water, or everything it has come into contact with, then I would go crazy or starve to death"*. (Hamburg).

Due to the complexity of the topic, participants have only fragmented knowledge, often based on their own experiences or media coverage. The inability to assess health risks associated with the use of certain materials induces a general feeling of insecurity among

some participants. *"We also hear about plasticisers (...) especially in plastic bottles and they probably shouldn't do that. My brain is telling me that some substance that is not good is also getting into the food. And in this case into the water."* (Leipzig). *"Yes, but also with plastics. It's also in the news that some substances can be released. I have a bit of a queasy feeling because I never know for sure what kind of bottle I have. Is it okay or not?"* (Hamburg).

To reduce complexity in the area of food contact materials, the majority of participants rely on monitoring mechanisms and the authorities or on the fact that they would learn about any relevant health hazards or scandals in the media. Trust in public authorities is demonstrated in the following quote: *"I trust the government. There are also recalls that seems to work. I hope that this also happens with food contact materials and that we are informed about it."* (Mannheim). Only under such circumstances would behaviour be re-evaluated and the appropriate changes made.

Participants view safety considerations as less relevant because possible consequences are not immediately evident and tangible. Especially among the group of carefree consumers, there is a basic level of trust that food contact materials sold on the market do not have serious and immediate lethal effects as it becomes evident in this quote: *"If I have a certain standard of living and anyone can live to be eighty, ninety, it's not like you can say I'm being poisoned."* (Hamburg). This impression is confirmed when reflecting on the past. Participants state that materials that were used more frequently in the past are now considered to be of concern. At the same time, no serious adverse health effects are associated with past habits of use.

The group of responsible, somewhat apprehensive consumers that are sceptical about artificially manufactured food contact materials and prefer traditional materials such as glass contrasts the group of carefree consumers. They tend to avoid artificially manufactured products. This becomes apparent in the discussion about water bottles. However, this group only makes up a minority of the participants.

Participants describe trends that take over each other, as can be seen in the following description: *"The first time I saw biodegradable plastic was at Green Week when I was fourteen years old and that was twelve years ago. And there can't be any long-term studies on it yet. This is more the problem we are facing right now. And even if we know what effects plastic has, and even if they are not nice, then we also can't know whether the effects of the new materials are going to be any better."* (Berlin). A participant from Mannheim articulates this aspect as follows: *"Many things that were allowed in the past are banned today. If there are alternative materials in five or ten years, we won't be aware of all that yet. You can't ban*

everything that contains harmful substances.” (Mannheim). Findings on the safety of materials are only available at a much later point in time than these materials are introduced. These observations support and confirm the mechanisms that are subconsciously used by the participants in order to reduce the significance of this issue.

Often, participants do not have the choice between different food contact materials because the food they buy is already packaged. In such situations, interviewees trust the material that is used. The following quote provides an example: *“When you buy fish at the market, it is wrapped in newspaper.” (Hamburg).* Such situations also support the devaluation mechanisms employed by the participants.

On the one hand, participants expect that no harmful substances migrate from food contact materials into food, and on the other, that the food or the use of food contact materials does not change the materials.

The release of harmful substances into food only becomes real to the interviewees when a change in smell or taste is noticed, for example with PET bottles. The following quote describes this impression in relation to water: *“With PET bottles and also with water it has this slight plastic taste.” (Berlin).*

Only in individual cases respondents are aware that substances released from food contact materials can effect changes in metabolism or hormonal balance. For some respondents, exposure to germs also counts as contamination of food.

Respondents learn about the safety of food contact materials from consumer magazines such as those published by Ökotest or Stiftung Warentest, but also by watching consumer and science programmes on TV. A few respondents mention social media or the internet in general. Packaging also provides consumer information. Interviewees, however, often do not notice the information on packaging or overlook it. Some respondents spontaneously mention the information on the use of aluminium foil.

5.3. Trust in food contact materials

Overall, there is a great deal of trust of participants in traditional materials such as glass, ceramics and porcelain, and a moderate level in natural products such as wood and paper, but also bioplastics. Trust in conventional single-use plastic and aluminium is comparatively low. The criteria for the classification of trustworthiness are knowledge, observations and intuition.

On a scale from zero “no trust at all” to ten “a great deal of trust”, respondents express a moderate level of trust in the food contact materials they use.

