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USE OF MARKET RESEARCH IN THE DEVELOPMENT OF CHEESE AND PASTA TARGETED AT ELDERLY CONSUMERS

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Abstract: Brazil has been going through a rapid demographic transition, where mortality and fertility levels are constantly decreasing and, as a result, the population is aging. This fact calls for a quick response from the market for products that meet the needs of this new growing niche. Thus, this work aimed to develop and evaluate virtual prototypes of food products for the elderly, based on the needs and desires of elderly consumers regarding new products, through the use of market research. To this end, three market surveys were developed, each consisting of an online questionnaire, with about 200 elderly respondents, over 60 years old, for each survey. Minas Padrão cheese and Spaghetti pasta were the best-accepted prototypes, showing the most positive results for purchase intent and interest in innovation, proving their effectiveness in developing products for the elderly.

Keywords: Market research; Prototyping; Development of new products; Third Age; Aging.

INTRODUCTION

In recent decades, Brazil has gone through a period of accelerated demographic aging, as a result of the decline in fertility and general mortality rates, which are identified as the main factors responsible for this change in age compositions and also in growth rates (WONG E CARVALHO, 2006).

The reduction in mortality is mainly related to advances in medicine and public health, increased income, better food conditions, control of vectors that cause infectious diseases, among others (BLOOM, 2011). The total fertility rate in Brazil went from 6.28 children per woman in 1960 to 1.90 children in 2010, a reduction of about 70%. The projection is that the number of children per woman drops to 1.5 in 2030. In addition, it is assumed that in 2050, the number of people over 60 years old will be equivalent to about 30% of the country's population (IBGE, 2015).

Along with the demographic changes that have occurred in the country in recent decades, the long-lived has expanded and gained greater attention in the social scenario, reaching new realities. This way, it has become an emerging population that encourages the development of new technologies, laws, products, services and scientific specialties within geriatrics and gerontology (FREITAS, 2019).

Aiming to meet the needs of this niche, an exclusive market has emerged, focused on new consumer demands, providing fulfillment and satisfaction in various fields, not just limited medicine and health services (SANTOS, 2017). As a result, the elderly have gradually become an important and influential segment in the production of new foods (ABREU, 2014).

Working with the development of new products is fundamental for a company that seeks leadership in its sector. In the past, large-scale and low-cost production guaranteed the success of industries, however, currently knowing how to create value is the key to success. Nowadays, conquering the market is linked to understanding its needs, and this way, being able to make the customer's will come true (REZENDE, 2008).

The development of new products is the transformation of something idealized by a niche market into a real product available for sale. Faced with the needs and desires of the consumer, this process begins, which ends with the translation of this will into something that is viable to be reproduced. For the execution of a new product, a lot of effort is needed, which requires research, careful planning, meticulous control and, above all, the use of systematic methods (KRISHNAN; ULRICH, 2001).

More and more consumers have adopted

diets that include products that provide health and well-being, those with functional properties have attracted the attention of this segment and to meet the growing demand of this market, the industry has invested in products with these benefits (MARTINS et al, 2013; REYNOLDS; MARTIROSYAN, 2016).

Functional foods are currently defined as natural or processed foods with the presence of known or unknown bioactive compounds that, in non-toxic amounts, promote clinically proven health benefits by preventing, managing or treating chronic diseases (MARTIROSYAN; SINGH, 2015). The development of new functional products reveals a growing trend associated with awareness of the role of diet in reducing the risk of chronic diseases. (ALEZANDRO et al., 2011).

One of the most used tools for decision making in the process of innovation, development and generation of new products is market research. It has the ability to express the behavior, desire or need of the consumer and also the advantage of measuring the acceptance of a certain product, which is why companies have invested in the incorporation and improvement of market research techniques (GONÇALVES, 2010).

To understand the needs and desires of the elderly is necessary in view of the growing number of people in this group. Companies still have great difficulty introducing specific products for this segment, given the scarcity of information about it. Thus, the objective of the study was to develop and evaluate virtual prototypes of food products for the elderly, based on the needs and desires of elderly consumers regarding new products, through the use of market research.

METHODOLOGY

Data collection was carried out through the interactive method, that is, through online questionnaires. Along with it, there was a free and informed consent form (TCLE), with guidelines and research objective, followed by two questions, if the person agreed with the term and if their age was over 60 years, which are fundamental and of elimination factor for participation.

The tool used to assemble and apply the questionnaires was the Google platform, forms (GOOGLE, 2020). This way, the project was carried out in three stages, in each stage a type of market research was developed, one complementary to the other, where the data collected in the previous one served as a basis for structuring the next one.

