

# The revitalisation of native grain legumes

## Survey on buying habits and assessment of image of legumes

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### Summary

Grain legumes (pulses) are healthy protein sources, and their cultivation is not very demanding. Nonetheless, they are becoming less important – especially the domestic varieties – as it is difficult to market them. Thus, the present study aims at establishing how well grain legumes are accepted and identifying the relevant factors.

In order to minimise the bias of the findings, a qualitative study supported by interview guidelines was carried out with 103 participants in Berlin and Munich.

The study found that price, freshness, health and ecological aspects were the most important selling points. On the other hand, it was concluded that customers hardly look at product characteristics. Grain legumes are generally accepted to be healthy – negative associations such as flatulence are of comparatively little importance.

In order to improve grain legumes marketing, it is recommended that leaflets should be prepared to explain the benefits they provide to health and the environment. It would also be desirable to improve the packaging and to introduce point-of-sale advertising.

**Keywords:** Grain legumes, pulses, consumer survey, consumer acceptance, buying habits, image assessment

*faba* L.) and peas (*Pisum sativum* L.) [4–8].

Nevertheless, the cultivation and breeding of domestic grain legumes have gradually decreased in recent decades. The cultivation area has been dropping for years and breeding programs have been cancelled [9, 10]. Practical agricultural arguments against the cultivation of domestic grain legumes include difficulties in marketing and poor animal performance if they are used directly [11].

The Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) is supporting the research project “LeguAN – Innovative and Integrated Value Creation Concepts for Functional Food and Animal Feed from Domestic Pulses: from Cultivation to Use”, sponsored by the Federal Institute for Agriculture and Nutrition (BLE). This project is to use innovative technological approaches efficiently to support the increasing demand for high quality plant proteins, as well as developing innovative products and providing scientific proof for the health-supporting potential of grain legume-based foods. The objective is to enhance the marketing and commercial potential of grain legume products and to give an energetic boost to the cultivation of grain legumes. It is planned to involve partners and sectors throughout the value-added chain, as novel approaches are essential for these products from traditional crops.

### Introduction

Grain legumes (pulses) can be important human foods, as they provide proteins and secondary plant metabolites, particularly flavonoids [1–3]. Increasing attention has recently been paid to plant proteins, as these not only provide essential amino acids, but are also considered to have physiological effects, such as reducing cholesterol and blood sugar. Initial results have already been reported for some pulse proteins, including products isolated from soya (*Glycine max* L.) or lupins (*Lupinus* L.), the broad bean (*Vicia*

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## Issues

The main reason that the cultivation of grain legumes is economically unattractive is their lack of acceptance by the consumer. The reasons given include the “homely” recipes and the “taste of pea”, and the inconsistent results on the tolerability or allergenicity and the flatulence suffered by many consumers. Consumers seem to be almost totally unaware that pulse-based foods may have positive effects.

In the course of the LeguAN project, several studies are to analyse the specific barriers which deter consumers from domestic grain legumes, as well as developing recommendations for innovative new products based on grain legumes (◆ Figure 1).

The initial substudy presented here evaluates the general acceptance factors for grain legume-based foods. The central questions were the following:

1) How should we assess the current acceptance of pulses by consumers?

2) Which factors influence the acceptance of grain legume-based foods?

As it is assumed that grain legumes resp. pulses were not a normal component of the interviewees' daily nutrition, the first objective was to obtain a general overview of their purchasing behaviour and of the product characteristics that they regarded favourably. On this basis, recommendations for action were developed, together with initial marketing strategies that were specific for pulses. This was to be followed by in-depth development in the course of the project.

This led, for example, to the following general questions for planning the first substudy in the LeguAN project.

- How intensively do consumers occupy themselves with selecting foods and planning their purchases?
- What are the main criteria that consumers employ when selecting their food?
- Which characteristics of pulses inhibit their purchase?

## Study design and methods

The study was based on consumer interviews. In order to minimise bias in the interviewees' statements, a qualitative study was performed at different sites, supported by interview guidelines [12]. The questions were open and the answer categories were not specified in advance. Thus, acceptance factors were not anticipated and there was extensive scope for different answers [13].<sup>1</sup>

As a first step, relevant literature was searched on the methods for collecting data on the acceptance of different foods.<sup>2</sup> On this basis, a guideline was developed, which served to structure and record the interview. The dimensions “purchasing behaviour”, “selection and acceptance of new products” and “image assessment of pulses” were constructed.