In the scaled query of individual materials in combination with typical uses, traditional

materials such as glass, ceramics and porcelain are trusted the most, followed by wood, e.g. fruit or vegetable baskets. Paper and bioplastics appear generally less trustworthy than traditional materials, but significantly more trustworthy than plastics, such as those used for deli cups and salad bowls. By far the worst performers are conventional plastic packaging and aluminium.

Material	Trustworthiness
Glass	trustworthy
Porcelain	trustworthy
Ceramics	trustworthy
Wood (fruit baskets)	somewhat trustworthy
Paper and cardboard (e.g. hamburger wrappers, vegetable paper,)	somewhat trustworthy
Bioplastics (such as menu boxes made from sugar cane, compostable packaging)	somewhat trustworthy
Plastics (for example deli cups, salad bowls, etc.)	not very trustworthy
Aluminium (trays, foil)	not very trustworthy

Write a number between 0 and 10 next to each material that food can come into contact with, depending on how much you trust this material. 0 means "I do not trust at all" and 10 means "I trust it completely".

Key: trustworthy: mean scale values 8 to 10, somewhat trustworthy: scale values 5 to 7, not very trustworthy: scale values 0 to 4, in qualitative analyses, exact statistical results are not presented due to the number of cases.

Table 2: Trustworthiness of food contact materials, scaled query

The participants' criteria for assessing the trustworthiness of food contact materials is based on knowledge, intuition and learned behaviour.

Participants agree natural materials to be generally very trustworthy. They consider ceramics, porcelain and glass, in particular, to be trustworthy, mainly because they do not change the smell or taste of the food even when exposed to heat or cold. In use, however, they do not always appear to be suitable due to their weight and fragility compared to other materials, especially when travelling. For glass containers, a change in the taste and smell of the food is remembered as a result of the lids being reused, but this is not attributed to the use of glass as a material. Porous ceramics as well as cracked glazes are considered less hygienic than smooth and undamaged materials. Such imperfections are easily recognisable and therefore provide reassurance. An example is provided by the following quote: "Ceramics from the medieval market, and if it is porous, then it also absorbs substances and

might release something again." (Berlin).

Most respondents are aware that aluminium foil is not a safe food contact material. However, not all respondents are able to name the exact reasons. However, many respondents are aware of the adverse effects of contact with acids. A few times, the foil itself was seen to change when it came into contact with such foodstuffs. However, the assessment of aluminium foil is mainly based on observation or knowing that this material cannot be used in the microwave, see the following quote: *"It flashes a lot." (Berlin)*. In addition, it is easy for the respondents to imagine that metal or chemical substances could migrate into the food. In addition, the participants know that, if possible, no metals should ever enter the body. The following quote expresses such a thought: *"When you work with salt and acids, it dissolves. That's a bit too risky for me. That's not something I want to swallow." (Hamburg)*. Against this background, the interviewees do not find it difficult to cut down on the use of aluminium foil or to consider its use carefully. This foil is mostly only used to cover food and is only used for a short time.

The price of food contact materials and the packaged food itself is also an indicator of safety for some participants, especially in the case of artificially produced materials. A participant from Mannheim expresses this aspect, for instance, *"I only buy brand names anyway. I don't buy cheap products; I don't trust them. I get well-known brands from stores. I trust German products and hope that's okay."* At the same time, some participants take the opposite view that price is not an indicator of product safety.

As a natural material, wood is controversial. On the one hand, it is seen as a natural raw material and therefore trustworthy for that reason alone. On the other hand, a few respondents that are more critical are aware that such food contact materials have been treated and bleached or coated, which undermines trust in this material. The following quote provides an example: *"This is treated wood and that is bleached wood and when I think that there is something in there and that the wood releases it, then that's something. I can't believe that cheap wood for mass production is very good. (Berlin)*. Participants rarely observed adverse effects or changes in taste, especially because the respondents recalled that these bowls are mainly used for storing fruits only. Wooden bowls are rated as being less hygienic, mainly because food residues cannot be properly removed, as can be seen from the following quote: *"Sure, it's a natural product, but it doesn't get full marks either, because when you take out the strawberries, you can see the outlines so there must be some kind of residue on them and bacteria." (Leipzig)*.