The convenience sampling technique was chosen, which consists of selecting an accessible sample from the population. This way, the selection is made for individuals who are readily available to answer the questionnaires and not because statistical criteria were used for this selection (OCHOA, 2015).

A minimum of 200 respondents was defined for each stage and the application of the questionnaires was carried out through dissemination through social networks and through calls to men and women aged over 60 years. Each stage of the research was carried out separately, since one depended on the other, so the respondents of one stage did not necessarily participate in the others.

RESEARCH STEPS

In the first stage, an exploratory market research was carried out, in which it was intended to specify one or two types of food product to be worked on. The categories available were: dairy, meat, bakery, pasta and beverages. Also, within each one there were at least two product options, so the elderly must choose a single category and within it a single specific product, to further narrow the choice and, after analysis, arrive at one or two

products with the most votes.

Descriptive research was applied in the second stage, with the aim of describing: who are elderly consumers, the most recurrent health problems and preferences for the most preferred products in the first stage. After carrying out the analysis of the second stage, the third stage was elaborated with a research of the causal/experimental type. In this phase, the prototypes were elaborated based on further research in the literature and on the results of the second stage, with the objective of evaluating the elderly's reaction to a new product aimed at the elderly and also their purchase intention.

Thus, three prototypes were developed for the cheese, namely Minas Frescal Cheese, Minas Padrão Cheese and Mozzarella Cheese, and the innovation of adding lutein was proposed because it brings several health benefits, especially for vision. Three prototypes for pasta were also developed, namely Fusilli Pasta, Talharim Pasta and Spaghetti Pasta, and the innovation of this was the addition of inulin, which helps with several problems, mainly in the functioning of the intestine.

DATA ANALYSIS

Each of the three applied questionnaires was tabulated in the Microsoft Office® Excel (2016) program to generate bar graphs. This way, it was possible to analyze the data by observing the percentages for each answer.

RESULTS AND DISCUSSION
EXPLORATORY RESEARCH

In the initial stage of the research, where the objective was to elect two foods/beverages preferred by the elderly for new products, 208 responses to the questionnaire were collected through exploratory research. In the first section of this, where the intention was to select a preferred category, responses were computed mostly for the dairy (29%) and pasta (31%) category (Figure 1). Within these two categories, there were several product options, however the most voted were: cheeses, in dairy products, adding up to a percentage of votes of 82.7% and pasta, in pasta, reaching 81.3% (Figure 2). Because they were the most voted foods, they were chosen to continue the research.

Probably, the choice of these two products by the elderly was due to the advantages offered, mainly with regard to taste and low cost. Another factor to consider is that both are part of the Brazilian consumer's table, being highly appreciated when shopping, becoming a cultural habit.

One of the most appreciated dairy derivatives in the world, cheese consumption has been growing in Brazil. According to the IBGE's Household Budget Survey (POF), they represent 10% of the most consumed dairy products in the country, second only to fluid milk. Several factors may favor this increase in demand, such as its nutritional composition containing good quality proteins, little fat and being suitable for all ages (OLIVEIRA et al, 2021).

The consumption of pasta is expanding more and more, being incorporated into cooking as a main dish or side dish. This high consumption is mainly related to its low cost, ease of preparation, versatility and long shelf life of the product (CAPPA; ALAMPRESE, 2017).