As it may be assumed that products containing pulses – such as noodles or bread – would be totally novel foods for the consumer, the method was selected in such a way that inferences were possible about the specific marketing and acceptance of pulses, on the basis of the con-

<sup>1</sup>There may be bias in the quantitative recording of personal attitudes and criteria for the assessment of foods. These systematic errors are minimised by using a qualitative recording instrument [13].

<sup>2</sup>See too i. a.:

– Spiller A, Enneking U, Lüth M. Analyse des Kaufverhaltens von Selten- und Gelegenheitskäufern und ihrer Bestimmungsgründe für/gegen den Kauf von Öko-Produkten. Projektabschlussbericht für das BMELV im Rahmen des Bundesprogramms ökologischer Landbau, Georg-August-Universität Göttingen Institut für Agrarökonomie. Göttingen (2004)

– Hampel J. Die Akzeptanz gentechnisch veränderter Lebensmittel in Europa. Stuttgarter Beiträge zur Risiko- und Nachhaltigkeitsforschung, Nr. 3, Institut für Sozialwissenschaften, Abt. für Technik und Umweltsoziologie, Universität Stuttgart (2004), S. 157–187

– R. Kaufentscheidungsprozesse des Konsumenten. Schriftenreihe Unternehmensführung und Marketing, Bd. 2. Wiesbaden (1972)

– Pfeiffer S. Die Akzeptanz von Neuprodukten im Handel: Eine empirische Untersuchung zum Innovationsverhalten des Lebensmittelhandels. Wiesbaden (1981)

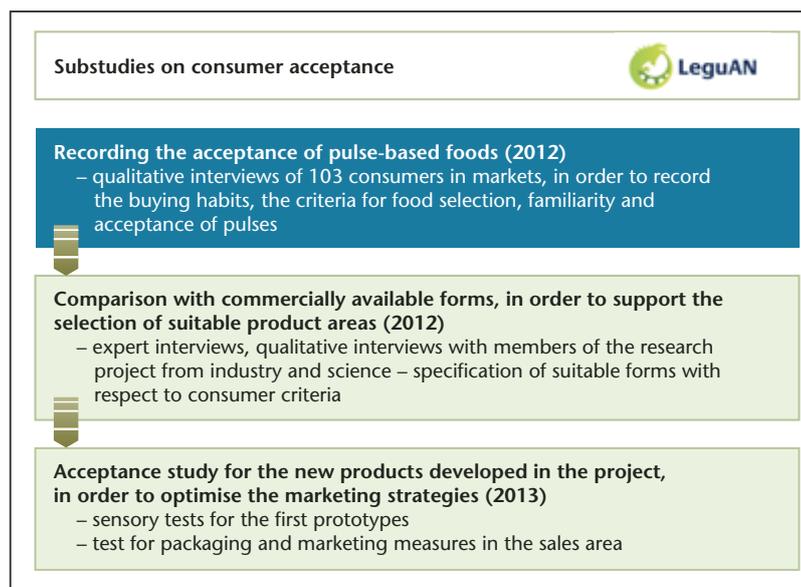


Figure 1: Overview of the substudies on consumer acceptance and marketing of pulse-based foods

sumer's daily behaviour and the general acceptance of new products. Favoured product characteristics were recorded at two levels. Firstly, an open question was put.<sup>3</sup> In answer to this, the interviewees could give their spontaneous opinion on the most important characteristics of a food. Secondly, they assessed the importance of the suggested characteristics in a table.

The quantitative item battery was an extended version derived from the results of the "National Consumption Study in Germany II" [14] (see too ♦ Figure 2). In collaboration with the scientific and industrial partners of the LeguAN project, the first version of the item battery was operationalised, i. e. transformed into a measurable form. The objectivity of the survey instrument was enhanced by considering the content of the guideline from the points of view of different research traditions and perspectives.<sup>4</sup> In addition, before data recording started, each interviewer performed at least two qualitative pretests (a total of ten pretests), for which a wide range of sociodemographic data was desirable, including age, gender and education. The revision of the guideline after the pretests served to validate the content of the survey instrument.