Respondents see paper as less trustworthy for storage compared to other materials. However, paper is only used once and only for short-term transport. For this reason, this

lower level of trustworthiness is not rated highly. Participants recall traditional shopping situations where food was packed in paper bags or fish in newspapers, which put them into contact with harmful printing ink. Sausage, meat and cheese from the deli counter and hamburgers are also wrapped in paper. Paper, however, is considered unhygienic, as can be seen from the following quote: *"The hamburger things, because they are soggy in the middle."* (Berlin). Only after some reflection, participants mention plastic film coatings, the manufacturing process or the printing ink. Criticism is voiced about the lack of transparency regarding the material. Many respondents do not know what harmful substances are present in common paper packaging, for example from printing or bleaching. One participant expressed this thought as follows: *"You always have to make a distinction: normal paper or paper for food. I have also read that it is artificially treated. I feel there is a lack of transparency there."* (Berlin).

In the context of paper, respondents also discuss TetraPacks, which are seen as harmless but are rated as highly questionable in terms of their environmental impact because they have several layers of coating.

Plastic packaging and storage containers are often used because of their light weight and wide availability. Participants distinguish between hard plastic, for example Tupperware or microwave containers, and soft plastic, for example PET bottles, plastic bags, plastic film or delicatessen or salad packaging. Many respondents have experienced that beverages from plastic bottles have a different taste to those from glass. This is considered to be particularly noticeable with water. Furthermore, limited heat resistance raises doubts about this material. Many respondents have noticed deformations following dishwasher use, melted plastic after use in the microwave or changes in the colour of the packaging. The following quotes are examples of this: *"I have seen this when frying. The [spatula] melted in the process."* (Hamburg) and *"Putting a plastic bowl in the microwave, something my girlfriend often does, I feel is not a good idea. You can see it on the bottom. I then throw the food away when I notice that the plastic has disintegrated."* (Mannheim). Sometimes, these observations result in a change of behaviour. For example, using ceramic containers for heating in the microwave or not cleaning the packaging in the dishwasher. However, these observations have not led to a decrease in use, as the following quote illustrates *"I don't think plastic is a problem. As far as taste is concerned, I agree."* (Mannheim). Media reports about the health risks of bisphenol A very likely contributed to avoiding or limiting the use of plastic materials. Participants mainly conclude that soft plastics should be avoided. As a result, but also for environmental reasons, they reduced their use of films and bags or the use of these materials was more conscious.

Respondents see bioplastics as a trend that many of them do not yet trust. The ability to

compost these materials seems to be an advantage, but respondents are not yet familiar with its composition and any associated health risks. The participants assume that health risks will also be linked to this material in the future because it is not a natural raw material. The following quote provides an example: *"I have recently heard that sugar cane is not so good and there are still some odours and it shouldn't be used."* (Berlin). One respondent mentioned the use of raw materials contaminated with pesticides for the production of bioplastics. A few respondents brought up the analogy to the bamboo trend, where risks were identified after a short time from the adhesives being used. One participant described her thoughts as follows: *"And this baby dish is also available in bamboo and I bought that too. But then I read later that it's not supposed to be so good either and what's in the bamboo."* (Berlin).

5.4. Familiarity with and use of symbols and warnings

Overall, existing information regarding suitability or warnings concerning food contact materials are not very well known. Respondents are most familiar with warnings about the use of aluminium foil and the food safe symbol. The dishwasher safe symbol is poorly understood and the information on aluminium foil seems too vague. Overall, the existing symbols and warnings are of little use for guidance.

Unless supported by naming or showing pictures, participants are mostly not aware of labels concerning food contact materials. The wine glass and fork icon is most familiar to respondents when it comes to indicating the suitability of materials to come into contact with food.



Figure 1: "Food safe" symbol

Nevertheless, even this most familiar icon has only a moderate level of awareness. Some respondents recall seeing this symbol on packaging or food containers.

The majority were able to identify the correct meaning associated with the wine glass and fork symbol after being shown the picture. However, respondents are not certain, but instead guess at the meaning. The following quotes exemplify this: *"It probably passed the first wave-through test that it doesn't initially release harmful substances."* (Berlin) and *"That I can eat out of it without anything happening."* (Mannheim). However, some respondents mistook it for information about a catering service or to indicate suitability for dishwasher use. The icon seems to provide some guidance to the interviewees. However, materials would also be

used if this symbol was missing. The presence of such information does not replace personal observation and evaluation. This is especially true for the more critical consumers. The latter aspect is expressed in the following quote: *"If it's on there and I have a funny feeling, I still won't buy it. I tend to trust my feelings."* (Mannheim).