DESCRIPTIVE RESEARCH

Moving on to the second stage, based on the two products chosen with the highest number of responses, 201 elderly people answered the descriptive research questionnaire. The first section of the second questionnaire focused on socioeconomic information, in which most respondents were female (58.2%). Regarding the age group, there was a decline in the answers computed with the increase in
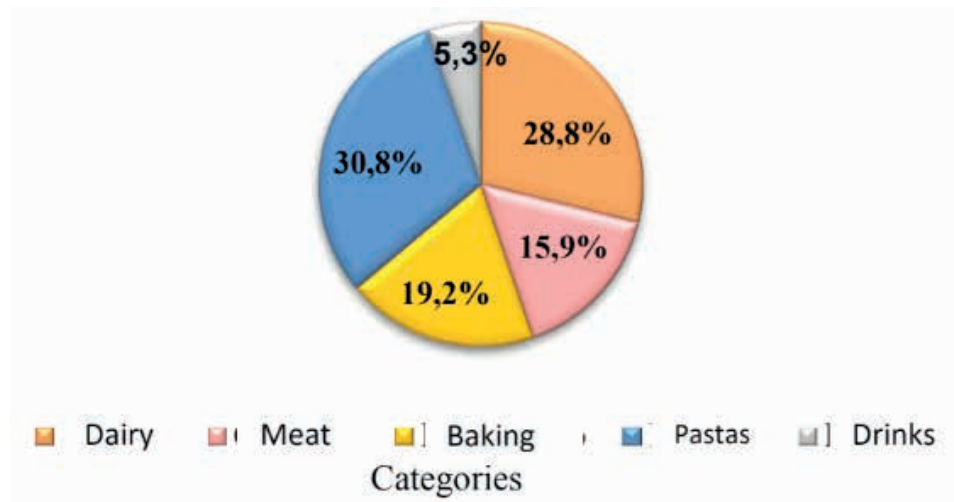
Figure 1. Graph of the elderly's responses to which food category they would like to see new products.
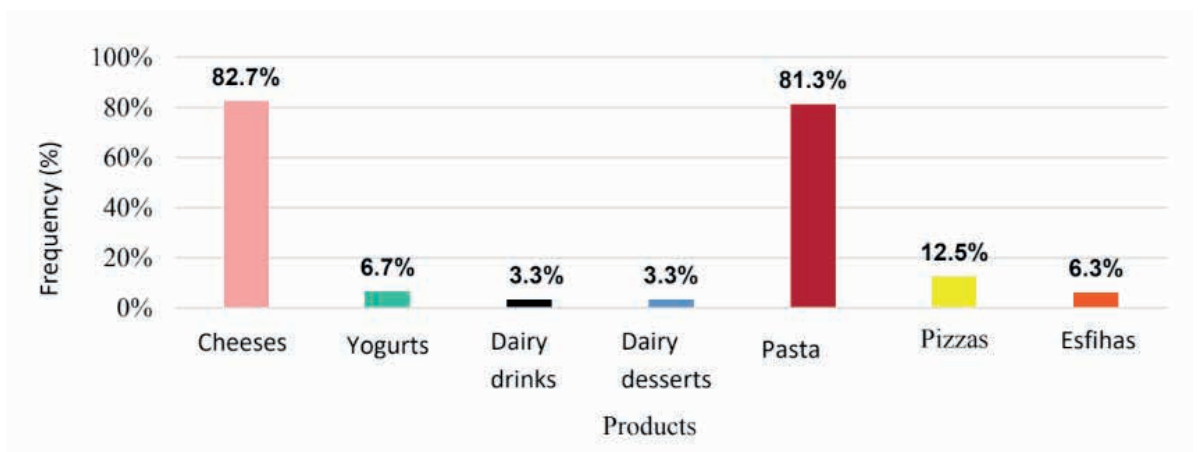Source: author himself, 2020.

Figure 2. Graph of the elderly's responses to which type of food they would like to see new products, within the dairy and pasta category.
Source: Author himself, 2020.

the age group, 40.8% of the participants were in the 60-65 age group, 26.9% in the 66-70 age group and 21.0% in the age group of 71-75 years.

Markings for monthly family income were mostly for 1 to 3 minimum wages (48.3%) and 4 to 5 minimum wages (43.3%), considering the 2020 minimum wage of R$1,045.00. As for schooling, most responses were for Elementary School (36.3%), Incomplete Elementary School (26.3%) and no schooling (16.0%). With regard to marital status, 55.6% of respondents were married and 25.4% were widowed (Figure 3).

In the second section of the questionnaire, the questions were formulated in order to complement the first section, and thus, to be able to understand a little of the relationship between socioeconomic factors and the behavior of the elderly. Most of the elderly participants were retired (86.6%), did not live alone (80.6%) and were responsible for buying food at home (61.7%) (Figure 4).

Regarding the practice of physical activities, most said they did not practice any (51.2%), and most practitioners were adept at walking (40.2%). Questions related to the packaging were also asked, in order to help design the prototypes, where 72.6% of the elderly stated that they had difficulties seeing the information written on the packaging labels and 91.5% stated that they liked to see the products through the packaging. (Figure 4).

NCDs (Chronic Noncommunicable Diseases) are characterized by having an uncertain etiology with variable causes and gradual onset (BRASIL, 2013). These diseases are identified as responsible for 72% of deaths worldwide and for 74% of deaths in Brazil (WHO, 2015).

The third section of the questionnaire was intended for a clinical characterization of the elderly respondents. Questions related to some diseases or changes in sensory perception typical of aging were asked. Of the chronic diseases, the most recurrent were Diabetes Mellitus (28.9%) and Arterial Hypertension (53.7%). Of the problems related to the sensory part, 55.3% said they had difficulty seeing, 23.6% difficulty chewing or swallowing food and 19.6% lack of appetite. Most claimed not to have lactose intolerance (95%) and celiac disease (96.5%), and as for other diseases, allergies or food intolerances, there was an open question in which the answers were all "I don't have" (Figure 5).