<sup>3</sup>A question that was often put in the guideline:  
3) Please think about how you select your daily food. What makes you decide to buy something or stops you from buying it? What is important when you are selecting a specific product? What do you think is most important?

<sup>4</sup>In qualitative social research, this procedure is known as research triangulation. See: Seipel C, Rieker P. Integrative Sozialforschung. Konzepte und Methoden der qualitativen und quantitativen empirischen Forschung. Juventa, Weinheim/München (2003)

<sup>5</sup>Thus, the planned sample size of N = 100 was reached. No interview was interrupted and there were no drop-outs.

Site of Survey	Interviews	
discounter	Aldi and Lidl	40
supermarket and full-range trader	Real Markt and Kaisers	40
bio shop	Biocompany	15
weekly market	Boxhagener Platz Berlin	5
<b>Total</b>		<b>100</b>

Table 1: Planned sites of survey for interviews

### Data collection and evaluation

During February 2012, 103 persons in Berlin and Munich were interviewed. The participants were recruited according to sample quotas. The site of purchase was used as a criterion to select the interviewees (♦ Table 1). The initial specification of the sample structure with respect to the sites of interview was specified on the basis of the GfK study on the market share and sales of discounters in comparison to other business models [15]. This is also intended to include the smallest group – in this case, consumers who purchase at weekly markets – with N = 5 participants.

In general, it is recommended that the sample size for qualitative interviews should be between N = 6 and N = 120 [16, 17]. As the study participants here were deliberately selected, it cannot be assumed that the sample is representative of the German population. Nevertheless, bias can be minimised by the quotas in the sample and a wide range of statements can be expected.

The qualitative statements of the interviewees were then digitally recorded and coded using MAYRING'S method of content analysis [18]. On the basis of the coding, the statements can be categorised. It is then possible to record and interpret qualitative data statistically. The statistical data serve to provide a simplified interpretation of the qualitative results.

### Results

#### Sample composition

There were 103 interviewees,<sup>5</sup> with a mean age of 43 years. Sixty-six (66) were female and 37 male. The total group consisted predominantly of persons with higher formal education, including about 60 % with the Abitur [roughly A-Levels] or a degree from a university or technical college. The mean size of the household of the interviewees was 2.3 persons. The income per household was evenly distributed. There was no trend towards a large group with higher or lower income within the sample.

Thus, the rules for the sample according to quota and the distribution of the sociodemographic variables must be rated as good. In accordance with the guideline, the following dimensions were used for data evaluation (♦ Overview 1).

#### Purchasing behaviour and routines

The study showed that most of the interviewees thought about their purchase in advance. Even without a shopping list, they had at least a "mental list". Although most of the interviewees used a list, most of them (60 %), spontaneously selected products in the market. 14 % of the participants stated that they always purchased the same products and brands.

Although food purchase was apparently well planned, only 5 % of interviewees sought information in the Internet or with other media about how “their” food was manufactured or composed.

### Selection and acceptance of new products

By combining open and closed questions to record favoured product characteristics, it was possible to obtain an unbiased overview of personal preferences. The results from these two types of question will now be presented separately.

### Evaluation of open questions

78 % of interviewees stated that the price was the most important purchase motive for them. In second place, the freshness of the food was important. Fruit and vegetables that do not appear fresh is generally not selected. One third of the interviewees also thought it important that the transport distances should be short and tended to prefer regional products<sup>6</sup> and products for which the country of origin is clearly marked and which are prepared in an environmentally friendly manner.

After price, freshness and region of origin, the interviewees gave the taste in fourth place. If a product had a relatively poor taste the first time it was purchased, it tended not to be purchased again. Barely a quarter of all interviewees generally checked the ingredients of the foods and preferred natural products with as few additives as possible. Barely a quarter of all interviewees thought it important that the products should look attractive and be attractively presented in the sales room.

### Evaluation of closed questions

In contrast to the open questions, the price appeared to be secondary in

#### I Purchasing behaviour and routines

- Planning the purchase
- Intensity of preoccupation with foods
- Selection of foods
- Favoured product characteristics

#### II Selection and acceptance of new products

- Awareness of new products
- Food labelling

#### III Image assessment of pulses

- Awareness of the term “pulses”
- Associations of the term “pulses”
- Influence of negative characteristics of pulses on purchasing behaviour

#### Overview 1: Overview of dimensions recorded

comparison to other criteria such as freshness and taste (◆ Figure 2). Taste is considered to be very important here and can be interpreted as one of the most important product characteristics. In the closed interview too, regional origin (regionality) was mentioned comparatively often and can, in general, be regarded as a decisive criterion. The distribution of the other criteria was in accordance with the answers to the open questions.

