

Author's summary of scientific achievements

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1 PERSONAL DETAILS

Marta Sajdakowska

2 DIPLOMAS HELD (ACADEMIC DEGREES)

- **Doctor of Agricultural Sciences**, discipline: Food Technology and Nutrition, specialization: Human Nutrition, Faculty of Human Nutrition and Consumer Sciences, SGGW in Warsaw, 2003, PhD dissertation: *The Impact of the Product's Country of Origin on Consumer Behaviour on the Food Market*
Thesis promoter: prof. Krystyna Gutkowska
Reviewers: prof. Ewa Babicz-Zielińska; prof. Barbara Kowrygo

- **M. Sc. (Eng.)**, major: Food Technology and Human Nutrition, Faculty of Human Nutrition and Home Economics, SGGW in Warsaw, 1999, Master's dissertation: *Knowledge of Consumer Rights on the Food Market in the Light of Interview Surveys*
Thesis promoter: prof. Irena Ozimek.

3 EMPLOYMENT RECORD

- **Assistant Professor**, Research Unit of Consumption, Department of Organisation and Consumption Economics, Faculty of Human Nutrition and Consumer Sciences, **SGGW w Warsaw**, from 2008 until now;
- **Assistant Lecturer**, Research Unit of Consumption, Department of Organisation and Consumption Economics, Faculty of Human Nutrition and Consumer Sciences, **SGGW w Warsaw**, from 2006 to 2008;
- **Lecturer and thesis promoter - University of Ecology and Management** – from 2004 to 2008;
- **Trainee - Sanitary and Epidemiological Section/Main Sanitary Inspectorate** – from 2004 to 2005.

4 ACHIEVEMENTS CONSTITUTING GROUNDS FOR POST- DOCTORAL PROCEEDINGS

4.1 Title of scientific achievement

Under the Article 16 item 2 of the Act of 14 March 2003 on the Academic Degrees and Academic Title as well as the Art Degrees and Title (Journal of Laws of 2017 item 1789), according to Article 179, item 2 the Regulations introducing the Act - Law on Education and Science (Journal of Laws of 2018 item 1669), the scientific achievement is a cycle of 6 scientific publications related to the core subject:

“Determinants of Consumer Acceptance of Quality Changes in Selected Food Products”

4.2 Publications presenting research findings constituting post-doctoral achievement:

(numbering according to Appendix 3, item I.B.)

1. **Sajdakowska M.**, Jankowski P., Gutkowska K., Guzek D., Żakowska-Biemans S., Ozimek I. 2018. Consumer Acceptance of Innovations in Food: A Survey Among Polish Consumers. *Journal of Consumer Behaviour*. 17, 253-267.

<https://doi.org/10.1002/cb.1708>.^{1 2}

IF₂₀₁₈=1,659; MNiSW points: 25

2. Gutkowska K., **Sajdakowska M.**, Żakowska-Biemans S., Kowalczyk I., Kozłowska A., Olewnik-Mikołajewska A. 2012. Poziom akceptacji zmian na rynku żywności pochodzenia zwierzęcego w opinii konsumentów (The Level of Acceptance of Changes on the Market of Food of Animal Origin According to Consumers). *Żywność, Nauka, Technologia Jakość*. 5 (84), 187-202.³

IF₂₀₁₂=0,190; MNiSW points: 15

¹ Publication as part of the Biofood project - innovative and functional products of animal origin (POIG.01.02-14-090/09-00).

² Findings of research performed in 2004 were funded in the form of MNiSW grant, Consumer Behaviours on the market of selected goods and services.

³ Publication as part of the project - as in footnote 1.

3. **Sajdakowska M.**, Gębski J., Gutkowska K., Żakowska-Biemans S. 2018. Importance of Health Aspects in Polish Consumer Choices of Dairy Products. *Nutrients*. 10, 1007, 1-12.
<https://doi.org/10.3390/nu10081007>.⁴
IF₂₀₁₈=4,196; MNiSW points: 35
4. **Sajdakowska M.**, Jeżewska-Zychowicz M. 2017. Postawy konsumentów wobec pieczywa a postrzeganie chleba z dodatkiem błonnika (Consumers' Attitudes to Bread and Perception of Bread with Added Fibre). *Żywność, Nauka, Technologia, Jakość*. 24, 4 (113), 113-125.
<https://doi.org/10.15193/zntj/2017/113-215>.⁵
IF₂₀₁₇=0; MNiSW points: 13
5. **Sajdakowska M.**, Królak M., Zychowicz W., Jeżewska-Zychowicz M. 2018. Acceptance of Food Technologies, Perceived Values and Consumers' Expectations towards Bread. A Survey among Polish sample. *Sustainability*. 10, 1281, 2-16.
<https://doi.org/10.3390/su10041281>.⁶
IF₂₀₁₈=2,075; MNiSW points: 20
6. **Sajdakowska M.**, Gębski J., Żakowska-Biemans S., Jeżewska-Zychowicz M. 2019. Willingness to eat bread with health benefits: habits, taste and health in bread choice. *Public Health*. 167, 78-87.
<https://doi.org/10.1016/j.puhe.2018.10.018>.⁷
IF₂₀₁₉=1,441; MNiSW points: 25

A total of publications constituting a scientific achievement has obtained **133** points according to MNiSW scoring system and a total **IF** according to their publishing year has amounted to **9.561**.

⁴ Publication as part of the project - as in footnote 1.

⁵ Publication as part of the Bioproducts project - innovative technologies of production of bakery products and low-calorie pasta (POIG.01.03.01-14-041/12).

⁶ Publication as part of the project - as in footnote 5.

⁷ Publication as part of the project - as in footnote 5.

I am a leading and corresponding author of 5 publications. My contribution to the above mentioned papers has been presented in Appendix 3, co-authors' statements have been presented in Appendix 4 and full texts in Appendix 5.

4.3 Presenting the scientific objective of the papers and obtained findings along with discussing their potential use

4.3.1 Introduction

Food quality depends on the objective characteristics of a product and on its subjective assessment. A consumer expects from food to be of high quality and therefore safe for health, nutritionally adequate and highly attractive in terms of its sensory properties [Baryłko-Pikielna, 1998]. However, it is not easy to define the consumer's way of understanding the quality as it comprises a sequence of characteristics whose meaning is different depending on the socio-demographic profile of a consumer and a kind of product [Jeznach, 2014]. The statement therefore proves a subjective way of defining food quality, so-called „consumer – oriented quality”, where the quality is emphasized as the degree to which a product meets the consumer's expectations [Oude Ophius and Trijp, 1995; Becker, 2000; Baryłko-Pikielna, Wasiak-Zys, 2004].

The perception of food quality by consumers includes characteristics relating to sensory, health, comfort and processing elements, which most often cannot be assessed at the point of sale but only after the product has been consumed (sensory and convenience aspect). In respect of some products, these are entirely the variables based on trust and therefore it is difficult to assess them even after a given product has been consumed. To sum up, the perception of food quality can be defined as a general set of consumer's expectations towards a product quality expressed in a shop and satisfaction or a lack of satisfaction during the process of preparing and consuming food [Bredahl, 2003].

A Total Food Quality Model (TFQM) is available in the literature [Grunert, 2006]. It concerns the quality from a consumer's perspective and includes their expectations (so-called expected quality) and the extent to which a given product meets these expectations (so-called experienced quality).

Consumer's expectations towards food quality are based on a number of factors, so-called intrinsic quality cues and extrinsic quality cues [Grunert, 2002; Grunert et al., 2003]. Intrinsic quality cues relate to physical characteristics of a product (e.g. appearance) and

extrinsic quality cues relate to the remaining aspects of a product e.g. its price, a kind of a shop at which a purchase has been made, consumer's claims or demands towards a product or a brand. After a purchase has been made, e.g. during preparing and/or consuming a meal, a consumer assesses the experienced quality, which often differs from the expected one. The link between expected and experienced quality is regarded as a factor determining consumer's satisfaction from a product and a factor defining the probability of making a purchase once again [Grunert, 2002].

In theoretical models relating to a choice of food, a set of various factors regarded as important is indicated. Shepherd [1985] mentions factors relating to food and an socio-economic environment, while Grunert et al. [1993] concentrates on the perception of selected aspects in relation to food and nutrition, such as motives for making a purchase, quality attributes and ways of preparing and consuming a meal (so-called food-related lifestyle, FRL). In the subject literature it is indicated that consumers' opinions towards food products and technologies used in their production play a major role in purchasing decisions on the food market [Ares and Gámbaro, 2007; Bruhn, 2007; Vassallo et al., 2009], and the importance of particular factors in a decision making process for many new food products differs depending on a kind of innovation and its acceptance on the market [Barrena and Sánchez, 2013]. In case of meat and meat products [Font-i-Furnols and Guerrero, 2014; Henschion et al., 2014] as well as milk and dairy products [Grunert et al., 2000; Bimbo et al., 2017; Rahnama and Rajabpour, 2017], there are a number of factors which influence consumers' choices, including those related to decisions made by Polish consumers [Gutkowska and Ozimek, 2005; Gutkowska and Ozimek, 2008; Gutkowska et al. 2014], and those regarding innovations in food [Olewnik-Mikołajewska et al., 2016a; Olewnik-Mikołajewska et al., 2016b]. With regard to food, consumers are increasingly seeking products of appropriate nutritional value and health properties [Gutkowska and Ozimek, 2005; Hoefkens et al., 2011].

Except for changes in products of animal origin, the next example of changes of an innovative nature which can be perceived by consumers as having a beneficial influence on human's health, is increasing the fibre content in food. The importance of selected fractions of dietary fibre in preventing civilization diseases among some consumer groups is emphasized in the literature [Schulze et al., 2007; Kristensen and Jensen, 2011]. Increasing the amount of fibre through adding it to products may result in the increase in their acceptance by consumers [Baixauli et al., 2008], and meeting consumer's expectations may prompt a repeat purchase and balance possible negative purchase experience or circumstances [Brunsø et al., 2002]. In a Polish customer survey on white bread with added fibre, a majority of the surveyed have

noticed the benefits resulting from consuming such bread, and almost a half of these respondents have defined these benefits as substantial [Jeżewska-Zychowicz, 2013].

The consumers' attitude towards market innovations, and therefore their readiness to purchasing new products is a consequence of their specific personality trait, which can be called innovativeness. Consumer innovativeness is a time function of adapting an innovation, which makes people who react to novelties positively and as the first ones are those of high level of innovativeness [Gutkowska and Ozimek, 2005]. Acceptance of market innovations is a complex process, determined by many factors. Among those factors it is crucial to indicate sociodemographic features, as well as psycho-social features that relate to individual perception of reality, including expected benefits and risks associated with the consumption of a food product [Jeżewska-Zychowicz et al., 2013].

A variety of factors influencing consumers' purchasing decisions and attaching importance to the attributes of food quality, including food of innovative nature, encourages seeking research methods which can show effectively what conditions shape present consumer behaviours on the food market.

4.3.2 Research aim and hypotheses

The aim of the presented scientific achievement has been to determine consumer acceptance of changes in quality in selected food products.

Specific aims included:

- to identify the level of acceptance of changes in selected groups of food products;
- to define the importance of socio-demographic characteristics in the acceptance of changes in the food market;
- to define the importance of psycho-social factors in the acceptance of changes in the food market;
- to define the importance of changes which are perceived by consumers as having health benefits and which have been introduced in selected groups of food products.

In the context of formulated aims, the following main hypothesis has been adopted:

Changes in food products oriented towards health attributes of food increase consumer acceptance of these products, which can result from the increase in consumers' knowledge on the relationship between nutrition and health.

