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MARKETING RESEARCH REGARDING CONSUMER PERCEPTIONS ON USING RADIO FREQUENCY IN BAKERY PRODUCTION

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Abstract

A marketing research using a quantitative method based on a questionnaire was conducted. The structure of the questionnaire was made taking into account the objective that have been pursuing in this study, namely the assessment of consumers' skills and perceptions in connection with the application of RF treatment technology in order to prolong the shelf life of packaged bakery products, in the conditions of eliminating the addition of synthetic additives.
The questionnaire was distributed online via Survey Gizmo platform. The results obtained showed that among the consumers, most young people and especially women from urban areas, innovative technologies are not so well known, especially the products obtained through the use of these technologies.
The paper presents the results of the questionnaire in terms of consumer preferences related to shelf-life, sensory characteristics, price and openness to products treated by innovative methods.

Key words*: unconventional treatments, RF treatment, shelf life, bakery products.*

INTRODUCTION

Radio frequency (RF) heating involves the use of electromagnetic energy at frequencies between 1 and 300 MHz (Datta et al., 2005). Among these, only selected frequencies (13.56, 27.12, and 40.68 MHz) are permitted for domestic, industrial, scientific and medical applications so as not to interfere with communication systems (Marra et al., 2009; Liu et al., 2011). RF generates heat rapidly within food materials due to molecular friction and space charge displacement in response to an externally applied alternating electric field. This technology can deliver thermal energy quickly to every part of the bulk food product in which pathogens may reside. Thus, RF heating could potentially replace conventional heating for solid and semi-solid foods which have low thermal conductivities (Jeong et al., 2017).

Understanding consumer attitudes, knowledge and behaviour is of vital importance to decision-makers in setting food policies, legislation and development-research directions within society. Furthermore, consumers have become more aware of healthy and safe food with low environmental impact (Draghici et al., 2011). Healthy and environmentally-friendly food products such as organic products become competitive on the market only if the ordinary consumer, the "common people" understands the benefits of these products (Niculiţă et al., 2007). Studying how people think about food and their production, how they buy or obtain the necessary food, their own attitude towards diet, and understanding the links between diet and health are entirely parts of multidisciplinary research that intersects both social sciences and natural ones and synthetically represents the consumer's science (Castura, 2018).

The current market context no longer allows the organization to make decisions without prior investigation into the environment in which it operates, as consumers' requirements are evolving in an accelerated way, competition is becoming more and more fierce and macroeconomic and legislative elements can have a decisive influence on success or failure of the company on the market (Steptoe et al., 1995). Any decision on the organization's activity should be based on solid data on the

dimensions and elements of the marketing environment within the organization in question, so that the products and /or services offered by it are in line with market requirements.
The most important dimensions of buying behaviour are: buying or non-buying reasons, buyers' preferences, buying intentions, and the most important dimensions of buying behaviour are: buying or non-buying reasons, buyers' preferences, buying intentions, and purchasing habits. All of these elements have a major influence in the purchasing decision process (Cătoiu and Teodorescu, 2004).
In this study, the consumer's attitude towards bakery products treated with radiofrequency was followed to extend the shelf life without adding synthetic additives.

MATERIALS AND METHODS

The questionnaire was distributed online via the Survey Gizmo platform and includes two sections:

- the first section refers to the consumer's demographic profile;
- the second section refers to consumer attitudes related to the application of RF treatment technology to increase the shelf life of packaged bakery products while eliminating the addition of synthetic additives.

The first section contains 5 questions out of which 4 questions are with answers to your choice and one with an open answer. The second section contains 8 questions, all of which are questions with answers to your choice.
The size of the sample was 321 participants, but only 320 valid questionnaires were selected as result of questionnaire analysis.

RESULTS AND DISCUSSIONS

As a result of the statistical processing of the collected data, a series of graphical representations have been drawn up which highlight a whole series of aspects related to consumer attitudes related to packaged bakery products obtained by applying RF treatment technology under conditions of reduction / elimination the addition of synthetic additives.

From a demographic point of view, it can be seen that the survey participants are mostly women (230 out of 320) in 72% (Figure 1).

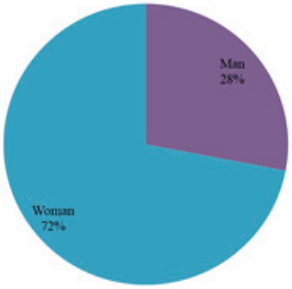

Figure 1. Respondents gender

The urban environment is home for 79% of the survey participants (Figure 2).