### Product positioning and social environment

The great majority of all interviewees (85 %) noticed new products directly within the shop and largely by chance.

Aside from the position in the market, the social environment was the second most important influence on the purchase of new products. Just over half of the interviewees stated that they tried out new products if they had been recommended by friends, acquaintances or the family. According to 47 % of the interviewees, they could be explicitly led to

purchase new products by advertising in daily newspapers or magazines or in the market advertising brochures. Other media, such as the Internet (5 %) and radio (10 %) appeared to have little influence on purchasing decisions within this area.

### Image assessment of pulses

#### Familiarity with the term “pulse”

The term “pulse” was familiar to most interviewees (80 %)<sup>7</sup>, who mostly defined it as the classical vegetables, such as peas, lentils or beans. Another 14 % of the interviewees recognised the term, but were not certain which sorts of vegetable it referred to. 6 % of the interviewees did not know what the term meant.

Most of the interviewees tended to be familiar with just the classical vegetables. None of the interviewees mentioned other pulses, such as broad beans, field peas or lupins.

#### Associations of the term “pulse”

The interviewees most often described pulses as containing vitamins, roughage and protein. They were therefore “good for the body”.<sup>8</sup>

Secondly, dishes in which pulses are used – e. g. lentil soup, bean soup and stews – were described as “delicious”. However, 9 % of the interviewees regretted that the preparation was too demanding, as they hardly had any recipes and, for example, soaking the vegetables during the preparation took too much time.

<sup>6</sup>The term regionality was defined in this study as the production of products within Germany, with the predominant use of ingredients and product components from Germany.

<sup>7</sup>Open questions in the guideline: 6 a) What does the term “pulses” mean to you? (please list pulses).

<sup>8</sup>Question 6 b) What do you associate with the consumption of pulses? 6 c) Does this characteristic influence your purchasing behaviour? Give a characteristic with a negative image? If yes, which one? Why? ►

Influence of the negative properties of pulses on purchasing behaviour

On the basis of this survey, it appears that the negative property of flatulence hardly inhibits the purchase of pulses. Although 31 persons stated that pulses caused them to have digestive problems, only 14 persons would not consume pulses because they caused flatulence. Of the 20 % of interviewees who generally consumed no pulses, the main obstacles to consumption were the taste and the demanding preparation. Taken together, the favourable association of pulses were much stronger than the unfavourable associations.

**Discussion**

Because of the deliberate selection of persons at different sites, there is no adequate guarantee that each person had the same chance of being selected for the study group. The qualitative data was quantified, in order to simplify the presentation and interpretation of the distributions. This cannot be generalised to the total German population.

In order to minimize possible bias (e. g. the effects of social desirability), the interviewers were trained in advance. The interviewers were adapted

to the ethnographic situation (clothes, behaviour), in order to minimize the distance between the interviewers and the interviewees [19]. Nevertheless, the differences in the result with the criterion of “price” imply that the social desirability did play some role in the closed question. The results of the open question showed that the interviewees were then less inhibited in giving the price as a criterion for selecting foods and that it can be assumed that the results are valid.

The results of the study showed no significant differences between different groups of persons with respect to the evaluation of product characteristics.<sup>9</sup>

The objective of this study was to record the fundamental obstacles and barriers that people experience when selecting foods. It can be concluded that the survey method has achieved this objective in a scientific manner.

**Conclusions and recommendations for actions for the sale of pulses**

Customers regard price, freshness and sustainability as important arguments for purchase. On closer examination, it becomes clear that health

maintenance is also an important aspect.

Pulses, such as beans, peas and lentils, are known to provide very healthy nutrition and can be cultivated in an environmentally friendly manner. These two strong points could be emphasised in marketing. In addition, the regionality could be stressed – e. g. through a reference to local farmers or to special local pulses. Extensive marketing campaigns could refer to the reduction in CO<sub>2</sub> emission in comparison to the production of animal proteins, as well as the favourable effects on the local earth. Moreover, as the negative associations with flatulence and difficulties in preparation are relatively minor, the term “pulse” can be used as a positive sales argument. In order to minimise problems with the difficult preparation of pulses, it would evidently be possible to develop instant products and to include simple recipes or describe these on the packaging.