In addition, 4 specific hypotheses have been formulated, reading as follows:

1. The level of acceptance of introduced innovations in the food depends on the nature of these changes, more specifically on the fact whether these innovations are about enriching the food or about reduction in certain components.
2. Selected socio-demographic variables, particularly sex, age and education differentiate the level of acceptance of changes in food.
3. The prevalence of a health-conscious attitude towards cereal products rather than a hedonistic one prompts to seek bread with a higher fibre content, whereby past experience with a food product may restrict the acceptance of these changes.
4. Consumer acceptance of innovative products depends mainly on choosing the right consumer segment and the appropriate way of communicating the marketing message.

4.3.3 Review of findings

4.3.3.1 The level of acceptance of increasing the quality of food of animal origin

Publications

I.B.1. Sajdakowska M., Jankowski P., Gutkowska K., Guzek D., Żakowska-Biemans S., Ozimek I. 2018. Consumer acceptance of innovations in food: A survey among Polish consumers. *Journal of Consumer Behaviour*. 17, 253-267.

<https://doi.org/10.1002/cb.1708>.

IF₂₀₁₈=1,659; punkty MNiSW: 25

I.B.2. Gutkowska K., **Sajdakowska M.**, Żakowska-Biemans S., Kowalczyk I., Kozłowska A., Olewnik-Mikołajewska A. 2012. Poziom akceptacji zmian na rynku żywności pochodzenia zwierzęcego w opinii konsumentów (The Level of Acceptance of Changes on the Market of Food of Animal Origin According to Consumers). *Żywność, Nauka, Technologia Jakość*. 5 (84), 187-202.

IF₂₀₁₂=0,190; punkty MNiSW: 15

I.B.3. Sajdakowska M., Gębski J., Gutkowska K., Żakowska-Biemans S. 2018. Importance of Health Aspects in Polish Consumer Choices of Dairy Products. *Nutrients*. 10, 1007, 1-12.

<https://doi:10.3390/nu10081007>.

IF₂₀₁₈=4,196; punkty MNiSW: 35

During the first years following the accession of Poland to the EU, when making a purchasing decision on the food market, consumers attached a relatively high importance to the price and the ease of food preparation, and relatively low - to the level of food processing, an organic production method, the level of sugar in food and its energy value [Gutkowska and Ozimek, 2005]. This sequence of factors taken into consideration by consumers has changed over the last few years. Comparing findings of consumer surveys performed on national samples in 2004⁸ and 2011⁹, (**publication I.B.1.**) indicates a few significant differences between 2004 and 2011. The organic production method was pointed as the least important in 2004, and as the most important in 2011, whereas the ease of food preparation appeared to be of less importance. The growing importance of the organic production method in Poland can stem from increasing supply of food from this production type, which results from beneficial effect of subsidies on organic farming, which Poland has been granted as a member of the EU. Food origin as well as low fat and sugar content obtained higher notes in 2011 and were in the major group of factors taken into consideration in a decision making process, which can result from increasing knowledge on a healthy lifestyle and from a growing importance of the country of origin, thus consumer ethnocentrism in Poland [Sajdakowska and Gutkowska, 2014]. A growing wealth of the Polish society in 2004-2011 enabled Polish consumers to

⁸ Size sample N=992

⁹ N=858

spend more money on travelling abroad and experiencing culinary heritage of other countries (**publication I.B.1.**). The analysis of consumer behaviours towards food of animal origin in 2011 enabled identifying 4 consumer segments: (1) who definitely rejected innovations, (2) who rejected rather than accepted innovations, (3) who accepted rather than rejected innovations, (4) who definitely accepted innovations. A consumer segment of those who definitely *accept innovations* was more willing than other segments to accept the purchase of new food products (*I like to buy new and different products*) and their culinary attractiveness understood as a search and trying new food products at social occasions (*At dinner parties, I will try new food*) and trying food products from different cuisines (*I like foods from different countries*).

From 2004 to 2011, a generation of Poles growing up in a free-market economy became fully independent consumers, forming a consumer group which, compared to an older generation of Polish consumers, is more open to innovations and has a wider choice of products in the market than it was ever before possible. Simultaneously, there was a rise in innovation of food producers, who modified their offer in accordance with changing expectations and consumer preferences. Moreover, a consumer group of higher level of education and income increased their market share, including the consumers who show their interest in a nutrition value and its impact on health.

The above mentioned conclusions have been confirmed by further consumer surveys (**publication I.B.2**) on acceptance of changes in food of animal origin conducted as part of “Biofood” project (**project II.G.3. survey ‘a’**¹⁰). In the research a relatively high level of acceptance of majority of presented innovations made in this food category has been observed. It should be noted that the declared acceptance of these changes has been of a dual nature, characterized by the fact that changes consisting in decreasing the content of ingredients which may have a negative impact on health or general well-being of a person have gained more acceptance, whereas enriching food, even if it could lead to a positive impact, have been accepted to a lesser degree. Another important finding is the regularity indicating the fact that the level of acceptance of innovations in food products of animal origin depends on the socio-demographic characteristics of consumers. In this regard, a convergence of a socio-demographic profile of innovators and variables in this profile described as determinants of a higher level of acceptance of innovations in food of animal origin has been observed.

¹⁰ N=1000

Variables such as age, education and income in a household are of a particular importance due to their level of contribution to the acceptance (**publication I.B.2.**).

In order to specify in more detail the level of acceptance of changes in food by Polish consumers, in the next stage of research it has been decided to analyze and assess this issue with regard to a selected group of products, i.e.: dairy products (**project II.G.3, survey ‘b’¹¹, publication I.B.3.**). A segmentation analysis has enabled identifying 4 consumer segments: Enthusiastic, Involved, Ultra-involved and Neutral.

Enthusiastic have attached more importance to the influence of dairy products on the immune system and have been more willing to agree with the opinion that dairy products are a source of minerals and vitamins. Ultra-involved and Involved have been less concerned about health properties of dairy products compared to other segments, however, Ultra-involved have been more quality-oriented than Involved. Neutral have been more open to accepting changes in the market of dairy products and relatively more interested in purchasing innovative dairy products. Neutral have indicated lower selection levels regarding the health benefits of dairy products.

An original cognitive value of the research lies in identifying consumer segments who have shown a different level of interest in innovations with respect to food. An applicable dimension of the research lies in the possibility of using the research findings in marketing activities of companies operating on the food market. When a dairy product is aimed at consumers belonging to a Neutral segment, a communication strategy should emphasize its health benefits, and quality in general should be highlighted when a product is aimed at Ultra-involved.

4.3.3.2 The importance of socio-demographic variables in acceptance of changes in the food market of animal origin

Publications

I.B.1. Sajdakowska M., Jankowski P., Gutkowska K., Guzek D., Żakowska-Biemans S., Ozimek I. 2018. Consumer acceptance of innovations in food: A survey among Polish consumers. *Journal of Consumer Behaviour*. 17, 253-267.

<https://doi.org/10.1002/cb.1708>.

IF₂₀₁₈=1,659; punkty MNiSW: 25

I.B.2. Gutkowska K., Sajdakowska M., Żakowska-Biemans S., Kowalczyk I., Kozłowska A., Olewnik-Mikołajewska A. 2012. Poziom akceptacji zmian na rynku żywności pochodzenia zwierzęcego w opinii konsumentów (The Level of Acceptance of Changes on the Market of Food of Animal Origin According to Consumers). *Żywność, Nauka, Technologia Jakość*. 5 (84), 187-202.

IF₂₀₁₂=0,190; punkty MNiSW: 15

¹¹ N=983

Based on various research and researchers' opinions available in the subject literature, multiple conditions of consumer innovation can be stated [Gutkowska and Ozimek, 2008; Kowalczyk, 2011]. Their tendency to accept innovations and consequently to purchase new products depends on variables characterizing a consumer and typical of a given product or a category. It has been noted that younger consumers who are better educated and have a higher income are more often early innovators [Gutkowska and Ozimek, 2008; Żakowska-Biemans et al., 2013]. A bigger tendency to accept innovations in dairy products than in meat and meat products has been observed [Kowalczyk et al., 2013].

Introducing products to the market is connected with a relatively high risk for an entrepreneur, therefore it is vital to recognize a set of criteria for consumer choices. In the light of research findings (**publication I.B.1.**), sex did not differentiate consumers' opinions on innovation in 2004 and 2011. However, a significant importance of age was observed. Both in 2004 and 2011 the innovation level was decreasing with the age of the surveyed showing that the younger consumers were, the higher their innovation level was. A significant impact of education was noted, however in 2011 the impact of education was more significant compared with 2004. In addition, the income level differentiated significantly the level of consumer innovation for both research periods, showing that the income level increased in line with the level of innovation of the surveyed. The importance of a place of residence was not confirmed, i.e. the fact that consumers living in big cities showed a higher level of innovation compared with those who live in smaller cities and towns was not noted.

Findings presented in the research on the level of acceptance of changes in food market of animal origin (**publication I.B.2.**) have confirmed the influence of majority of socio-demographic variables, which has validated the conclusion that the level of acceptance of innovations applied in this food category depends on the socio-demographic characteristics of consumers. The convergence of a socio-demographic profile of innovators and variables considered in this profile has been observed as a determinant of a higher level of acceptance of innovation applied in a product of animal origin. The findings have confirmed the statement that younger consumers with higher income and better education have declared a higher level of acceptance of most changes in food of animal origin. A significant cognitive value of conducted studies lies in the statement that respondents from bigger cities have shown higher level of acceptance of changes in food of animal origin. The above mentioned statement can be of applicable value for entrepreneurs operating on innovative food market who seek target consumers living in an area of a given size.

4.3.3.3 The importance of selected factors in a decision-making process when buying bread with higher fibre content

Publications

I.B.4. Sajdakowska M., Jeżewska-Zychowicz M. 2017. Postawy konsumentów wobec pieczywa a postrzeganie chleba z dodatkiem błonnika (Consumers' Attitudes to Bread and Perception of Bread with Added Fibre). *Żywność, Nauka, Technologia, Jakość*. 24, 4 (113), 113-125.

[https://doi: 10.15193/zntj/2017/113-215](https://doi.org/10.15193/zntj/2017/113-215).

IF2017=0; punkty MNiSW: 13

I.B.5. Sajdakowska M., Królak M., Zychowicz W., Jeżewska-Zychowicz M. 2018. Acceptance of Food Technologies, Perceived Values and Consumers' Expectations towards Bread. A Survey among Polish sample. *Sustainability*. 10, 1281, 2-16.

[https://doi: 10.3390/su10041281](https://doi.org/10.3390/su10041281).

IF2018=2,075; punkty MNiSW: 20

I.B.6. Sajdakowska M., Gębski J., Żakowska-Biemans S., Jeżewska-Zychowicz M. 2019. Willingness to eat bread with health benefits: habits, taste and health in bread choice. *Public Health*. 167, 78-87.

<https://doi.org/10.1016/j.puhe.2018.10.018>.

IF2019=1,441; punkty MNiSW: 25

Similarly as in the case of products of animal origin, when it comes to cereal products the extent to which selected variables can differentiate consumers' opinions in the process of buying food has been assessed. The analysis of available findings of own research (**publication I.B.4., project II.G.5.**) has indicated that the most important factors considered by respondents while buying bread have been as follows: taste, freshness, 'use by' date and general appearance. In the research discussed it has been checked if respondents' sex differentiated opinions on determining factors when buying bread. For women, significantly more important than for men have been: general appearance of bread, its content, calorific value, additives, information on the package and the package itself. The analysis of findings included in the next publication (**publication I.B.6.**¹²) has confirmed the findings on the most important factors in choosing bread (freshness, taste, naturalness and health benefits) obtained in other surveys (**publication I.B.4.**). Further factors have been mentioned such as: price, 'use-by' date, knowledge of the product, appearance, added grains and fibre. It has appeared, however, that sex has not differentiated opinions on the level of consumption of bread with added fibre content (**publication I.B.6.**). It should be emphasized, though, that men have been less willing than women to consume bread with a lower salt content, which may indicate the fact that women are more interested in the influence of food on health.