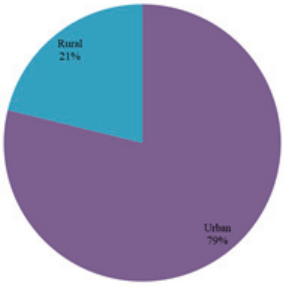

Figure 2. Place of residence of the participants

The intellectual level of the participants in the study results from Figure 3, so the last graduated school is the university for 75% of the participants, high school for 16% and vocational school for 5% of them.

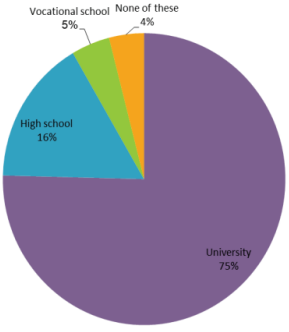

Figure 3. The intellectual level of the participants in the study

Most respondents are young people aged 20 to 35. 19 respondents out of 320 were over 50 years old (Figure 4).

Figure 4. Demographic profile of study participants - age

Of the total number of respondents, 38% have net monthly income for the entire household between 1501 and 2500 lei, while 25% of them have a higher income, ranging from 2501 to 4000 lei (Figure 5).

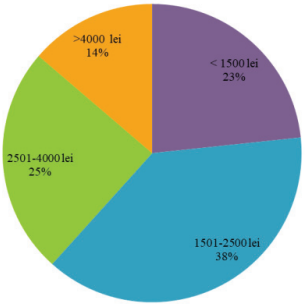

Figure 5. Demographic profile of study participants – age

The first question in the second section of the questionnaire refers to the food that is consumed at least once a month.

The first place was occupied by bread with 87.7%, followed by vegetables and fruits and meat by 85.5%.

Dairy products are placed on the next place, and on the last places the fish and the pasta are only 59.1% and 57.5% (Figure 6).

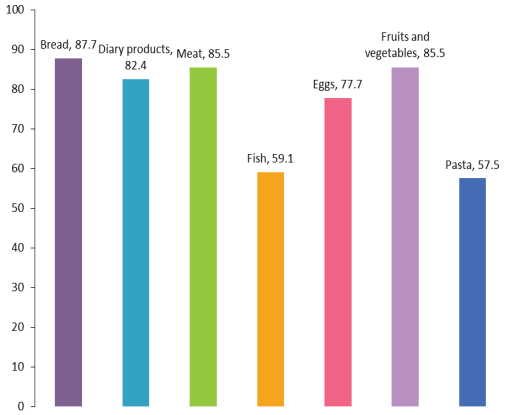

Figure 6. Foods consumed at least once a month

Question 7 was about the consumed type of bread and was answered only by respondents who selected the bread as food consumed so only 278 respondents continued the questionnaire. 52% of consumers said they prefer white bread, while 14% and 15% prefer black bread and whole bread (Figure 7).

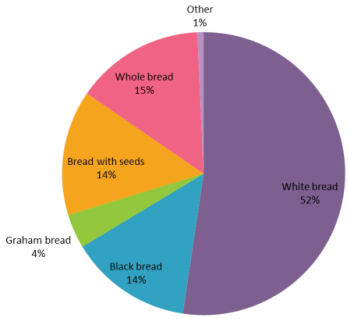

Figure 7. Favourite bread varieties

Regarding the type of bread consumed, the majority of the respondents (53%), preferred the fresh bread (unpackaged), followed by the bread packed with 37% (Figure 8).

For the purchase of bread, neighbourhood stores are preferred by almost 43% of consumers, supermarkets of 30%, and shops specialized in bakery products and hypermarkets of only 17% and 10% of consumers (Figure 9).

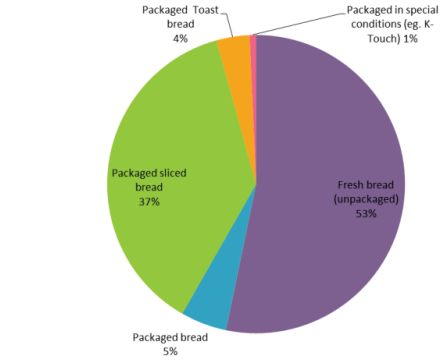

Figure 8. Types of bread consumed

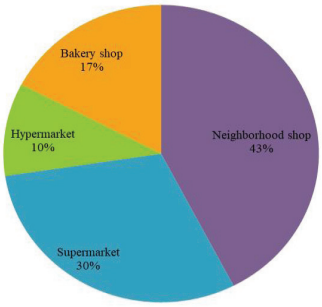

Figure 9. Place of purchase of bread

The next question concerns the importance of the qualities of a loaf when it is purchased. Regarding this issue, 75.8% of the respondents mentioned the freshness of a product as very important when purchasing it, followed by its taste and the validity term for small differences. The packaging of a food is considered very important by 13.4% of the participants, while the producer / mark are an appreciated indicator of 17.6% of them. Appearance, low content of additives, colour and smell are qualities appreciated by 16, 13 or 10% of respondents (Table 1).