Although many consumers are generally aware of the term “pulses”, their knowledge of other sorts, such as broad beans and lupins, is very limited. Marketing innovative products based on less well known types of grain legumes presents a great challenge. A successful strategy would require knowledge transfer and transparent communication with the consumer.

Many consumers reported that they tended to base their selection of products on appearance, touch and smell.

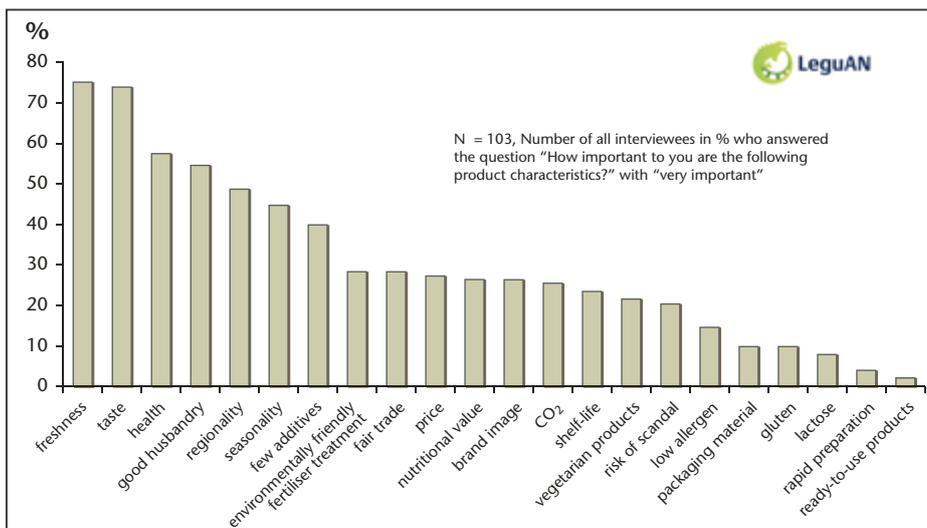


Figure 2: Properties with a favourable effect on product selection

<sup>9</sup>Calculation of the Pearson correlation gave weak, but significant, correlations between the parameters income and fewer food additives, food labels, CO<sub>2</sub> and environmentally friendly fertiliser treatment, with value of r = 0.23–0.29. Thus, persons in the higher income range tend to favour products with fewer additives, better CO<sub>2</sub> balance and more environmentally friendly fertiliser treatment. Nevertheless, no reliable statement on this issue can be made, due to the number of cases and the qualitative procedure used in this study.

However, this reliance on the senses<sup>10</sup> does not necessarily permit any conclusion about the actual product properties. When considering this evaluation, it should be remembered that pulses are mostly presented to the consumer in a processed form. This may reduce the favourable perception by the senses.

For example, information on the packaging may then be helpful and provide useful hints.

The statements and suggestions from the interviewees suggest that the marketing of pulses might focus on advertising supplements and newspapers, with support from viral marketing or oral propaganda. As purchasing behaviour is greatly influenced directly within the shopping centre, it would be sensible to promote advertising here.

Selling pulses under the individual market labels<sup>11</sup> (particularly with reference to nature or health) should have a favourable effect on purchasing behaviour.

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#### Conflict of Interest

Dipl. Soz.-tech. Susann Klemcke is Project Manager at YOUSE GmbH.  
 Prof. Dr. Sascha Rohn is Project Coordinator of the LeguAN Research Project.  
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## References