The analysis of the importance of technologies used in cereal products production (**publication I.B.5.**) has indicated that more men than women have shown a positive attitude to technologies which are used to increase the nutritional value of cereal and cereal products.

¹² N=1014

Such a regularity has been noted mainly with regard to Enthusiastic segment, which has comprised more men compared to other segments. The influence of selected values on consumer choices has been noticed. Traditional have perceived themselves as health- and environment-conscious and giving attention to natural characteristic of food. Consumers from remaining segments (Sceptic and Enthusiastic), however, have not differ significantly in terms of values on natural characteristic of food or being health- and environment-conscious. Both Sceptical and Traditional have declared high concern about the use of new technologies in food production, including concern about the environment, health and natural characteristic of food.

Findings observed are both of cognitive and applicable value, and values mentioned by the consumers from particular segments should be taken into consideration by entrepreneurs in a decision-making process while choosing the right technology used in bread production and with regard to communicating this information to consumers, because as findings of own research suggest, a number of consumers shows a relatively high level of concern about the production method applied.

4.3.3.4 The level of acceptance of changes in food on the example of bread with higher fibre content Publications

II.B.4. Sajdakowska M., Jeżewska-Zychowicz M. 2017. Postawy konsumentów wobec pieczywa a postrzeganie chleba z dodatkiem błonnika (Consumers' Attitudes to Bread and Perception of Bread with Added Fibre). *Żywność, Nauka, Technologia, Jakość*. 24, 4 (113), 113-125.
[https://doi: 10.15193/zntj/2017/113-215](https://doi.org/10.15193/zntj/2017/113-215).
IF₂₀₁₇=0; punkty MNiSW: 13

II.B.5. Sajdakowska M., Królak M., Zychowicz W., Jeżewska-Zychowicz M. 2018. Acceptance of Food Technologies, Perceived Values and Consumers' Expectations towards Bread. A Survey among Polish sample. *Sustainability*. 10, 1281, 2-16.
[https://doi: 10.3390/su10041281](https://doi.org/10.3390/su10041281).
IF₂₀₁₈=2,075; punkty MNiSW: 20

The research has focused also on assessing the level of acceptance of changes in cereal products (**publication I.B.5., project II.G.5.**). Consumer decisions regarding food, as it has been noted in previous parts of the Abstract, are determined mainly by sensory factors and physiochemical properties of these products, including freshness, changes to composition, taste, colour and texture [Pliner and Hobden, 1992; Arvola et al., 2007; Dean et al., 2007; Gellynck et al., 2009; Ginon et al., 2009]. However, the price [Gellynck et al., 2009] and the impact on health [Arvola et al., 2007; Ginon et al., 2009] are perceived as particularly important when choosing a food product, and a consumer tendency to reject or avoid an unknown food product is called food neophobia [Pliner and Hobden, 1992; Siegrist, 2013].

Despite the fact that factors for choosing a cereal products are well recognized in the literature, there is very little research on the expectations from specific products, including bread. Research conducted in **BIOFOOD project (project II.G.5., publication I.B.5.)** provides data, which allow to bridge the gap existing in the literature i.e. tries to answer the question if consumers tend to seek food products of health properties including commonly consumed products such as bread. Food producers are involved in the process of developing new products with higher nutrient content or those produced with new technology in order to meet consumer needs and remain competitive in the food market [Siro et al., 2008; Barrena and Sánchez, 2013]. Cereal products have been intensively improved in the production process in order to obtain food of a higher nutritional value and simultaneously retain its sensory acceptance [Rakcejeva et al., 2007; Calderelli et al., 2008; Vassallo et al., 2009; Shepherd et al., 2012, Afzal et al., 2016]. Changes in cereal products, for example a higher fibre content in white bread, are accepted by consumers [Dean et al., 2007], however the level of acceptance of these changes depends on the kind of a product to which fibre is added [Balasubramaniam and Cole, 2002; Van Kleef et al., 2005].

On the other hand, the need for retaining the natural character of a food product is clearly articulated by consumers [Marquat et al., 2006]. The use of various modern technologies in food production enables improving health benefits as well as other benefits, such as longer shelf life and higher comfort of use. However, consumer acceptance of the technologies used in food production varies depending on the kind of technology used in food production [Cardello et al., 2007; Costa-Font et al., 2008; Cox and Evans 2008; Siergrist et al., 2013], and consumers particularly show their lack of acceptance of using genetically modified organisms in food [Gaskell et al., 2000] and therefore reject, among other things, food produced with the use of GMO.

In order to gather opinions on selected technologies used in the production of cereal products in the research (**project project II.G.5., publication I.B.5.**¹³) 3 consumer segments have been identified: Sceptical, Traditional and Enthusiastic, based on their level of acceptance of technologies used in cereal production. Generally, in the sample researched, a neutral attitude towards technologies used has been presented, a relatively higher acceptance has been shown towards a traditional crossbreeding of various kinds of cereal and the process of enriching with calcium or fibre. Traditional have appreciated the natural properties of food, tradition, environment, quality of life and health compared to consumers from other segments.

¹³ N=1000

Self-perception as a person who values tradition and quality of life has been connected with falling into the Sceptical segment. Both Sceptical and Traditional have declared higher concern about the use of new technologies in food production, including threat to the environment, health, natural properties of food and quality of life. Findings obtained can be applicable and used by bread producers in order to predict demand for these products and by marketing specialists who are responsible for the process of effective product labelling and for communicating appropriate marketing message to the consumers in order to encourage them to purchase these products.

In further research (**publication I.B.4.**¹⁴) in which bread has been used as a product towards which consumer attitudes have been examined, it has been noted that the more health-conscious attitude towards bread consumers have shown, the stronger they have agreed with the opinion that bread with added fibre has better characteristic in terms of taste and value, a higher nutrient content, fewer calories, although it is more expensive as well. With the increased hedonistic attitude, the fact that bread with added fibre has a worse appearance and is less readily available has been emphasized more often. The observed regularity is of high cognitive and applicable value, due to the fact that in case of aiming bread at a given target group (health-conscious attitude vs. hedonistic attitude), it is important to communicate given benefits to the consumers, to use appropriate pricing strategy as well as to sell products through suitable distribution channels.

4.3.3.5 The importance of changes of health nature introduced to food

Publications

I.B.1. Sajdakowska M., Jankowski P., Gutkowska K., Guzek D., Żakowska-Biemans S., Ozimek I. 2018. Consumer acceptance of innovations in food: A survey among Polish consumers. *Journal of Consumer Behaviour*. 17, 253-267.

<https://doi.org/10.1002/cb.1708>.

IF₂₀₁₈=1,659; punkty MNiSW: 25

I.B.2. Gutkowska K., Sajdakowska M., Żakowska-Biemans S., Kowalczyk I., Kozłowska A., Olewnik-Mikołajewska A. 2012. Poziom akceptacji zmian na rynku żywności pochodzenia zwierzęcego w opinii konsumentów (The Level of Acceptance of Changes on the Market of Food of Animal Origin According to Consumers). *Żywność, Nauka, Technologia Jakość*. 5 (84), 187-202.

IF₂₀₁₂=0,190; punkty MNiSW: 15

I.B.3. Sajdakowska M., Gębski J., Gutkowska K., Żakowska-Biemans S. 2018. Importance of Health Aspects in Polish Consumer Choices of Dairy Products. *Nutrients*. 10, 1007, 1-12.

<https://doi.org/10.3390/nu10081007>.

IF₂₀₁₈=4,196; punkty MNiSW: 35

¹⁴ N=1013

I.B.4. Sajdakowska M., Jeżewska-Zychowicz M. 2017. Postawy konsumentów wobec pieczywa a postrzeganie chleba z dodatkiem błonnika (Consumers' Attitudes to Bread and Perception of Bread with Added Fibre). *Żywność, Nauka, Technologia, Jakość*. 24, 4 (113), 113-125.
[https://doi: 10.15193/zntj/2017/113-215](https://doi.org/10.15193/zntj/2017/113-215).
IF₂₀₁₇=0; punkty MNiSW: 13

I.B.5. Sajdakowska M., Królak M., Zychowicz W., Jeżewska-Zychowicz M. 2018. Acceptance of Food Technologies, Perceived Values and Consumers' Expectations towards Bread. A Survey among Polish sample. *Sustainability*. 10, 1281, 2-16.
[https://doi: 10.3390/su10041281](https://doi.org/10.3390/su10041281).
IF₂₀₁₈=2,075; punkty MNiSW: 20

I.B.6. Sajdakowska M., Gębski J., Żakowska-Biemans S., Jeżewska-Zychowicz M. 2019. Willingness to eat bread with health benefits: habits, taste and health in bread choice. *Public Health*. 167, 78-87.
<https://doi.org/10.1016/j.puhe.2018.10.018>.
IF₂₀₁₉=1,441; punkty MNiSW: 25

As it has been emphasised earlier in the study, factors of health nature which consumers understand as a lower level of food additives, fat and salt, higher vitamin and mineral content have been of significant importance in the decision-making process when buying food of animal origin (**publication I.B.1.**). The analysis of findings of further research (**publication I.B.2.**) has confirmed the above findings pointing that the surveyed in general have shown a relatively higher level of acceptance of changes in food of animal origin which involve the reduction in the content of these ingredients of these products which are generally perceived as having a negative impact on health. A relatively high level of acceptance of lowering cholesterol content in food of animal origin has been observed. A lower level of acceptance has concerned adding to food such ingredients as: bacterial cultures to yoghurts, omega-3 acids to yoghurts and mayonnaise, vitamins and mineral elements to prevent nutrition deficits to meat, milk and dairy products or vitamins and mineral content to enrich milk and dairy products.

Findings presented in the following publication (**publication I.B.3.**) have also confirmed the importance of health benefits while choosing food of animal origin, indicating that with regard to dairy products Enthusiastic segment, compared with other segments, have assessed most favourably dairy products due to their beneficial on the immune system and their mineral and vitamin content. Enthusiastic have consistently agreed with the statement that dairy products with a reduced fat content are beneficial for their health. Enthusiastic segment has comprised more women and elderly people who have shown greater awareness in terms of health and a higher level of knowledge on the health aspect of food.

In terms of behaviours concerning cereal products, it has been noted that health benefits are particularly important for consumers while choosing food (**publication I.B.4.**). A health-conscious attitude to a greater extent than a hedonistic attitude has differentiated

opinions on quality distinctive features which respondents considered while buying bread. People who have shown a health-conscious attitude from tertile 3, i.e. people who have shown the highest extent of this attitude, indicated significantly higher assessment with regard to all bread characteristics considered during the buying process. In terms of general appearance, taste and freshness of bread purchased, the surveyed from tertile 3 have expressed a higher importance of these characteristics compared to people from other tertiles.

When it comes to the perception of technologies used in food production, the research conducted has indicated (**publication I.B.5.**) that Traditional and Sceptical have perceived more negative aspects connected with using new technologies. Similar attitudes of consumers from both segments have been connected, as it has been indicated in the earlier parts of the study, with their perception of higher risks for the environment, limited natural properties of food and a negative impact on health.