With aging, the demand for medicines and hospital medical services take priority and consume a large part of the budget of families with elderly people (ZANON; MORETTO; RODRIGUES, 2013). Hypertension and diabetes, which received the highest percentage of responses, require both drug treatment and a balanced diet, especially in terms of sodium and carbohydrates. Thus, chronic diseases and physiological changes resulting from aging must be taken into account when designing a product for the elderly.

In the last section of the second questionnaire, there were specific questions about cheese and pasta, with the aim of obtaining answers to build prototypes of new products, taking into account the opinion, taste and preferences of elderly consumers.

For cheeses, 91% of the responses were positive regarding consumption, mostly for the types: Minas fresh cheese (77.6%), Minas standard (72.6%) and Mozzarella (60.7%). According to Perry (2004), these three cheeses are widely consumed in the country, especially the first two that are of Brazilian origin. Regarding weight, 38.3% of respondents said they preferred between 751g and 1Kg and 32.3% preferred between 501g and 750g (Figure 6). The preference for larger pieces reveals the large consumption of cheese by the elderly and also because it presents the
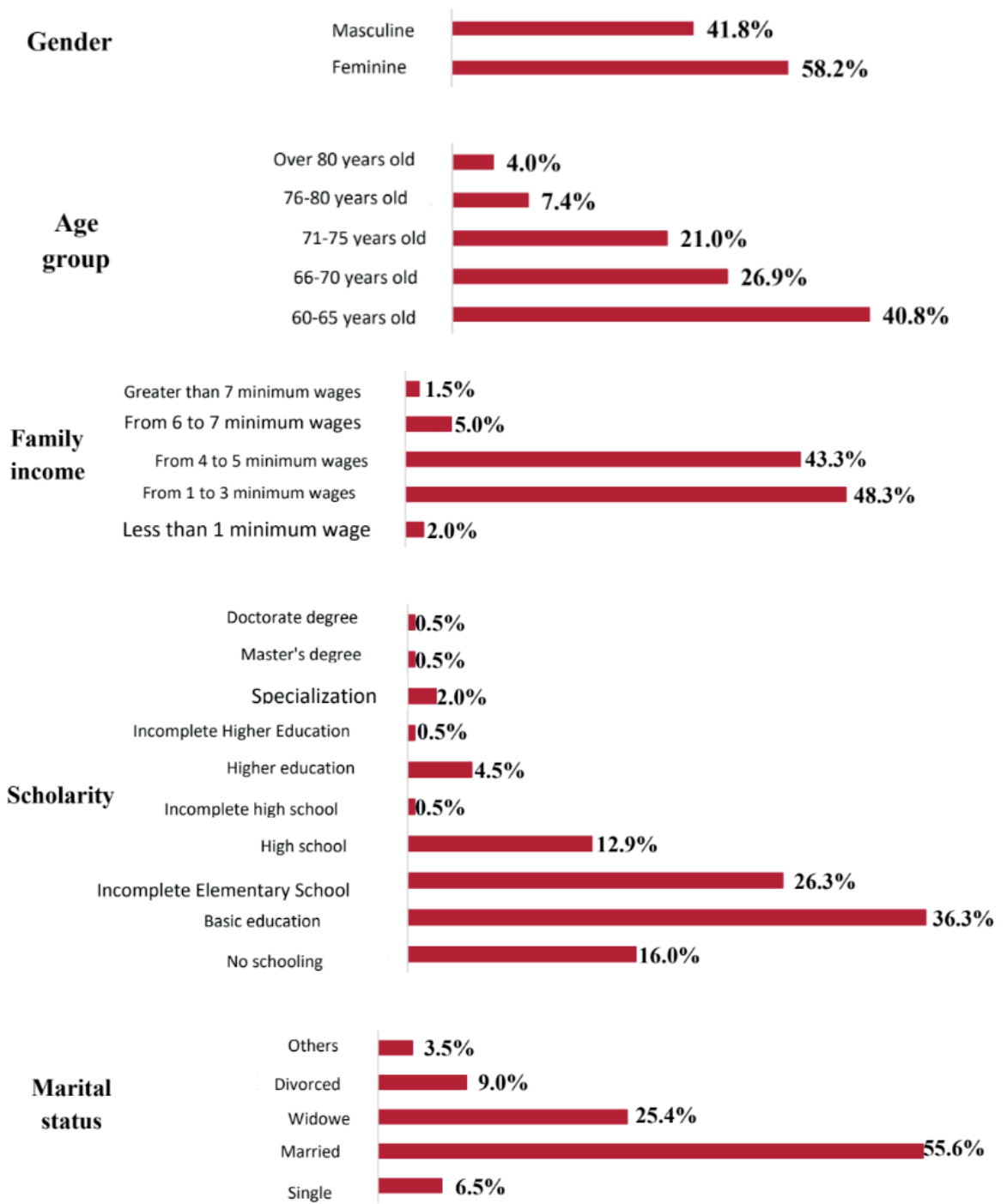
Figure 3. Answers obtained from the questionnaire of the 2nd Stage of the research, referring to the socioeconomic data of the interviewees.
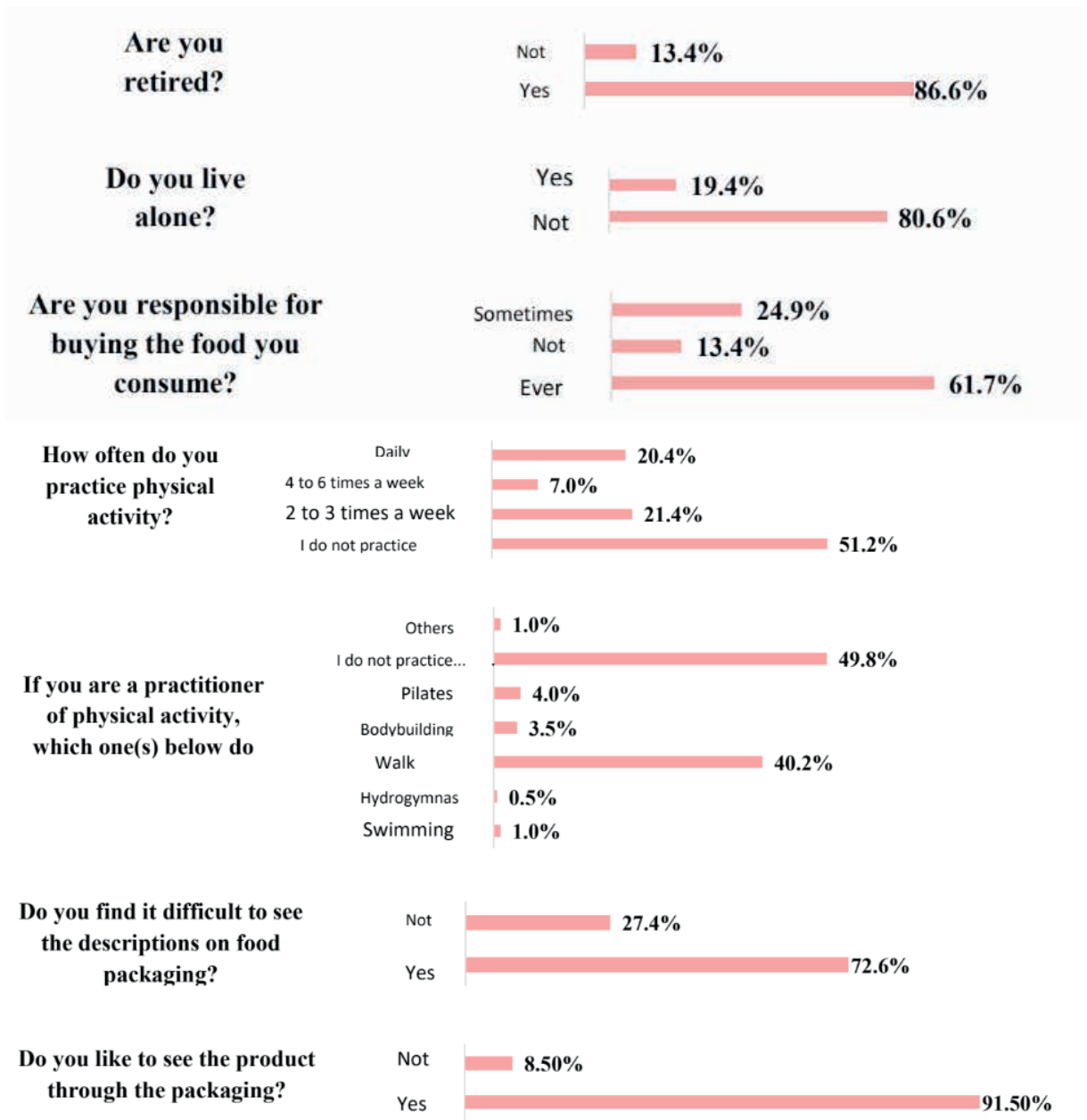
Source: Author himself, 2020.