1. Young VR, Pellett PL (1994) Plant proteins in relation to human protein and amino acid nutrition. *The American Journal of Clinical Nutrition* 59: 1203–1212
2. Siah SD, Konczak I, Agboola S et al. (2012) In vitro investigations of the potential health benefits of Australian-grown faba beans (*Vicia faba* L.): chemopreventative capacity and inhibitory effects on the angiotensin-converting enzyme, -glucosidase and lipase. *British Journal of Nutrition* 108: 123–134
3. Whitlock KA, Kozicky L, Jin A et al. (2012) Assessment of the mechanisms exerting glucose-lowering effects of dried peas in glucose-intolerant rats. *British Journal of Nutrition* 108: 91–102
4. Fruhbeck G, Monreal I, Santidrian S (1997) Hormonal implications of the hypocholesterolemic effect of intake of field beans (*Vicia faba* L.) by young men with hypercholesterolemia. *American Journal of Clinical Nutrition* 66: 1452–1460
5. Macarulla MT, Medina C, De Diego MA et al. (2001) Effects of the whole seed and a protein isolate of faba bean (*Vicia faba*) on the cholesterol metabolism of hypercholesterolaemic rats. *British Journal of Nutrition* 85: 607–614
6. Yang B, Chen Y, Xu T et al. (2011) Systematic review and meta-analysis of soy products consumption in patients with type 2 diabetes mellitus. *Asia Pacific Journal of Clinical Nutrition* 20(4): 593–602
7. Bazzano LA, Thompson AM, Tees MT et al. (2011) Non-soy legume consumption lowers cholesterol levels: a meta-analysis of randomized controlled trials. *Nutrition, Metabolism & Cardiovascular Diseases* 21(2): 94–103
8. Weisse K, Brandsch C, Zernsdorf B et al. (2010) Lupin protein compared to casein lowers the LDL cholesterol: HDL cholesterol-ratio of hypercholesterolemic adults. *European Journal of Nutrition* 49(2): 65–71
9. Dahl WJ, Foster LM, Tyler RT (2010) Review of the health benefits of peas (*Pisum sativum* L.). *British Journal of Nutrition* 108: S3–S10
10. Deutsche Agrarforschungsallianz-Fachforum: Leguminosen als notwendiger Baustein in einer zukunftsfähigen deutschen Land- und Ernährungswirtschaft. URL: [www.dafa.de/fileadmin/dam\\_uploads/images/Veranstaltungen/FF\\_Leguminosen/ff\\_leguminosen-kernziel\\_forschungsansaeetze.pdf](http://www.dafa.de/fileadmin/dam_uploads/images/Veranstaltungen/FF_Leguminosen/ff_leguminosen-kernziel_forschungsansaeetze.pdf) Zugriff 12.07.12
11. Specht M (2009) Anbau von Körnerleguminosen in Deutschland – Situation, limitierende Faktoren und Chancen. *Journal für Kulturpflanzen* 61(9): 302–305
12. Mayer H. Interview und schriftliche Befragung – Grundlagen und Methoden empirischer Sozialforschung. 6. Aufl., Oldenbourg Wissenschaftsverlag GmbH, München (2013)
13. Diekmann A. Empirische Sozialforschung. Grundlagen, Methoden, Anwendungen. 19. Aufl., Rowohlt-Taschenbuchverlag, Reinbek (2008)
14. Max Rubner-Institut. Bundesanstalt für Ernährung und Lebensmittel. Nationale Verzehrsstudie II – Abschlussbericht. MRI, Karlsruhe (2008)
15. Twardawa W. Discounter am Scheideweg – Wie kaufen Kunden künftig ein? GfK Panel Services Deutschland, Eugen Seubert, Nürnberg (2008)
16. Helfferich C. Die Qualität qualitativer Daten. Manual für die Durchführung qualitativer Interviews. VS Verlag, Wiesbaden (2005), S.173
17. Merkens H. Stichproben bei qualitativen Studien. In: Friebertshäuser B, Pregel X (Hg). Handbuch Qualitative Forschungsmethoden in der Erziehungswissenschaft. Juventa, Weinheim (2003), S. 97–106
18. Mayring P. Qualitative Inhaltsanalyse: Grundlagen und Techniken. Beltz Verlag, Weinheim/Basel (2010)
19. Behnke J, Baur N. Empirische Methoden der Politikwissenschaft. 2. Aufl., UTB, Schöningh (2006)

<sup>10</sup>When the consumer evaluates product freshness, he rarely has data on the production period available and usually acts “as he feels”.

<sup>11</sup>Question in the guideline: 5) In your opinion, which labels are responsible? (Do you trust labels?) – Almost a third of the interviewees (31 %) considered that food labelling was responsible and trusted this. There was a strong tendency in favour of the company brand of the place of purchase. Company brands are products sold under the trademark of the place of purchase.

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