The emphasis was on radiofrequency as an innovative method of treating food products with positive effects on quality in terms of increasing their shelf life. Radio frequency (RF) is part of a group of innovative techniques based on electromagnetic heating (eg infrared or microwave) and which has the potential to deliver high-quality foods from the point of view of food safety and with a deadline higher validity (Kim et al., 2012; Orsat et al., 2014; Trujilo et al., 2014).

Asked how openly would be to try bread without preservatives treated with radio frequency, 95% of respondents said they were very open (Table 2).

Tabel 1. The importance of quality parameters when buying bread

Importance / Characteristics	1 - Very little important		2 - Less important		3 -Medium		4 - Important		5- Very important		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
Content of preservative additives	32	0.119	27	0.101	42	0.157	64	0.239	103	0.384	268
Shelf life	14	0.051	9	0.033	16	0.058	61	0.221	176	0.638	276
Assortment	9	0.033	11	0.04	53	0.195	99	0.364	100	0.368	272
Aspect	6	0.022	9	0.033	36	0.132	116	0.426	105	0.386	272
Package	28	0.104	57	0.212	72	0.268	76	0.283	36	0.134	269
Freshness	4	0.015	1	0.004	4	0.015	56	0.207	205	0.759	270
Taste	2	0.007	1	0.004	12	0.043	76	0.275	185	0.67	276
Smell	7	0.026	5	0.019	25	0.093	96	0.356	137	0.507	270
Colour	2	0.007	9	0.033	47	0.173	114	0.419	100	0.368	272
Producer/ mark	25	0.091	50	0.182	73	0.266	78	0.285	48	0.175	274
Ingredients	7	0.025	11	0.04	49	0.178	78	0.283	131	0.475	276

Tabel 2. Level of acceptability

	1- not open at all		2		3		4		5- very open		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
Level of acceptability	28	0.101	26	0.094	62	0.224	66	0.238	95	0.343	277

Taking into account the benefits of innovative products, 53% of survey participants would not pay a higher price for radio frequency treated products, while 18% of them would not buy the products (Figure 10).

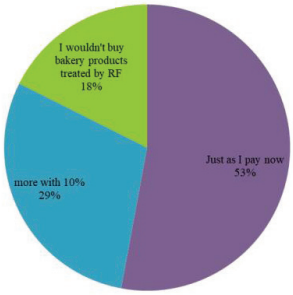

Figure 10. Availability of higher price payment for RF treated bakery products

On the last question, "Under what conditions would you be more open to buy products that have been used in innovative processing methods?", 55% of respondents say there should be more information on such methods, while 20% want to be recommended by specialists (doctors, nutritionists, researchers) (Figure 11).

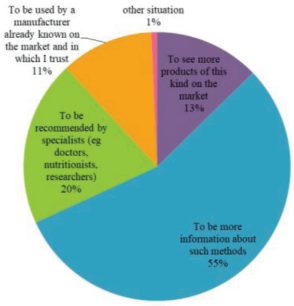

Figure 11. Conditions of acceptability for products treated with innovative methods

CONCLUSIONS

The socio-demographic profile of the respondents was as follows: more than half of the participants in the interview were women (72%); 79% of the respondents were from urban areas, most of them being young people aged between 20 and 35 years old and 75% of them have higher education.

The most frequently consumed food product was bread with 87.7% of the responses, followed by vegetables, fruits and meat (85.5%), dairy products (82.4%), eggs (77.7%), pasta (57.5%) and fish (59.1%). For the purchase of bread, neighbourhood stores are preferred by 43% of consumers, followed by supermarkets (30%), specialized stores for bakery products (17%) and hypermarkets (10%).

52% of the respondents prefer white bread, while black bread and whole bread is preferred by 14% and 15% respectively. 53% of the respondents prefers fresh bread (unpacked), while 37% prefers packed bread.

Taking into account the benefits of innovative products, benefits presented in the survey, 53% of the participants would buy radiofrequency treated products if they cost the same, 29% would pay more with 10% and 18% of them would not buy such products. Furthermore, 55% of the respondents say there should be more information about such methods, while 20% would like such products to be recommended by specialists (doctors, nutritionists, researchers).

The overall conclusion of this study is that innovative technologies and the products obtained using these technologies are not that well known. Consumers are susceptible to the use of innovative technologies to obtain food, mainly being concerned by the impact on their

health. These fears are often justified, especially due to the lack of information at the level of the average consumer.

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