Figure 4. Answers obtained from the questionnaire of the 2nd Stage of the research referring to complementary questions about the characterization of the interviewee.
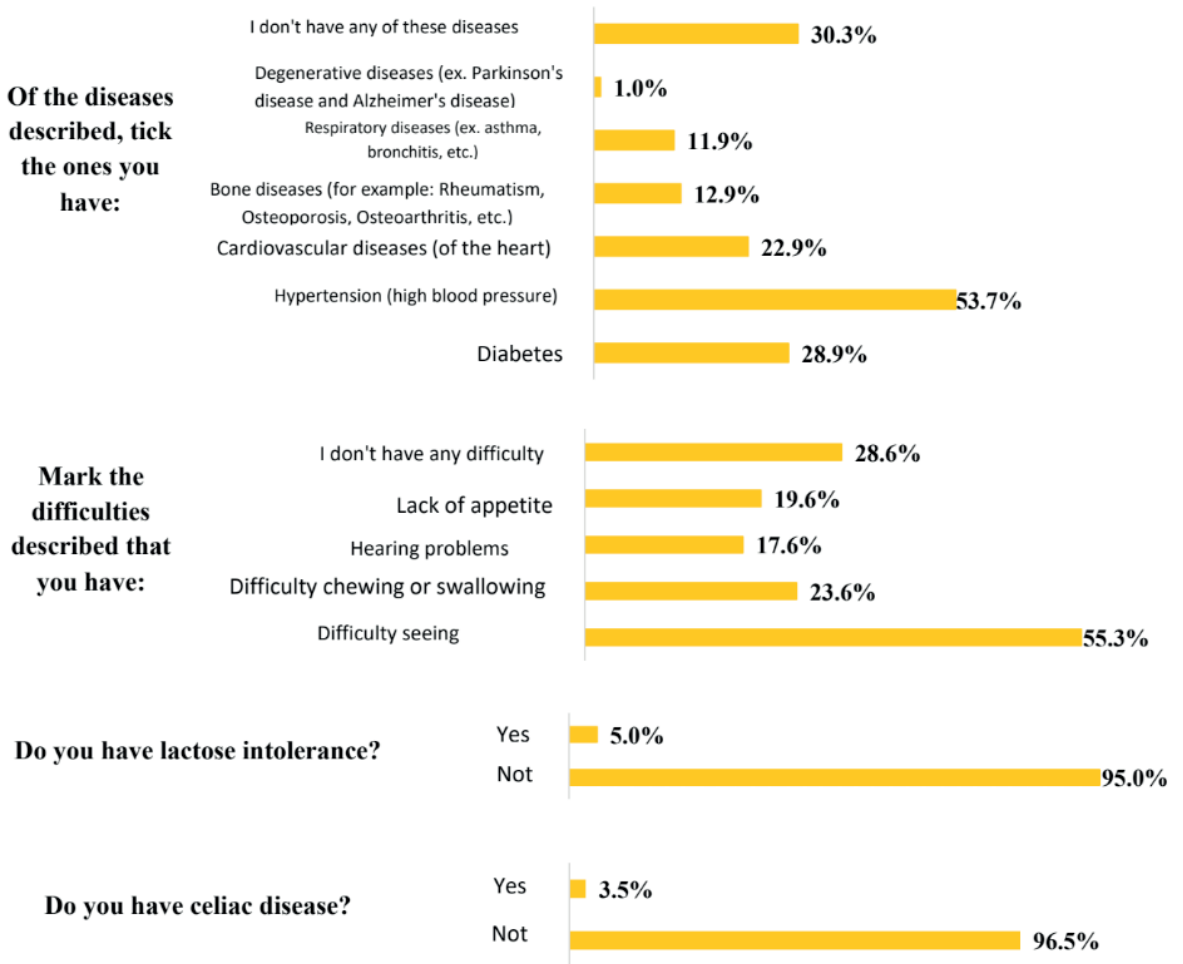
Source: Author himself, 2020.