Only a few participants are aware of the dishwasher safe icon, in spite of the fact that it was shown to them. A wide variety of meanings were attributed to the symbol. Some recognised the rays as a dishwasher, others associated them with heat rays and therefore heat or light resistance, as can be seen from the following quote: *"500 lux I would say."* (Leipzig).

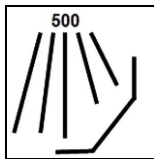


Figure 2: "Dishwasher safe" symbol

Respondents do not recognise the number on the pictogram as indicating the maximum number of recommended dishwasher cycles. Most respondents are inclined to think it is temperature information, but this was rejected as unlikely due to the number "500". In particular, the number of recommended dishwasher cycles is deemed unrealistic. Counting the number of washing cycles for different cooking and storage materials seems impossible to imagine and created hilarity. Two quotes provide examples of this: *"I'll also do it thousand times then. I don't count."* (Hamburg) and *"I wouldn't use it at all. It shows me that it is only for a certain need. I don't want to keep an Excel spreadsheet. It's too risky for me."* (Mannheim).

Printing a service life in years or a maximum temperature similar to the washing recommendations for textiles would gain much greater acceptance. This similarity is expressed in the following quotations: *"It's like clothes, there are so many symbols there too."* (Leipzig) and *"I thought of how it is with washing labels. You get a certain feeling for some symbols, for some you don't."* (Hamburg).

Some respondents were already aware of the warnings on aluminium foil, the warning is understood and yet the material is used despite the recommendation. However, respondents are aware that its use may be associated with health risks and are also convinced that the risk is manageable when used infrequently and in small quantities. The following quote provides an example: *"And it's the quantity that counts. A drop of lemon will not be so bad, but a whole peeled lemon is. It's a question of how much. And a bit of algae won't make that much difference either."* (Berlin).

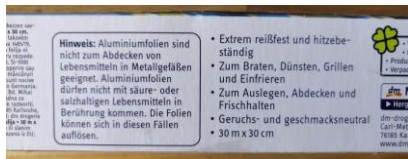


Figure 3: “Aluminium foil warning”

The warning does not specify at what point a food counts as “salty” or “acidic”. The information that the foil is safe for grilling also causes confusion, as grilled meat is considered salty. Such confusion is evident in the following quotes: *“But the funny thing is that it says it is barbecue-safe.”* (Leipzig) and *“I watched a cooking programme and I put lamb in it for it to cook. I made the mistake of adding salt. What about a trout wrapped like that in the oven?”* (Hamburg).

These unspecific warnings or the presumed contradictions facilitate the inner justification of using the material and foster the hope that the effect of its use is not threatening. In addition, for sustainability reasons, this material is seldom used in any case.

5.5. Awareness of risks and expectations of material labels

5.5.1. Awareness of melamine

Respondents use melamine primarily in the form of cooking utensils, less so as baby or children's tableware. Only a minority of participants are aware of the risks associated with melamine. Many participants are surprised by the instructions for use and find them incompatible with actual use.

Only a few respondents are aware of the material melamine and the warning to avoid heating it. The following quote illustrates such a spontaneous response: *“I’ve heard about it, but I don’t know where.”* (Leipzig). No interviewee recalls the warning in association with certain foods. The term was occasionally confused with the neurotransmitter “melatonin”.

After being shown typical pictures, many respondents are able to identify the material. Cooking utensils, such as spatulas, are used more often than baby and children’s tableware. This is certainly also due to the fact that many of the participants do not or no longer have young children. This tableware is used because it is more robust than ceramic tableware, see the following quote: *“Babies can also toss them in the corner.”* (Berlin). Cooking utensils are used because they are viewed as the standard in retail, as shown in the following quote: *“I shopped at Ikea.”* (Berlin).



Figure 4: Melamine products

The majority of participants do not think at all about the use and suitability of the material in their daily lives. However, based on the explanation of risks in the group discussions, the lack of heat resistance is seen as problematic. Cooking utensils made of melamine that reach a temperature of over seventy degrees each time they are used are seen as posing a risk. The following quote provides an example of such a thought: *"But especially spatulas, they sometimes reach 200 degrees..." (Leipzig)*. Many respondents combine this with considerations on a general ban of such products. *"I am deeply shocked. Doesn't the government have to draw attention to this? I don't even know what to think anymore."* (Mannheim).