It has been proven (**publication I.B.6.**) that respondents have shown in general a relatively moderate interest in bread with added health benefits. Those who have regarded taste as an insignificant motive for their choice have been more willing to eat bread with added fibre and a reduced salt content compared to consumers who have considered taste as an important or moderately important motive for their choice (upper and middle tertile). Participants who have perceived health benefits as unimportant (lowest tertile) have been less willing to eat bread with added fibre and a reduced salt content than the others. Significantly higher willingness to eat bread with a reduced salt content and added fibre has been observed among those respondents for whom health benefits have been important (upper tertile). The research has additionally shown that the consumers who have been more willing to eat bread with added fibre have belonged to this group of people who generally attach greater importance to health benefits of cereal products, eat more wholemeal bread and eat bread with added grains more often than other consumer groups. The research has also shown that those who are more willing to eat bread with a reduced salt content belong to this consumer group where general consumption of wholemeal bread has been higher.

To sum up, an interesting research aspect presented in the study lies in the possibility of treating the amount and the kind of consumed bread as a variable which can be connected with the willingness to eat bread with improved health benefits.

Findings obtained are both of cognitive and applicable value and should be taken into consideration while implementing a strategy concerning compulsory reformulation of food product content in order to, among other things, reduce salt content and increase fibre content in the diet of people with special dietary requirements. Research findings may also contribute

to launching a public campaign involving companies operating on the food market, consumer organisations, which will not only raise public awareness but also encourage Polish consumers to consume less salt and more fibre and consequently contribute to the growth in the importance of health benefits of food compared to taste attributes.

4.3.4 Summary of a series of publications

To sum up, the research conducted and presented in a series of publications which constitute the scientific achievement has enabled recognizing conditions of consumer acceptance of changes regarding changing quality of selected food products. Moreover, a complex research approach has enabled performing a comprehensive analysis of the impact of various variables on the acceptance of changes by consumers.

Findings discussed verify positively hypothesis 1. that the level of acceptance of introduced innovations in the food depends on the nature of these changes, more specifically on the fact whether these innovations are about enriching the food or about reduction in certain components, which indicates that entrepreneurs in their activities should focus on improving those ingredients which are perceived as beneficial by consumers and on communicating these changes adequately to the level of knowledge among consumers.

Research conducted has confirmed the validity of hypothesis 2. that selected socio-demographic variables, particularly sex, age and education differentiate the level of acceptance of changes in food, which confirms the necessity to take them into consideration while creating new food products in order to be successful on the market and meet consumers' expectations.

Obtained findings have confirmed hypothesis 3. as well, indicating that a health-conscious attitude towards cereal products rather than a hedonistic one prompts to seek bread with higher fibre content, whereby past experience with a food product may restrict the acceptance of these changes. It seems to be vital while aiming products of this category at a specific consumer profile, as in the opinion of the surveyed, bread with added fibre is characterised not only by better taste characteristics but also by better health attributes and higher nutrient content. Moreover, it is less caloric, but also more expensive. To sum up, producers introducing their products to the market should attach high importance to the characteristics which are important for particular consumer groups in order to attract their attention to those aspects they value.

Discussed research findings verify positively hypothesis 4. as well, which states that consumer acceptance of innovative products depends mainly on choosing the right consumer

segment and the appropriate way of communicating the marketing message. It should be therefore emphasized that producers operating on the food market should pay attention to the quality attributes, among which health benefits are particularly appreciated.

Research undertaken by me has been aimed at determining conditions of consumer acceptance of quality changes of selected food products, and a proposed research approach has contributed to identifying new categories of consumers. Obtained findings will enable creating new products including services which will respond to consumer needs to a greater extent and to a marketing message of companies from food industry. New knowledge on the conditions of consumer behaviours may also be used to develop a policy regarding correct nutrition, as it includes valuable grounds of applicable value on the directions of food product reformulation and their level of acceptance among consumers.

4.3.5 Conclusions

To sum up, a discussion on the conditions of consumer acceptance of changing quality of selected food products provides the following conclusions:

1. Consumer acceptance of quality changes referring to food depend both on socio-demographic variables and on variables connected with consumer's values. It should be therefore noted that while shaping a market offer it is important to address the consumer profile at which a product is aimed at.
2. The complexity of determinants influencing consumer decisions on the food market should be particularly taken into consideration during a decision-making process while introducing changes to food by producers. Particular emphasis should be put on the way in which the information on which food ingredients have been reduced or improved is communicated. The above mentioned activities are already reflected e.g. in appropriate provisions of Food Law, however they still need implementing as a common market practice.
3. Among food attributes, those connected with taste, freshness, product utility, the ease of preparation and the way of production play a major role, however those who have a beneficial influence on health start to play a key role as well. However, due to a complex nature of consumer decisions it is important to strike the right balance between these factors in order to encourage consumers to purchase a product and simultaneously to meet their expectations from a given type of food.

4.4 Literature

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5 REVIEW OF OTHER SCIENTIFIC AND RESEARCH ACHIEVEMENTS

I completed studies in the faculty of Human Nutrition and Consumer Science of the Warsaw University of Life Sciences (SGGW) in 1999 with the highest score, based on passing MA examination with the highest score and on MA dissertation *Knowledge of Consumer Rights on the Food Market in the Light of Interview Surveys*, which obtained the top mark and I was awarded with Master of Science degree. In the same year I started Doctor Studies in the faculty of Human Nutrition and Consumer Science of the Warsaw University of Life Sciences (SGGW), and in 2003 in front of the Scientific Board I presented my PhD dissertation *The Impact of the product's country of origin on consumer behaviour on the food market* under the supervision of prof. Krystyna Gutkowska, and was awarded with a PhD degree of Agricultural Sciences in a discipline of Food Technology and Nutrition.

I started my professional work in 2004 at the University of Ecology and Management as a lecturer delivering practical exercises and lectures from the following subjects: Introduction to Marketing and International Marketing. At the University of Ecology and Management I supervised students' theses on consumer behaviours. In the same year I started to work at Main Sanitary Inspectorate, which enabled me to acquire practical skills regarding food and nutrition. Then in 2006 I started to work at Research Unit of Consumption, Department of Organisation and Consumption Economics cooperating with projects carried out under the 6th Framework Programme (FP6): **Truefood** and **Co-Extra** (respectively: **Traditional United Europe Food**, Traditional Food in the United Europe, GM and non GM-supply chains – their **COEX**istence and **TRAC**eability, Coexistence of genetically modified products and not modified ones and control over their movement in distribution chains). Research work undertaken within these projects as well as active participation in project meetings held by various partners from famous research centres and universities in Europe¹⁵ gave me a chance to extend my knowledge and develop my practical skills regarding research on consumer behaviours, including learning how to use numerous new research methods (quantitative, qualitative methods and methods using the real products, the photos of products and/or the examples of product's labels, so called experimental methods) as well as analytical methods. Part of the above mentioned research methods (i.a. experimental auctions, con-joint

¹⁵ Projects were undertaken in cooperation with i.a.: The Norwegian Institute of Food, Fisheries and Aquaculture Research, Nofima, Norway; Institute of Agrifood Research and Technology IRTA, Spain; L'Institut national de la recherche ergonomique, French National Institute for Agricultural Research INRA, France; Ghent University, Belgium.

analysis) and analytical ones were already used in research conducted in Europe, however at that time they were not commonly used in consumer studies performed on the food market in Poland.

In 2006 I started to work as an Assistant Lecturer at Research Unit of Consumption, Department of Organisation and Consumption Economics of the Warsaw University of Life Sciences (SGGW) and continued research within the above mentioned projects. In the following years I improved my skills through the participation in the following projects: ProoptiBeef, Biofood and Bioproducts, which were co-financed from the European Regional Development Fund (ERDF) under the Operational Programme Innovative Economy 2007-2013. In 2013-2014 as a supervisor and chief researcher I conducted research „The Importance of Consumer Ethnocentrism in Consumer Behaviour on the Food Market” under an internal grant to maintain research capacities.

Regarding my didactic activities, since 2006 I have conducted or co-conducted the following subjects for students of Research Unit of Consumption, Department of Organisation and Consumption Economics: Consumer Protection, Consumer Protection on the Food Market, Food Law, Managing Quality in the Food Chain, New Trends in Consumption, Consumer Behaviours and Market Research on the Food Market. I have also cooperated and jointly conducted classes on Consumer Behaviours for foreign students (Erasmus), as well as delivered classes at Faculty of Economic Sciences and Faculty of Production Engineering of the Warsaw University of Life Sciences (SGGW). In 2016 I created and developed my original programme of the following subjects: Consumer Protection, Consumer Protection on the Food Market, Food Law and in 2018 - Legal Aspects of the Food Market.

My scientific and research work is connected with analyzing and assessing consumer attitudes and behaviours on the food market, and in undertaken research challenges I try to combine, among other things, quantitative, qualitative and so called experimental methods.

My research and scientific interests focus on analyzing consumer attitudes and behaviours towards food, among which 4 main thematic areas can be distinguished:

- 1) The importance of selected food attributes in perceiving quality (publications: II.A.1., II.A.2., II.A.4, II.A.5, II.B.1, II.B.2, II.B.8, II.B.16., II.B.22, II.B.27, II.B.30, project II.G.3.);
- 2) Consumer innovations and innovativeness on the food market (publications: II.A.2., II.A.3., II.A.6., II.A.8., II.B.8., II.B.9., II.B.10., II.B.11., II.B.12., II.B.13., II.B.14., II.B.17., II.B.22., II.B.25., II.B.29., II.B.31., II.B.32., projects: II.G.2, II.G.3., II.G.5.);

- 3) Country of origin as a factor in choosing food in the opinion of consumers (publications: II.B.4., II.B.7., II.B.17., II.B.21., II.B.23., project II.G.6);
- 4) Willingness to pay (WTP) a particular price for food products of changed characteristics (publications: II.A.7., II.B.13., IIB.20., II.B.24., IIB.26., II.B.32., projects: II.G.2., II.G.3.).

5.1 The importance of selected food attributes in perceiving quality

In earlier parts of the study it has been noted that consumer understanding of the notion of food quality is not easy to define. In research performed as part of the Biofood project (II.B.27.) a trial has been undertaken to determine which factors are important for consumers in their perceived assessment of food of animal origin. It is worth noting that consumers pay attention to three groups of factors while describing qualities of products of animal origin: (1) factors connected with a production process (including those which concern animal breeding) and a distribution process in order to obtain a satisfactory product; (2) food attributes which are essential for a consumer while shopping - sensory qualities of a product, producer's or seller's opinion as well as all kind of information on packaging; (3) the ease of preparing a dish at home and a satisfaction upon preparing a dish (mainly in the case of meat and meat products). It should be noted that taking into consideration different attributes regarding food quality, consumers form a complementary assessment of a quality based on their expectations, such as: physical properties (e.g. an appearance and/or a smell of a raw product/product), the attractiveness of the packaging including product labelling (e.g. information on the packaging). Moreover, consumers take into account attributes connected with credence, e.g. a suitable animal breeding method which guarantees the natural attributes of a products. Consumers try to verify part of this information at the sales points e.g. through seeking the opinion of a seller, and upon making the purchase consumers assess the quality of components during food consumption e.g., at home or at a bar/restaurant. In case of products of animal origin they assess their taste and smell qualities as well as their health benefits (the choice of a suitable processing method, e.g. stewing instead of frying), as well as their own or their family satisfaction connected with consuming a given food and/or dish.

Based on the analysis of collected research data, it can be noted that changes to food of animal origin should relate to its natural nature, due to the fact that improvements to food have negative connotations among consumers and are associated with adding artificial additives, e.g. preservatives, which are designed to extend the 'use-by' date. However,

research shows that improving food by protecting its natural properties, including coming back to traditional production methods, is assessed positively.