Figure 5. Answers obtained from the questionnaire of the 2nd Stage of the research referring to the clinical characterization.
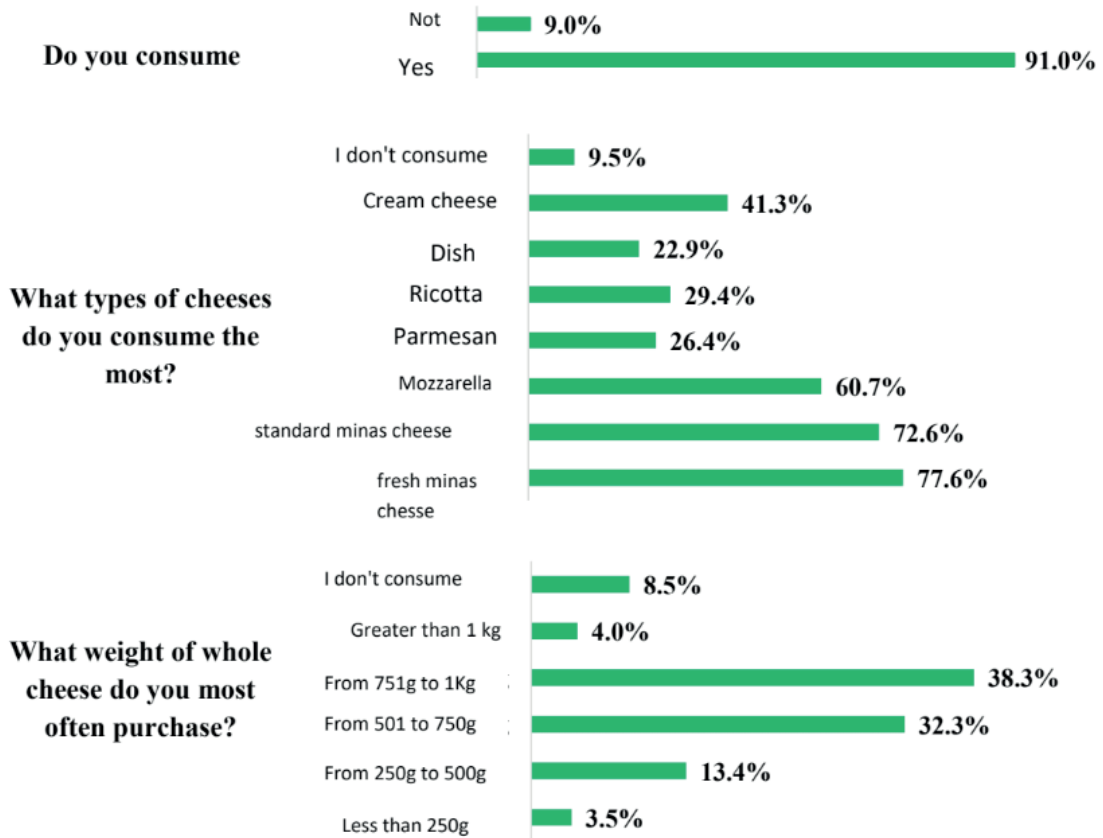
Source: Author himself, 2020.

Figure 6. Answers obtained from the questionnaire of the 2nd Stage of the research referring to the consumption of cheese by the elderly.
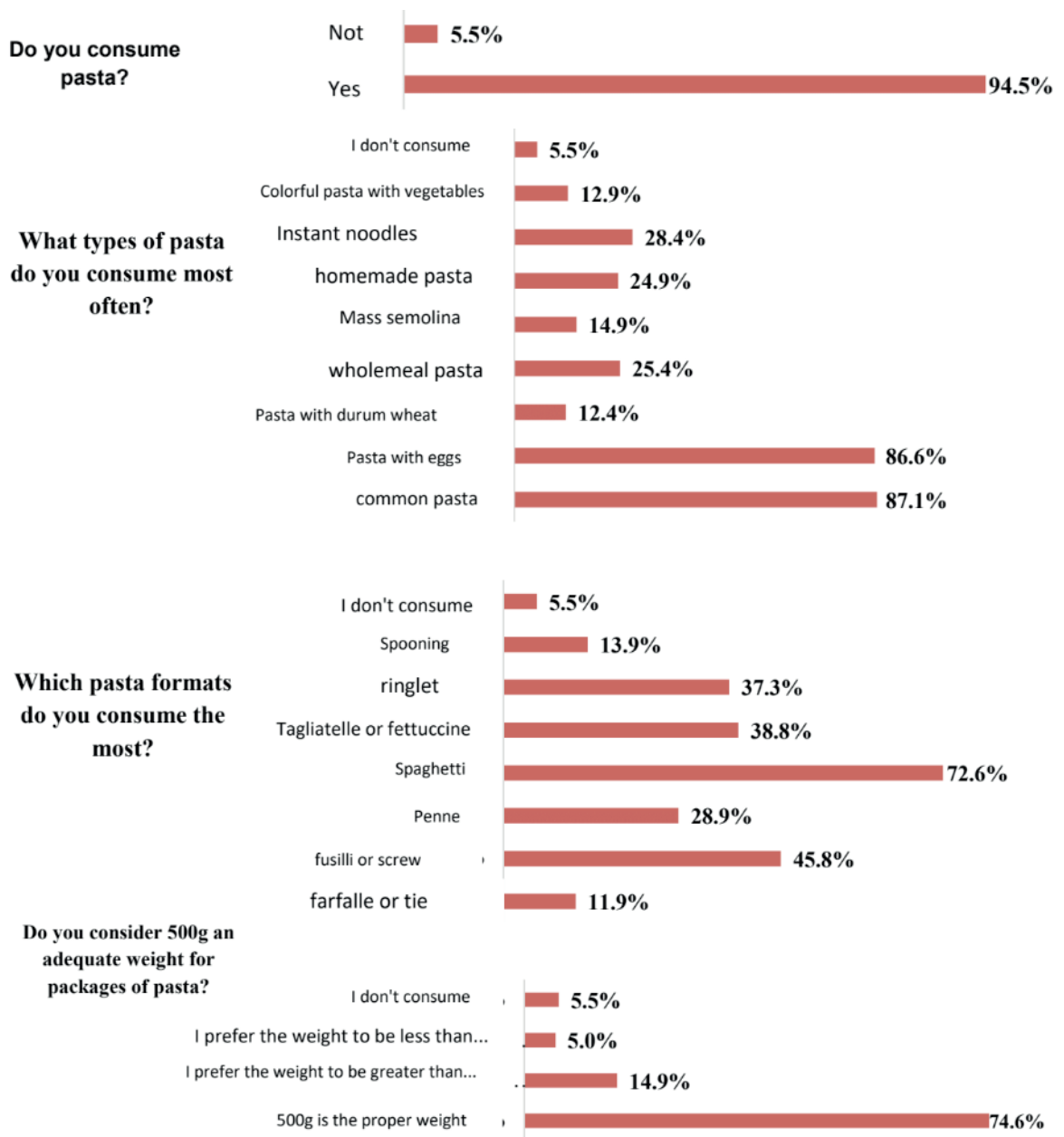
Source: Own author, 2020.