5.5.2. Labelling food contact materials

Participants think that warning information should be mandatory. The information should be easy to identify on the packaging as well as on the products. The information should at least be easy to understand and easy to read. The design can be based on washing labels. Legends could also be printed on kitchen utensils to lend additional support.

Based on the specific example, the respondents discussed a variety of required criteria for suitability and warning information. Warnings should be mandatory on all food contact materials that pose a risk when used, as can be seen from the following quotes: *"Especially on kitchenware [made of melamine] it should be clearly indicated on it if it isn't heat resistant."* (Berlin) and *"You can sell it, but you have to point it out. Then it's up to you to decide if it's okay."* (Mannheim). This is particularly important for childrens' and baby products. Warnings are thus a minimum requirement. According to the participants, missing warning or suitability information would imply that products or packaging can be used without any restrictions.

Participants expect warning and suitability information on the packaging as well as on the product. Labelling on the product could be done by means of a pictogram due to limited space. Explanations that are more detailed could be placed on the packaging. One participant expresses this as follows: *"I would also like an icon and would put it on the product. The description for it can be on the packaging."* (Mannheim). Placing the information on the product is necessary because the packaging is often thrown away or no packaging is available, as one participant describes it: *"I usually buy a roll of [aluminium foil] and put it in the drawer. And the packaging then gets thrown away."* (Leipzig).

The information on the products should be permanent and easy to recognise. Labelling by means of a sticker would have the disadvantage that it would be removed or would no longer be recognisable after several uses. See the following quote: *"But you then just throw away*

all the stickers." (Berlin). Aesthetic aspects would have to be taken into account when it comes to putting the recommendations or warnings on the products, at least in the case of tableware and cooking utensils. These warnings should not be visible when putting tableware, for example bowls, on the table. The following quote expresses this desire: "And then just on the bottom so you don't always see it and the bowl should also look a bit nice." (Leipzig). Some participants also express the desire for the information to be short and easy to understand: "I don't read things through if there's a lot of text. I work all day, so I don't really have the time. If it's too full of details, then it's of no use to me." (Mannheim).

In the view of some respondents, a QR code would be helpful to give interested users the opportunity to get information that is more detailed. Such an expectation is summed up in this quote: *"I would like to have the option of getting information from the manufacturer's website. I would also like a symbol and a description that explains exactly what it means." (Mannheim).* However, such options would probably only be used by a minority of participants. In the discussion rounds, respondents seldom spoke about wanting to use such information, but recommended it for specific target groups, such as younger age groups. The following quote expresses the idea: *"And when I buy a spatula, I don't first read on the internet about what I do with it." (Leipzig).* Compared to a link to a website, a QR code is more convenient because it is easier to use to get to the website according to the participants. This is apparent in the following quote: *"Young people have a look at it, but they don't look at the website. It's different with a QR code." (Mannheim)* Overall, some respondents who would like to have more detailed information see a QR code as a useful addition. However, the majority of participants would probably rarely use this opportunity to get more in-depth information.

Respondents consider international harmonisation and recognition, at least in the EU, essential for the development of icons. In addition, it must be ensured that the meaning is unambiguous and can be easily interpreted, see the following quote: *"As simple as possible and understandable for everyone, even international people." (Berlin).* The characteristic "heat resistance" could, for example, be represented by a flame with an indication of the temperature, as the following quote describes: *"Pictograms and maybe standardised like a flame with a cross through it and seventy degrees." (Berlin).* A crossed-out symbol could imply a risk according to the respondents. Where possible, the colours of traffic lights, especially green and red, could be used to indicate suitability or a warning. Warning or suitability information should be associated with the intended use. The following quote exemplifies this: *"I wouldn't care about the composition of a spatula if it said don't let it get too hot." (Berlin).* More appropriate than just a general temperature recommendation would be information on whether the material can be used without hesitation in the microwave,

dishwasher or oven. This approach is illustrated by the following quote: *"I think it should be stated on the packaging that it can only be heated up to seventy degrees and whether it can be used in the microwave or not."* (Leipzig). Better than the number of times it has been used, for example washing cycles, would be temperature specifications or a duration of use in years, as can be seen from this quote: *"It is easier for me to tell you when I bought the plate than to tell you how many times it has been in the dishwasher."* (Berlin).