In the next publication (II.B.2.) quality attributes and barriers to consumption with regard to beef have been assessed. The analysis of qualitative research (method – Focus Group Interview, FGI) conducted among consumers indicates that beef is perceived as food which has a beneficial influence on health compared to other types of meat available on the market, due to its low fat content and its content of numerous valuable nutrients. However, the popularity of this meat in the diet of Polish consumers can be limited by 3 groups of factors which are deeply rooted in the minds of the surveyed: (1) price – beef is significantly more expensive compared to other kinds of meat, (2) the necessity of a major involvement on a consumer's side – meat is rather difficult to prepare, i.e. consumers need a lot of time to process it and have no guarantee that as a result they will receive a dish of a desired taste and smell qualities and simultaneously the so-called “culinary effect” connected with the preparation process will be impressive. It is also crucial that the choice and purchase of a desired portion of this meat in the market is connected with a culinary failure due to the fact that the quality of meat available on the market varies greatly. The last barrier (3) pointed out but consumers is the children's unwillingness to this kind of meat – female consumers have emphasized the fact that children dislike this meat due to its taste quality, i.e. the taste itself and difficulty in biting.

Among consumers who run households individually the popularity of this meat decreased and it is rarely used by young people to prepare meals. Moreover, in the opinion of the surveyed, beef is the meat which is rather chosen and prepared for special family occasions. Among older consumers the popularity and skills necessary to process beef are relatively higher, which is connected with the long-standing tradition in a household and with the possibility to buy high-quality meat in the past decades (II.B.2.). A positive image of beef compared to other kinds of meat (i.e. pork or poultry) has been noted in the next publication on this topic (II.B.1.). However, among those female consumers who have declared that they do not buy beef, pork has been appreciated to a higher extent and it has had a more positive image as meat to be used. Among positive elements of beef, its health aspect and good taste have been emphasized, whereas its unpredictable and erratic quality as well as high price have been mentioned as disadvantages. The above mentioned factors have been mentioned as main barriers of low beef consumption in households (II.B.1.). It should also be noted that the information on the beef class among some consumer groups, in particular those who seek

information on beef, can be the factor encouraging the increase in consumption of this meat (II.A.5.).

Except for assessing the quality attributes with regard to meat and meat products, within the performed research the quality attributes with respect to dairy products, e.g. cheese have been assessed (II.B.22.). It has been noted that in consumers' opinions the quality of food is associated to the highest extent with freshness and naturalness understood, among other things, as a lack of harmful compounds or preservatives. Some among the surveyed have stated that they are interested in changes to food and expect improvement in the quality of cheese available on the market. Simultaneously, it should be noted that consumers react positively to the majority of changes with regard to changes in health benefits of cheese. However, producers who are planning to change the quality of their products must bear in mind that these changes should go towards lowering undesirable, in the opinion of consumers, content (e.g. cholesterol) and increasing these ingredients whose influence and properties are generally known to consumers and which have health properties. Simultaneously, these changes cannot disturb the original nature of food, because they will be rejected by potential buyers in this food category. Therefore, while creating a new food product, it is necessary to take into consideration consumer preferences and expectations regarding their acceptance of proposed innovations.

Yoghurts are yet another example of a product whose quality attributes have been assessed (II.B.8.). Among the most often mentioned quality attributes have been those which have been perceived as important regarding cheese, i.e. attributes addressing qualities connected with freshness and naturalness: „fresh food”, food containing natural ingredients, deprived of preservatives or artificial additives. These attributes have been followed by food security and characteristics connected with taste qualities, ‘use-by’ date, price, information on a quality certificate.

To sum up, food quality is associated by consumers mainly with freshness, naturalness and lack of artificial additives. Consumers assessed positively numerous changes to the food production occurring in the last years, among other things, decreasing the content of artificial ingredients and preservatives. Based on the research findings on the acceptance of changes in food products of animal origin, it should be noted that a relatively high level of acceptance of most of the innovations included in the research has been observed in this product category. (II.B.8.).

Traditional food should be mentioned as yet another type of food whose attributes have been assessed in the conducted research (II.A.2., IIA.4.). Research on traditional food

conducted within TRUEFOOD project (Belgium, France, Italy, Norway, Poland, Spain) proves that consumers indicate 4 main characteristics: product naturalness, local origin, a way of processing and appropriate sensory qualities. Polish consumers, compared with other countries participating in the study, have accepted to a lesser extent changes interfering with the traditional nature of the food, which indicates the need of preserving naturalness and originality of the food. Research shows that in the opinion of consumers from particular European countries, traditional food qualities refer mainly to cultural heritage of various countries, customs, special occasions/holidays and as well to the variety of dishes and meals.

Opinions on traditional food expressed by Polish participants of FGI (II.B.30.) have been classified into two categories relating to product characteristics and nutritional behaviours. With regard to characteristics of discussed food, the origin of raw products or products, way of producing or preparing have been mentioned. Simultaneously, positive aspects of consuming this type of food resulting from a low level of processing and a natural process of production have been pointed out and therefore attributing the quality of uniqueness to traditional food. It has also been emphasized that food described as traditional should be a part of a specific culture. In terms of nutritional behaviours, the fact of passing eating patterns from generation to generation has been pointed out, and therefore cultivating culinary traditions received at home. Traditional food, according to the participants of focus group interviews, has had characteristics of food commonly consumed, but traditional dishes have been associated with special occasions, e.g. family celebrations. Research conducted using word association tests indicates that the term ‘traditional’ with respect to food is most often associated with a dish/meal, family/home, a taste and its origin: ‘domestic’, ‘national’, which confirms findings obtained by in-depth group interviews. Traditional food is perceived as part of cultural heritage, and its taste qualities are particularly valued. Summarizing the results of surveys, it should be noted that consumers surveyed have associated traditional food mainly with food available for generations, commonly consumed, mainly at home with family, and therefore close to the culture and geographical area of its origin. In the opinion of the participants of the study, health and sensory qualities of this type of food have been significant. The attributes of traditional food perceived by the participants of qualitative tests reflect therefore the criteria which distinguish traditional food from the perspective of EU law and approaches developed so far (II.B.30.).

My scientific interests, except for the way of perceiving traditional food and the importance of its attributes, include aspects of green consumption (II.B.16., II.G.3.). The analysis of findings obtained in own research within Biofood project has indicated that among

the attributes of food quality referring to green consumption consumers have pointed out a kind of production, including the animal breeding which respects rights of farmed animals compared to a production method based on feeding animals with forage with genetically modified ingredients. However, it has been noted that sex and age has not influenced significantly the opinion of the surveyed on the level of acceptance of a production, including the animal breeding which respects rights of farmed animals and a production method based on feeding animals with forage with genetically modified ingredients. It has been observed, however, that education and subjective assessment of the financial situation have had a significant influence on the acceptance of production, including the animal breeding which respects rights of farmed animals. Regarding feeding animals with forage with genetically modified ingredients only the subjective assessment of financial situation influenced significantly the opinion of the surveyed. People who have accepted animal breeding which respects rights of farmed animals have been those with higher education, rather than those with vocational or secondary education. Other studies within the Biofood project (II.A.1.) confirm that consumers attach importance to attributes referring to sustainable growth, including sustainable consumption while making purchasing decisions and treat them as important quality attributes of food of animal origin.

Unique cognitive value of the research performed lies in the recognition of attributes of food quality, including those which refer to sustainable consumption and assessing their level of importance for general assessment of food quality. Conducted research is of applicable value due to the possibility of using available data while preparing marketing message to the consumers who prefer different food categories, including (1) meat and meat products, (2) milk and dairy products, (3) traditional food (4) food of animal origin in general, in case when aspects connected with green consumption can have particular importance for consumers due to their choice of food based on production method and food processing beneficial in terms of animal well-being.

5.2 Innovations and consumer innovativeness on the food market

The research on the acceptance of selected innovations in food has been described in own publications as well as in publications that were developed in a co-authorship (II.B.9, II.B.10, II.B.11, II.B.12, II.B.13, II.B.17., II.B.25., II.B.29, II.B.31., II.B.32.).

Regarding meat and meat products (II.B.31., II.G.3.) a performed segmentation analysis has enabled distinguishing consumers, among other things, based on their innovation level, which has confirmed socio-demographic conditions of innovativeness known from the

subject literature [Rogers, 1995; Jeżewska-Zychowicz and Kowalczyk, 2009; Kowalczyk, 2011]. Two, out of six, identified segments have been particularly interested in selected groups of meat products (respectively: sausages and premium cold cuts). The prevalence of the least innovative consumer group has been noted, whose socio-economic and demographic characteristics has shown features typical of „fussers”, which confirms findings available in the literature [Rogers, 1995; Jeżewska-Zychowicz and Kowalczyk, 2009; Kowalczyk, 2011].

Findings presented in the next publication (II.B.9., II.G.3.) have proven that among those, who have accepted innovations in food to a higher extent than others have been respondents with higher level of education and whose financial situation has been good. These people have reacted positively to changes in a market offer of food and to changes in products of animal origin consisting in reducing cholesterol content and reducing the level of some ingredients. It can indicate the fact that the changes towards reducing the level of negatively perceived content are gaining more acceptance than those towards enriching food. At the same time, it should be emphasized that including a three-pronged attitude (II.B.11., II.G.3.) indicates that not all consumers have been familiar with the concept of innovative food, and those who have been familiar with this concept have most often associated it with food of a better quality and safer for their health (cognitive component). With regard to affective component, changes consisting in lowering the content of those ingredients which can potentially have a negative impact on human health have been relatively more acceptable and enriching food, even if, in the opinion of the surveyed, it has had a positive influence, has been perceived as less acceptable. When it comes to a behavioral component, only a small proportion of the consumers surveyed has represented the category of innovators, majority of which belonged to the category of early followers and late majority, which have been those of the surveyed who have expressed their willingness to buy new products only after some of their acquaintances have already had them and assessed them positively.

The analysis of further studies (II.A.8.) on products of animal origin indicates that consumers show more innovativeness regarding dairy products than to milk, meat, meat products and eggs. A similarity regarding the willingness to buy novelties in case of particular products from the category of meat and meat products, milk and dairy product as well as eggs (mainly milk drinks, milk and cheese) has been observed. The willingness to buy analyzed product groups has been determined by sex or income, and the intention to buy has been moderately conditioned by age and education. A place of residence has been the factor which has affected to a larger extent the interest in buying novelties. It should also be emphasized that while choosing food, innovators, to a greater extent than other consumer groups, take into

consideration its utility, dietary and environmental aspects, and declare more often their readiness to accept higher prices of innovative products.

The above findings have been supplemented by research conducted within Biofood project (II.G.3.), which has been analyzed using a **Choice Based Conjoint** (CBC) method. In the methodology of CBC, the respondents are shown a combination of product attributes and their preferences towards selected variants are assessed [Vidal et al., 2013], which enables calculating the so-called partial utilities, i.e. the share of an attribute level in the overall product utility [Walesiak and Bąk, 2000]. The surveyed are given a task to assess various profiles of products (e.g. a production method, a place of origin, health qualities or a given nutritional value of a food product), and the assessment of attributes and related values enables a general (total) assessment of a given product [Grunert et al., 2009].

In the study conducted as part of the project (II.G.3.) an original set of product attributes has been used which have included information which could potentially be placed on a yoghurt label, and a price has constituted one of the attributes. It has been noted that in the case of yoghurts, consumers have been willing to pay relatively slightly more compared with the initial price of the product. Among the attributes which have obtained the highest average level of importance in the total utility of the product, there have been those attributes which have been related to improving some food ingredients, triggering positive associations among consumers, i.e. increasing the amount of bacterial cultures, vitamins and minerals.

Presented findings which use a modern method of researching consumer behaviors on the food market are of applicable value due to the fact that they clearly indicate what kind of benefits is important for a consumer and what kind of information can encourage a potential buyer to choose a product (yoghurt) on the market, which should be taken into consideration in a marketing message.