In addition to the ease of understanding, legibility, which means the size of the labelling, is also important to the respondents. They expect that most consumers must be able to read the information without having to use aids such as glasses or a magnifying glass. The following quote expresses this desire: *"Or you can't read it. I have glasses and I can't see it. And there is so much written on it."* (Hamburg). Legibility should also include being able to recognise it on the product or packaging.

For substances such as melamine, participants expect that the relevant warning information can be taken into consideration at the time of making a purchasing decision. The following quote highlights this expectation: *"I want to make up my own mind when I buy something. I can read that on the bottle and then decide."* (Mannheim). However, such information would influence the purchasing decision, as the following quote demonstrates: *"I wouldn't buy a spatula if it said 'do not use above seventy degrees'"*. (Leipzig). As a matter of principle, visually impaired people should also be able to identify suitability and warning information, but the interviewees are aware that this would be difficult to display, at least on the products themselves.

The design of warning and suitability information could be based on washing labels or the icons on the washing machine. In the view of some respondents, it might be conceivable to place legends for the most important symbols on the actual technical appliances, for example on the dishwasher or microwave: *"It should actually also be written on the dishwasher what should not be put in there."* (Mannheim). In this way, each time it is used, it can be checked whether it is suitable for the intended application. Overall, however, there should only be a manageable number of symbols that would have to be learned.

5.6. Safety of food contact materials and assignment of responsibility

Participants generally assume that the safety of food contact materials has been tested before products are put on the market. The threshold for warning information should be geared towards the most vulnerable members of the public. Products whose use is associated with health risks should not be sold in the first place. Manufacturers of such products and authorities are seen as responsible for the safety of the products. Manufacturers of packaged food as well as retailers of tableware and

cooking utensils are seen as jointly responsible. Consumers could only be responsible for the safe use of products when the requisite information is available.

In the discussion groups, participants agreed that food contact materials that are not suitable for the intended use should not be sold. *"I think that products like this spatula [should not] be sold."* (Mannheim). *"It should not be allowed to happen in the first place."* (Hamburg). *"I also don't know how you can make dishes that are not allowed to get hotter than seventy degrees."* (Berlin).

Consumer information and warnings are seen as minimum requirements. Only a few participants consider the responsibility for decisions on buying and usage to lie exclusively with the consumers themselves.

When discussing the needs upon which warning information should be based, a majority of participants are in favour of taking the needs of vulnerable groups of people as a guideline. The following quote reflects this idea: *"Because children are also vulnerable and if they are able to tolerate something, then adults should too. But if we are able to tolerate something, then they [the children] won't necessarily be able to."* (Leipzig). Warning information should already be provided when there may be hazards for pregnant women, babies or people with health risks, such as allergies. It should also be mandatory to provide information on potentially toxic or carcinogenic substances, see the following quote: *"It would be good if everything toxic or carcinogenic had a symbol on it."* (Mannheim).

Respondents somewhat disagree on the following aspect: While some expect clear labelling to be at least mandatory with regard to materials that are hazardous to health, others argue for a general ban on these substances as food contact materials.

In the view of the interviewees, responsibility should not be shifted to the consumers themselves due to the complexity and the lack of choice or control. For example, consumers often have to rely on others when food is used in other households or institutions. Such a limitation is expressed in the following quote: *"So you are at the in-laws and they are the ones who cooked. You are not aware of it then either."* (Hamburg). Participants call for a general ban on products made of certain food contact materials if the general use of such products was inherently associated with a risk, for example spatulas made of melamine. *"It is important to me that it [food contact materials in general] is not harmful to health and I have not even thought about that. That something is not suited for the purpose I'm buying it, and I think that's quite a big deal. That shouldn't be the case at all."* (Leipzig).

Some participants assign responsibility for the decision to use the product to consumers if minimum information requirements are met. This attitude is made clear in the following quote: *"Everyone then knows that they are taking a risk and can get information about what*

exactly is involved. But it should then really be on everything, no matter if it's food or paint." (Mannheim). However, the majority of participants reject the individual responsibility for deciding to use something or for avoiding risks. A feeling of being overwhelmed and a desire for simplicity and usability can be observed due to the amount and diversity of information that consumers are faced with in connection with shopping groceries: *"How much information I have to read, the score [nutrition labelling], how long the shelf-life is, that's a disaster." (Hamburg).* *"I'm a lazy sod and I don't want to worry about all that stuff either. I don't want to have to look at every package and every plate and every cup to know that I am able to use it and what for. I want to be able to use the products for which they are advertised without any restrictions." (Leipzig).* *"You always have to take some responsibility for what you are doing, I would say. But if you buy a nice cup for your grandchild with a teddy bear on the front, I don't look at it to see if I can boil it at seventy degrees. (Leipzig).*

Respondents are not able to clearly assign the specific responsibility for providing information. They primarily assign responsibility for warnings and suitability information to the manufacturer of the packaging and products. Such an assumption is demonstrated by the following quote: *"Every reputable manufacturer has a laboratory of some kind. They test it during product development and for management and for whatever other reasons. After all, the manufacturer also has to cover itself under EU rules. Any food manufacturer not in compliance with these rules would be immediately off the market if this were to come out." (Leipzig).* However, all interviewees are aware that manufacturers largely produce in the Asian region and thus outside European standards. For a manufacturer in China, according to the respondents, responsibility must then pass to the importer, see quote: *"If someone sells cutlery, it must then have a European seal. Or if it comes from abroad, then the importer would have to ensure that it is not harmful." (Mannheim).* A great deal of responsibility is also given to the state's supervisory authorities, combined with the expectation that no products that are harmful to health would be approved for import. Respondents link this to the responsibility of checking whether warning information was included.

Most of the respondents assume that the basic suitability for use as a food contact material is tested before a product or packaging material receives approval for the German market. Only a few respondents are aware that tests are only carried out on a random basis and thus products that would not be approved also reach the market. This expectation or consideration is reflected in the following quote: *"Each country would then have a supreme supervisory authority, which is then a federal authority or an authority that is supervised by the state. And they have to supervise it according to the UN's guidelines and then it works. But it's a huge job, and it may not be possible to implement it at all." (Berlin).* This trust is

based on basic confidence in German authorities or the perception of Germany as a highly regulated country with a large number of standards and testing institutes, as can be seen from the following quote: *"That's what I assumed. Substances are tested before they appear on the market."* (Mannheim). *"I am absolutely convinced that there is an authority in Germany that has checked or approved it. It's not as if the yoghurt producer can just get some packaging and fill it up and say I'm selling this. It has been tested at some point beforehand to see if it's harmful to health. Otherwise it wouldn't be available on the German market at all."* (Leipzig) There are, however, concerns about the controls on imported products: *"My level of trust is somewhat high. But when I think of Chinese products, it is quite possible that something slips through."* (Mannheim). One respondent sees her confidence in European authorities confirmed by her experience with an online purchase where delivery was refused by the authorities due to quality flaws. This experience is described in the following quote: *"I have previously ordered things from China and customs said it was not EU-compliant. They didn't let it in at all."* (Hamburg). The interviewees consider the consumer associations, Stiftung Warentest and Ökotest, TÜV, the Fresenius Institute, but also the government to act as supervisory bodies authorities.

The interviewees distinguish between food and products for food storage or food preparation when attributing other areas of responsibility. Food manufacturers are also expected to select suitable packaging materials in order to avoid health risks. This is exemplified by the following quote: *"If I sell food in a package and I buy the package in China, then I am responsible for it."* (Mannheim). In contrast, hardly any responsibility was attributed to food retailers, mainly because they would not have the skills to assess whether a package or a product was suitable or not. The following quote demonstrates this opinion: *"If I imagine that this is in a small town and a small shop, he doesn't have a clue either."* (Berlin).

However, retailers of food storage or food preparation products, for example tableware and cooking accessories, are expected to take more responsibility in the selection of products they sell or to inform consumers if their use is associated with risks.

Some of the interviewees advise looking to regulations in other European countries for inspiration when dealing with warning and suitability statements.

The information about restrictions on the use of melamine leads to the expectation by the respondents that the public should be informed if products are generally associated with risks. The following quote provides an example: *"The question is whether you have to put it on the material or whether you have to better inform the public. It's the same with cigarettes. You have stickers on them, but you still knew it was harmful beforehand."* (Leipzig). Respondents expect education of this kind for children already in schools, but also as

consumer information in the media.