Other findings of own research, using survey tests indicate that changes in yogurts consisting in increasing those ingredients which, in the opinion of consumers, have a beneficial influence on health have obtained relatively higher acceptance, and slightly lower - changes consisting in lowering this content which is undesired in terms of health. Regarding yoghurts, consumers have positively assessed numerous changes introduced by producers and food processors over the last few years, including particularly reducing the content of artificial ingredients and preservatives. It should also be noted that on the Polish market, a wide range of yoghurts is available and additionally it is the food group which is perceived by consumers as having a beneficial nutritional and health value, due to, among other things, applied innovations, including those consisting in enriching with so-called „live bacteria cultures”. For

the above reasons in the study discussed, the focus has been on the changes which have been desired or accepted by consumers in this product category. Hence, the highest level of acceptance in the opinion of the surveyed has been granted to: the addition of bacterial cultures and enriching with minerals and vitamins, and then reducing the content of some ingredients such as sugar or fat. Simultaneously, food producers should attach particular importance to the way of labeling in this product category, including placing legible and comprehensible information of the beneficial effect of a product. Moreover, they should remember about the indicated by consumers need connected with the pleasure derived from consuming yoghurts (II.B.8.). Findings of research conducted on the cheese and yoghurt market show the direction in which changes to food should go towards so that consumers' expectations can be met, particularly in relation to health benefits and at the same time in order not to destroy the positive image of food regarding its freshness, naturalness and taste.

In case of some dairy products, e.g. cheese (II.B.22.) consumers view positively the majority of suggested changes regarding their health qualities. However, producers from this sector planning changes in the quality of their products should remember that these changes must go towards reducing undesired ingredients and increasing those ingredients, whose effect and properties are commonly known to consumers and which have health effects.

The following product group in relation to which consumer behaviors have been analyzed is traditional food. Research among European consumers concerned opinions in the acceptance of changes in traditional food, i.e.: (1) product novelty resulting from newly used food ingredients, (2) a variety of products compared to the offer of traditional products which has already been known by consumers, (3) changes to processing process, (4) the origin and ease of use (II.A.2., II.G.2.). In case of Polish consumers who have taken part in FGI (II.B.29., II.G.2.) a relatively low level of acceptance for introducing innovations to traditional food has been observed. It may result from the fact that consumers present various expectations towards food which often seem difficult to reconcile, e.g. consumers expect products to have traditional taste and natural properties and at the same time they expect an extended 'use-by' date. Traditional taste of products, according to FGI participants, can be guaranteed by e.g. an original manufacturing formula, natural methods of preserving food, e.g. freezing. FGI participants have declared their positive attitude to innovations that could improve, among other things, the ease of use, extending a product variety, facilitating storing and preparing meals and a positive attitude regarding innovations aiming at improving health properties of traditional food.

With respect to a traditional character of a product which is quite commonly used, i.e. bread and innovations accepted by consumers, one opinion expressed by one interview participant seems to be particularly important. The opinion states that the traditional character of bread enables maintaining „a modernized way of production”, and at the same time keeping „an old and original recipe”. Other aspects of bread as a traditional product, apart from its recipe and unchanged composition, has been its prevalence in our society and in national culture. Another aspect proving the traditional character of bread is its unchanged taste. It should therefore be emphasized that among main attributes of traditional food its naturalness, recipe and repetitive nature seem to be important (II.B.29.).

Obtained findings are of high cognitive and applicable value and can serve entrepreneurs operating on the market of food of animal origin in order to boost their effectiveness in relation to innovative products of animal origin, all the more that introducing innovations to traditional food sector is not always viewed positively by consumers as acting which can disturb its qualities connected with its natural character.

As part of my research interest conducted, except for the assessment of opinions regarding food of animal origin, an attempt to assess attitudes and behaviors towards innovative food on the example of cereal products has been undertaken.

Findings (II.B.10., II.G.5.) of the research conducted as part of focus group interviews indicate that consumers surveyed have expressed rather positive opinions on bread, and when it comes to the possibility of introducing changes, i.e. adding fibre to white bread, the necessity to preserve its natural character has been particularly emphasized. It has also been underlined that when any change is made to the composition of bread, including those which have beneficial influence on health, it is required that consumers are fairly and duly informed about them. Therefore, it seems that, from a manufacturer’s point of view who offers their products to the consumer, including bread with added fibre, it will be important to customize the parameters of a product so that the clients are satisfied with its sensory qualities, as well as with its availability and comprehensibility of information addressed to a consumer. Quantitative surveys (II.B.13., II.G.5.) confirm findings of the performed and discussed above qualitative surveys. Consumers surveyed have shown their positive opinions regarding the possibility of introducing changes to bread, i.e. adding fibre to white bread. Among the respondents who more often agreed with the opinion on health aspects related to the use of fibre have been younger people, of higher level of education and coming from big cities, which confirms a profile of an innovative consumer indicated in the literature.

Findings presented in the following publication are the confirmation of positive opinions on bread with higher content of fibre (II.A.3.). The aim of the study has been the assessment of acceptance of white wheat bread rolls without and with added fibre. Real products have been used in the study and the importance of the influence of frequency of consuming white bread rolls as well as the declaration of their purchase have been assessed. It has been noted that significant discrepancies in consumers' assessment of bread rolls with different level of fibre have occurred. Bread rolls with a 12% addition of fibre have obtained higher levels of acceptance and participants have indicated that they are willing to pay more for bread rolls with added fibre, which at the same time has confirmed higher acceptance of these rolls compared to white wheat bread rolls without added fibre content. It should also be emphasized that the findings of a study discussed are of applicable value, because they show the fact that adding fibre to the product gives more opportunities to use this information in labeling, including placing a nutrition claim on the packaging. Additionally, the observed willingness to buy a bread roll with added fibre and at the same time higher acceptance of its sensory qualities are important predictors of future consumer behaviors. The findings of this study may be applied in developing food products of improved health qualities, e.g. while aiming products at consumers with special dietary requirements.

However, consumer opinions should be taken into account, in which they have indicated that the amount of fibre consumed in a diet should be to some extent controlled by consumers due to the fact that not every person is advised to increase its consumption (II.B.14., II.G.5.). It has been therefore noted that relatively more women, younger people, with higher level of education, living in bigger cities and respondents who have declared the purchase of a new food product with health benefits have agreed that the amount of consumed fibre should be controlled. Regarding selected characteristics of cereal products with added fibre, the influence of socio-demographic variables and declarations of buying a new product with health benefits have been noted. It should be emphasized that relatively more women, younger people, with higher level of education, living in bigger cities and respondents who have declared that they buy new food products as soon as they become available and quickly, however after some consideration they have appreciated selected characteristics of cereal products with added fibre compared to the same products, but without fibre. Obtained findings on the profile of a potential consumer who is interested in selected cereal products with added fibre can be used by entrepreneurs operating on this market in improving existing and developing new food products, thus showing their cognitive and applicable character.

It should also be noted that the consumers who are characterized by a higher level of knowledge on nutrition verified during the research are more knowledgeable, compared with other respondents, on which health benefits are related to consuming cereal products with higher level of content (II.A.6., II.G.5.).

Apart from bread, in the research conducted (II.B.12., II.G.5.) the opinions on pasta with selected qualities have been assessed. It has been proven that among the pasta offered to consumers in the study, the surveyed have been interested in the highest level in the pasta, which has been characterized by a short cooking time. Simultaneously, low interest in pasta with added fibre content or in pasta with reduced caloric value has been noted. Product knowledge and perceiving oneself as a person who cares about health have influenced positively the declaration to increase the consumption of pasta with added fibre and reduced caloric value. It has been noted that women showed higher interest in pasta with added fibre and lower caloric value compared with men.

Original cognitive and applicable value of the presented research findings with the use of pasta lies in the outcome which indicates that in the decision-making situation between comfort of use and health benefits of a product, in case of some product the attributes connected with its comfort of use (i.e. the time necessary to prepare the food/meal) are more appreciated by consumers..

5.3 Country of origin as a factor in choosing food in the opinion of consumers

I have taken up topics connected with a country of origin and consumer ethnocentrism for the first time as part of my PhD dissertation project¹⁶. Main observations and conclusions which I have noted at that time are as follows: a product of national origin is mainly a product which has been produced in a given country (e.g. in Poland), from domestic resources, and to a lesser degree by a company of a national (e.g. Polish) origin. Polish origin of a product has played a greater role during a decision-making process about buying food rather than the information on the country of origin itself. It should also be noted that a stronger ethnocentric attitude has been observed among the consumers characterized by a lower level of education, difficult or very difficult financial situation, at the age over 30 and living in rural areas or in medium-sized cities. Difficulties in identifying domestic and foreign products have consequently resulted in confusion regarding the country of origin of particular brands. Wrong association between a brand and a country of origin has been connected, among other things,

¹⁶ Research conducted within a supervisor research grant KBN no. 5 H02C 054 20, carried out in 2001-2003 under the guidance of prof. K. Gutkowska.

with their wording and have resulted from the activities of companies towards increasing international cooperation, movement of capital and labor, non-capital relations and taking over domestic companies by foreign entities. Consumers have perceived domestic food as better compared to foreign food. However, negative opinions on the visual aesthetic of the packaging of domestic products indicated at that time that food producer should have paid more attention to this element in order to increase the competitiveness of Polish food over the foreign one.

Except for my PhD dissertation, I have taken up the topics connected with a country of origin and ethnocentric attitudes in other publications (II.B.4., II.B.21., II.B.23., III.B.7.). In order to verify the importance of the country of origin while choosing food and to understand the intensity of consumer ethnocentrism among the Poles in 2013, I once again conducted research among Polish consumers with the use of my original questionnaire (II.B.18., II.G.6.).

It should be emphasized that ethnocentric attitudes in the area of market and consumption are manifested by a conscious consumers' preference for domestic products compared to foreign ones, and contrary to these attitudes, a part of consumers show an internationalist attitude and choose foreign products. There is also a group of cosmopolitan consumers who do not take the country of origin while making their purchasing decisions and who aim to achieve the greatest possible benefits from using a product. Among the key factors for ethnocentric attitudes socio-demographic variables should be indicated, i.e. age, sex, level of education, financial situation as well as a kind of purchased product and a variety of products in a given group. In case of heterogeneous goods, a brand and origin of a product are of major importance (II.B.4.). In the following publication (II.B.23.) it has been noted that domestic food constitutes food made in Poland and from domestic resources and labor and under a domestic brand. Consumers showing an ethnocentric attitude towards food are more often older women, with a lower level of education and income with a high level of awareness of the relationship between purchasing domestic food and the state of Polish agriculture and companies producing food products. Moreover, in the opinion of the surveyed, domestic food is perceived as healthier, tastier, less expensive, whereas foreign food is described as less natural, more expensive but at the same time as having better packaging

A similar profile of a consumer of Polish food has been observed in other own studies (II.B.21.), in which it has been noted that buyers of domestic food purchase in small shops and buyers of foreign food - in super- and hypermarkets. Purchasing foreign food has not been viewed negatively by the surveyed, and enriching the food market with foreign products contributed to improving quality of Polish food. In the following publication on the importance of a country of origin and ethnocentrism in the purchasing decisions of consumers

(III.B.7.) it has been emphasized that in promotional campaigns, a Polish origin of a product should be highlighted, as it determines favorable opinions on the qualities of domestic food, and consumers attaching significant value to the Polish origin of food are the target group for domestic companies on the agri-food sector.

In the era of progressing globalization process (II.B.18.) a tendency to maintain the individualization of choosing the means for satisfying the needs is observed, as well as striving for keeping a national identity, by cultivating national cuisine, traditional dishes and willingness to promote national products, to name but a few. There are somewhat contradictory tendencies, and their intensification is directly related to growing symptoms of international competitiveness, for which it is significant to gain new markets. Such tendencies are strengthened by promoting a national culture and identity and a crowning achievement of these trends is ethnocentric attitudes, whose core lies in classic understanding of ethnocentrism [Nowa encyklopedia powszechna, 1996, s. 276]. Such view of ethnocentrism includes ex definitione a more favorable perception of phenomena typical of a group to which an individual belongs and with which they identify [Szromnik, 1998], recognizing it as a better one [Zimbardo and Ruch, 1994].

The analysis of empirical data obtained in the above mentioned study indicates that the ethnocentric attitudes towards food exist with various levels of intensity, and its borders are set by socio-demographic variables characterizing the surveyed consumers. These variables determine different way of understanding the term of „food of Polish origin”. Regarding the latter, it has been noted that an increasing tendency to understand this term by the share of Polish employees in the production process of food in this sense has been connected with higher age, a lower level of education and worse assessment of financial situation. It has also been concluded that a higher level of acceptance with respect to those statements proposed in the study which characterized in a positive way the willingness to buy domestic food and emphasized a positive impact of buying domestic products on the situation in Polish economy and agriculture has characterized elderly people, having a lower level of education and assessing their financial situation less favorably.

Findings of own research on an ethnocentric attitude confirm that food of Polish origin is understood mainly as this produced in Poland and from Polish resources, and consumers who emphasize the place of production as the criterion of „Polishness” have been those over 61, having a higher level of education and declaring travelling abroad more often. Contact with other cultures and the experience gained during travelling can significantly reinforce the importance of a production place in the perception of products viewed as domestic. The

domestic origin of resources has been emphasized mainly by women, older respondents and people having a higher level of education. The relationship between socio-demographic variables and opinions on the criteria which are relevant to the conceptualization of a product of Polish origin can be vital for developing a communication strategy aimed at consumers.

The original cognitive and applicable value of the research conducted lies in the generally declared positive assessment of domestic food which has also been perceived as being easy to prepare and easily available on the market. It should be emphasized that it can become a favorable practice in modern systems for food labeling, e.g. tools such as mobile applications, in which we can emphasize the above stated information and simultaneously these applications may be particularly popular with younger consumers of higher income level who show their ethnocentric attitude relatively less seldom. The findings are also valuable with regard to older consumers whose share in the society is increasing. Systems for food labeling and marketing efforts aimed at senior consumers should focus mainly on emphasizing the origin of food from domestic resources as an important quality attribute valued by this group of respondents. The findings of studies presented have been published in *Food of Polish origin and its attributes in consumers' opinion*, Sajdakowska B., Żakowska-Biemans S., Gutkowska K., which is currently under evaluation.

5.4 Willingness to pay (WTP) a particular price for food products of changed characteristics

The „willingness to pay a particular price” (WTP) is the next area within the scope of my interests. WTP is defined in the subject literature as a maximum price which a given buyer is willing to pay in order to buy a specified amount of a product [Wertenbroch and Skiera, 2002]. The concept of WTP is of high importance in, among other things, developing and introducing new products to the market. Methods which are used to assess the level of WTP have been applied for different food types, including the analysis of consumer attitudes towards functional food as well as for innovative categories not existing so far on the food product market and for premium food [Combris et al., 2009].

Topics related to WTP are largely unknown and rarely used in research on Polish consumers on the food market, however, its importance seems to be significant for purchasing decisions of consumers. The above observations have prompted me to investigate the possibility of using a WTP methodology in my research on consumer behaviors in Poland (II.A.7., II.B.13., II.B.20., II.B.24., II.B.26., II.B.32., II.G.3.).

The example of using a WTP methodology is a study on yoghurts (II.B.24.), in which illustrations of yoghurts have been presented and based on them consumers have been asked to

indicate the price level they would be willing to pay if the health quality of a products were improved. In the study discussed, a tool designed specifically for this purpose has been applied. The tool has used the modification of Contingent Valuation Method supplemented by product illustrations.

Contingent Valuation Method is used in the approach based on survey studies. In this type of a studies, a questionnaire is prepared and respondents are asked directly if they would be willing to pay a specific price for the product or if they would be willing to pay a higher price for improving a given product, simultaneously indicating particular product characteristics or characterizing it directly. Contingent Valuation Method is used with regard to products in case of which there are no specific market prices, pesticide-free fruit and vegetables, organic food, to name but a few. For this group, a hypothetical WTP (i.e. declared by respondents) is significantly higher than the actual WTP which consumers pay on average on the market [Grunert et al., 2009].

The use of product illustrations in the study discussed (II.B.24.) has made it easier for the consumers to imagine a specific situation of choice on the market (CAWI method – Computer Assisted Web Interview). The surveyed have been presented with 4 illustrations of yoghurts: (1) strawberry yoghurt, (2) strawberry yoghurt with probiotic bacteria, (3) strawberry yoghurt with higher content of calcium, (4) strawberry yoghurt with reduced content of sugar. Participants of the study have been parents of children up to 3 years of age as a group which is particularly interested of health qualities of food and potentially willing to pay a higher price for selected food attributes.

The obtained findings of a survey study have shown that in general consumers have shown a relatively higher level of acceptance of changes consisting in increasing the ingredients which have positive effect on health, and a relatively lower of changes consisting in reducing the undesired ingredients. However, despite the fact that consumers attach a great importance to health and that they declare their willingness to pay a specific price for selected health qualities of a yoghurt, the accepted price level has not been very high, which can be a clue for entrepreneurs who aim their products at this target group to plan an optimal price policy of a company operating on the yoghurt market or to estimate the demand for new and/or partially changed products.

Apart from applying a WTP methodology together with the use of Contingent Valuation Method to assess products of animal origin, it has also been used to study bread with higher fibre content. In general, respondents have shown positive views on the possibility to introduce changes to bread, i.e. adding fibre to white bread. Among the respondents who

have agreed with the opinion on health aspects related with the use of fibre, younger people, with a higher level of education and from big cities have been in majority. Positive opinions on adding fibre to white bread have been confirmed by the willingness declared by a majority of respondents to pay a specific price for selected cereal products with added fibre when they have had a choice between 2 products: a loaf of white wheat bread and the same loaf but with a higher fibre content (II.B.13.). In the following publication (II.B.20.) in order to check to what extent the surveyed consumers have been willing to pay more for health qualities of a product, the respondents have been asked during a study to imagine a situation when they buy a loaf of white bread of 600 g and at PLN 2.35. Then, they have been asked how much more they would pay for the same loaf of white bread with added fibre as a favorable product characteristic. About 20% of the surveyed have declared that they would pay up to PLN 0.35 more; almost 1/3 have been willing to pay PLN 0.40–0.75 more. A price higher by around 1 PLN or by slightly more than 1 PLN has been declared by another 1/3 of the surveyed and almost every tenth respondent has declared that they will pay PLN 1.2 or more. However, among the people who have claimed that they will not pay more for a loaf of white bread with added fibre, the most frequent reasons there have been: „I do not care too much about fibre” or „bread with fibre is expensive anyway”, which indicates that entrepreneurs introducing new cereal products, e.g. bread with a higher fibre content should particularly attach their importance to a suggested price policy, as it may not always be reflected in consumer behaviors on this market.

Another example of conducted research using a WTP methodology has been applying the so-called Experimental Auctions (EA), which has been performed within studies in research projects: Truefood and Biofood. With regard to products of animal origin (II.A.7., II.G.2.) the research methodology has been developed based on the experience gained as a result of cooperation with INRA, a research institute in Dijon, France (L’Institut national de la recherche argonomique, French National Institute for Agricultural Research¹⁷).

Experimental Auctions method belongs to a group of methods used in an economic experiment. During the test, various product versions are presented and consumers give their suggestions of prices they would be willing to pay for a given product versions of for their improved alternatives. There are i.a. two ways of conducting so-called experimental auctions: Vickrey’s [Vicrey, 1961] and Becker, DeGroot and Marschak’s (BDM method) [Becker et al., 1964]. The basic difference between these methods lies in different levels to which

¹⁷ Sylvie Issanchou - task supervisor in the project.

participants of the study are involved, i.a. in price suggestions generated during a study. During a Vickrey's auction (second-bid auction), an auction is won by a person offering the highest price for a product. This person, however, will pay for a product as much as the second-highest price offered. In a BDM procedure, participants give their price suggestions independently of other people participating in a study, then a price is drawn from a previously set collection of prices (these prices are most often close to average market prices for a given commodity). If a participant's purchase offer has been at least equal or higher than a market price, the transaction is conducted at this price. Otherwise, a transaction does not take place. When a market price drawn is higher than a bid price (suggested by a participant) a buyer does not perform a transaction but at the same time they are satisfied that they do not have to pay such a high price. When a market price drawn is lower than this suggested by a participant, they only pay the drawn (market) price, independent and lower than the bid one, which also is a source of the participant's satisfaction.

BDM method influences to a similar extent the consumers surveyed, i.e. those who have a low and high level of purchasing motivation, and moreover, in this method there is no group pressure on individual purchasing decisions of a consumer (i.e. mutual competition with regard to suggesting prices); the advantage of this method lies also in the ease of methodology which is presented to the surveyed, compared with the methodology of Vickrey's auctions.

In the study discussed (II.A.7., II.G.2.) experimental auctions using the BDM procedure have been applied [Becker et al., 1964; Ginon et al., 2014]. Consumers have been presented with 5 variants of dry smoked pork sausages (1. traditional, 2. with reduced salt level, 3. with added selected spices, 4. with meat from organic production and 5. in biodegradable packaging). The study has been conducted in Cracow and Warsaw. In stage I (blank test), the participants have indicated to what extent they like dry smoked pork sausages (linear hedonic scale) and have given a maximum price they would be willing to pay for 300 g of a product in packaging. In stage II, participants have been given dry smoked pork sausages with a label with information on the assessed kind of dry smoked pork sausages on it and have been asked to indicate the level of „liking” and a price. In stage III, participants have looked at a product with information on the label and assessed dry smoked pork sausages on a hedonic scale and indicated the price. Then, an experimental auction has been conducted which consisted in a random selection of a price from average market prices. When a price has been indicated as so-called purchase price (equal or higher than a drawn one) - a transaction has been conducted at the market (drawn) price. In general, the observed relationships between WTP of variants used in the test reflect regularities noted in the case of hedonistic assessment

for Warsaw and Cracow. However, for participants from Warsaw (stage I) none of the variants have obtained a purchasing price compared to traditional one; and the lowest purchasing price has been given for the organic variant. However, in stage 3, a dry smoked pork sausage in a biodegradable packaging has obtained the highest purchasing price, similarly to stage 2. Regarding participants from Cracow, only for stage 1 the influence of conditions on the level of WTP has been observed. Similarly to Warsaw, it has referred to dry smoked pork sausages in a biodegradable packaging, which have obtained the highest price, however the consumers have not been willing to pay more for them than for traditional dry smoked pork sausages. It should be emphasized that the findings of a research study performed after the experimental part indicate that changes influencing sensory quality and consisting in reducing salt and adding ingredients which changed the taste have obtained low scores

A study conducted among yoghurt buyers is another example of my use of the WTP methodology (II.G.3.). The research methodology has been similar to the one discussed above within the Truefood project. The study was performed in November 2013 among people from Warsaw.

5 kinds of natural yoghurts available on the Polish market have been used in the study and, in order to avoid discrepancies resulting from i.a. sensory assessment during the test, they have been of similar texture. A natural yoghurt as a so-called basic version has been used, as well as its 4 variations in packaging of 200 g:

- (1) 2 healthy variants – „natural goat yoghurt”; „yoghurt from pure areas of the Mazovia region”;
- (2) and 2 variants of yoghurts characterized by features appealing to beneficial health qualities and to the need of taking care of own appearance i.e. „sugar-free yoghurt” and „fat-free yoghurt”.

The analysis of obtained findings indicates that in stage I, i.e. in a blank test, a natural yoghurt and a yoghurt defined as „from pure areas of the Mazovia region” have obtained the highest scores, and a „goat” yoghurt has obtained lowest levels of acceptance. Taking sex into consideration has shown that women have indicated higher scores on a hedonic scale slightly more often compared to men regarding a yoghurt from „pure areas of the Mazovia region”. Regarding the second stage (II) in which consumers have looked only at a yoghurt packaging, the highest scores have been declared for a „goat” yoghurt and a yoghurt from „pure areas of the Mazovia region”, and relatively the lowest - for a „sugar-free” yoghurt. It should also be added that women have generally declared higher levels than men for the yoghurts tested.

In the third stage (III) in which the surveyed looked at labels on yoghurt packaging and tasted different variants of yoghurts, all available yoghurts have scored high and a „goat” yoghurt has been scored as the last one, however, it has obtained a relatively high general average score on the hedonistic scale. For every yoghurt apart from a natural one, women have declared slightly higher scores compared to men.

Regarding the second part of the study i.e. the assessment of the willingness to pay a particular price for yoghurts (WTP), in stage I, the surveyed have declared the highest price levels for a natural yoghurt. However, in stage II when participants have assessed yoghurt labels - the highest price levels have been declared for a „goat” yoghurt, followed by a „sugar-free” yoghurt and a yoghurt from „pure areas of the Mazovia region” on the second position. Regarding a „goat” yoghurt and a „fat-free” yoghurt, a slightly higher prices have been declared by men compared to women. However, with regard a to yoghurt from „pure areas of the Mazovia region” higher levels have been declared by women compared to men. In stage III of the test, i.e. when full information on the product has been available, the highest price level has been declared for a „goat” yoghurt, higher price for this yoghurt has been declared by men than women. In general, 1/3 of the surveyed in total has declared prices which enabled them to buy a product, and the highest average price has been obtained by a „goat” yoghurt.

Summing up obtained findings, it can be concluded that the participants of the study when not having full information on the products have assessed higher these yoghurts with added value in the form of so-called health benefits. Simultaneously, when full information on the product was available, a goat yoghurt has been assessed relatively higher compared to other yoghurts tested, which has been confirmed by higher average levels of a WTP for a goat yoghurt. Obtained findings are of particular cognitive and applicable value due to the innovative nature of the applied research methodology, which enables identifying price levels which are close to actual market situation.

Methods using a WTP can become useful tools for determining the level of willingness of a Polish customer to pay specific prices for innovative products of animal origin. During the implementation of the study, consumers are shown a suggestion of a set of information e.g. regarding selected health benefits, improving the nutritional value of products of animal origin or indicating a place of origin of particular natural qualities which have a beneficial effect on food quality. Therefore, it is essential to define to what extent given attributes of food products are preferred and accepted by consumers. A further step is to diagnose if consumers are willing to pay more for selected attributes of a given food product and if yes, which price levels they will declare as acceptable (II.B.32.).

It should also be emphasized that upon a prior adaptation in line with the assumed research objective, the effects of applying WTP methodology will make it easier for entrepreneurs to make decisions regarding positioning products on the market, in particular with relation to alternatives for products which have been previously unavailable for consumers. Conducting research of this type can contribute to shaping a potential pricing policy while introducing e.g. new or changed products to the market. An adequately designed research methodology will enable indicating a model of a consumer who is interested in paying a specific price level for selected attributes in innovative products.

In conclusion, my scientific activity presented in the achievement which constitutes grounds for post-doctoral proceeding as well as other achievements concentrate on the detailed understanding of consumer behaviors towards food with particular focus on directions for changing its quality. In my research activities I undertake a multidimensional approach to a consumer which comprises qualitative, quantitative and experimental research methods as well as analytical methods in order to explore and gain insight into the level of acceptance and consumer preferences and to recognize development trends on the market of innovative products which include changing the food quality, mainly its health attributes, which in the era of increased concerns about diet-related diseases seems to be of a particular value.

5.5 Literature

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6 SUMMARY OF RESEARCH ACTIVITIES

My scientific input includes over **78** publications, including **13** in journals indexed in Journal Citation Report and **33** are publications in journals included on the list of Ministry of Science and Higher Education (MNiSW). I am also an author and co-author of 4 chapters in domestic and foreign monographs.

All publications have been presented in table 1. below¹⁸.

Table 1. Summary of scientific publications with regard to Polish Ministry of Science and Higher Education scoring and Impact Factor

No.	Publication ¹⁹	No. of publications		No. of points from MNiSW list	IF	5-year IF	Total of points from MNiSW list ²⁰
		Before PhD	After PhD				
A. Publications in journals with an Impact Factor (IF) in the base of Journal Citation Reports (JCR)							
<i>1.</i>	<i>2.</i>	<i>3.</i>	<i>4.</i>	<i>5.</i>	<i>6.</i>	<i>7.</i>	<i>8.</i>
1.	Animal Science Papers and Reports (2016)	0	1	25	0,725	0,845	25
2.	Appetite (2009)	0	1	20	2,582	3,691	20
3.	Cereal Foods World (2017)	0	1	20	1,558	1,159	20
4.	Food Quality and Preference (2010)	0	1	32	3,013	4,181	32
5.	Journal of Consumer Behaviour (2018)	0	1	25	1,659	2,270	25
6.	Meat Science (2017)	0	1	40	2,821	3,550	40
7.	Nutrients (2017)	0	1	35	4,196	4,603	35
8.	Nutrients (2018)	0	1	35	4,196	4,603	35
9.	Polish Journal of Food and Nutrition Sciences (2016)	0	1	15	1,276	1,760	15
10.	Public Health (2019)	0	1	25	1,441	1,752	25
11.	Sustainability (2018)	0	1	20	2,075	2,177	20
12.	Żywność Nauka Technologia Jakość (2012)	0	1	15	0,190	0,295	15
13.	Żywność Nauka Technologia Jakość (2013)	0	1	15	0,311	0,295	15
Total		0	13	-	26,043	31,181	322
B. Publications in journals with an Impact Factor (IF) included in part B of a Minister's list							
1.	Acta Scientiarum Polonorum (2011)	0	1	9	-	-	9

¹⁸ A total number of points has been compiled based on archival releases of Scientific Research Committee, as well as based on: *Komunikat Ministra Nauki i Szkolnictwa Wyższego (MNiSW) w sprawie wykazu czasopism naukowych z dnia 21.10.2005 r.*; *Ujednolicony wykaz ze strony internetowej MNiSW (2007-2010)*; *Komunikat MNiSW w sprawie wykazu czasopism naukowych z dnia 20.12.2012 r.*; *Komunikat MNiSW w sprawie wykazu czasopism naukowych z dnia 31.12.2014 r. (ze zmianami z 25.03.2015 r.)*; *Komunikat MNiSW w sprawie wykazu czasopism naukowych z dnia 23.12.2015 r.*; *Komunikat MNiSW w sprawie wykazu czasopism naukowych z dnia 9.12.2016 oraz wykaz do Komunikatu z dnia 25 stycznia 2017 roku w sprawie wykazu czasopism naukowych wraz z liczbą punktów przyznanych za publikacje naukowe w tych czasopismach, ustalonego na podstawie wykazów ogłoszonych w latach 2013-2016.*

¹⁹ In parentheses, a year in which publication(s) was/were published

²⁰ Total of points as per MNiSW list of scored journals indicated in column 3 or 4.

No.	Publication ¹⁹	No. of publications		No. of points from MNiSW list	IF	5-year IF	Total of points from MNiSW list ²⁰
		Before PhD	After PhD				
2.	Acta Scientarum Polonorum (2012)	0	1	9	-	-	9
3.	Acta Scientarum Polonorum (2016)	0	1	15	-	-	15
4.	Annals of Warsaw Agricultural University (2000)	2	0	4	-	-	8
5.	Handel Wewnętrzny (2002)	1	0	6	-	-	6
6.	Handel Wewnętrzny (2011)	0	1	9	-	-	9
7.	Handel Wewnętrzny (2013)	0	2	12	-	-	24
8.	Handel Wewnętrzny (2014)	0	2	12	-	-	24
9.	Handel Wewnętrzny (2017)	0	2	12	-	-	24
10.	Handel Wewnętrzny (2018)	0	2	12	-	-	24
11.	Journal of Agribusiness and Rural Development (2015)	0	1	13	-	-	13
12.	Marketing i Rynek (2014)	0	3	6	-	-	18
13.	Przemysł Spożywczy (2001)	1	0	4	-	-	4
14.	Studia i Prace WNEiZ US (2016)	0	1	9	-	-	9
15.	Technologia Alimentaria (2003)	0	1	4	-	-	4
16.	Towaroznawcze Problemy Jakości (2015)	0	1	9	-	-	9
17.	Wiadomości Statystyczne (2001)	1	0	4	-	-	4
18.	Zeszyty Naukowe SGGW w Warszawie, Ekonomia i Organizacja Gospodarki Żywnościowej (2016)	0	2	13	-	-	26
19.	Zeszyty Naukowe SGGW w Warszawie, Ekonomia i Organizacja Gospodarki Żywnościowej (2017)	0	1	15	-	-	13
20.	Zeszyty Problemowe Postępów Nauk Rolniczych (2011)	0	1	6	-	-	6
21.	Żywność Człowieka i Metabolizm (2001)	1	0	2	-	-	2
22.	Żywność Nauka Technologia Jakość (2009)	0	2	4	-	-	8
23.	Żywność Nauka Technologia Jakość (2014)	0	1	15	-	-	15
24.	Żywność Nauka Technologia Jakość (2017)	0	1	15	-	-	15
Total		6	27	-	-	-	298

No.	Publication ¹⁹	No. of publications		No. of points from MNiSW list	IF	5-year IF	Total of points from MNiSW list ²⁰
		Before PhD	After PhD				
C. Authorship of a chapter in a research monograph							
1.	Autorstwo rozdziału w języku angielskim (2013)	0	1	5	-	-	5
2.	Autorstwo rozdziału w języku polskim (2012)	0	2	4	-	-	8
3.	Autorstwo rozdziału w języku polskim (2016)	0	1	4	-	-	4
Total		0	4	-	-	-	17
D. Conference publications reviewed but not included in Web of Science							
1.	Materiały w formie abstraktów w języku polskim i angielskim	0	19	0	-	-	0
2.	Rozdziały w wydawnictwach konferencyjnych w języku polskim i angielskim	3	5	0	-	-	0
Total		3	24	-	-	-	0
E. Popular science publications in Polish and English							
1.	Wież Jutra (2001)	1	0	-	-	0	0
TOTAL					IF	IF 5-letni	Total of points from MNiSW list
PUBLICATIONS IN TOTAL		78		POINTS IN TOTAL	26,043	31,181	620

The number of citations of my papers according to **ICI Web of Science** base amounts to **338**²¹ (329 excluding auto-citations), a Hirsch index – **3**, number of citations registered by SCOPUS Elsevier is **406**, a Hirsch index – **4**. Google Scholar has identified a total of **860** quotations of my papers with a Hirsch index of **9**.

A total **IF** according to the publishing year of a paper amounts to **26.043**, and a current 5-year total Impact Factor for these journals and publications amounts to **31.181**.

The total number of points obtained as per specifications published by the Ministry of Science and Higher Education (formerly by Scientific Research Committee) according to the publication year amounts to **620**, whereby **596** has been obtained upon defending a doctoral dissertation.

Sajdekowolna

²¹ As of 01.02.2019.