Figure 7. Answers obtained from the questionnaire of the 2nd Stage of the research referring to the consumption of pasta by the elderly.

Source: Author himself, 2020.

possibility of serving the whole family, since most do not live alone.

There was also an open question where the respondent had to describe what he expected in cheese developed for the elderly, the terms that appeared most frequently were "less fat", "less salt" and "more vitamins and minerals". In general, this group of consumers understands that cheese consumption has its health benefits, but is also aware that some types of cheese are greasier, and that this is not beneficial for their health, especially for those who have some type of chronic disease that restrict the consumption of fatty foods. The same is said for salt, which must also be controlled in the diet of the elderly. The perception of the need for more vitamins and minerals reveals access to information about the importance of including these in their diet.

As for pasta, 94.5% of the oldest respondents said they consumed it, with a large percentage consuming egg pasta (86.6%) and regular pasta (87.1%). For the item format, the highest scores were respectively: Spaghetti (72.6%), Fusilli or Screw (45.8%) and Tagliatelle or Fettuccine (38.8%). A question was asked regarding the size of the package, where 74.6% of the elderly stated that they preferred the 500g package (Figure 7), which is the standard size found on the market.

As previously done with cheese, there was an open question where the respondent had to type what he expected from a pasta developed for the elderly. The expressions that appeared most frequently were "more vitamins", "more nutrients" and "less additives". The first two expressions, as well as in relation to cheese, express concern with the need to include these components in the diet, on the other hand, the term "less additives" demonstrates a lack of knowledge about the pasta manufacturing process, which does have the inclusion of some additives, but in low amounts and with the aim of preserving this food. The use of this term

may be linked to a concern with a healthier lifestyle, without the heavy consumption of processed foods.

Regarding the frequency of consumption, for pasta the highest percentage of responses was "weekly" with 46.8%, probably due to the cultural issue of consuming pasta on Sundays, whose main ingredient is pasta. As for cheese, the highest percentage of votes was for "daily" with 21.9%, which may be related to the fact that cheese is a versatile food and can be consumed at any meal of the day (Figure 8).

With regard to the most important characteristics for the elderly, for both pasta and cheese, flavor was the most voted, with 71.6% and 78.1%, respectively. For pasta, after flavor, the other two most voted characteristics were: aroma (54.7%) and appearance (52.2%). As for cheeses, they were: appearance (55.2%) and price (43.3%) (Figure 8). It is interesting to note that for both foods, the percentage of votes for flavor and appearance stood out, which indicates the importance of these two characteristics in foods for this market.

Among the reasons that lead this public to consume cheese and pasta, pleasure was the most voted for both (Figure 8), being an interesting question as it demonstrates that the elderly consume these foods because they like it and the addition of compounds with the proposal of something positive for health, can further leverage the sales of these foods.

Finally, in most cases, when it comes to innovation, the value of the product can be a little above the conventional. Thus, for the question "how much would you pay more for this innovation", for pasta the highest percentage of votes was for "up to 30% more than conventional" and for cheese "up to 40%". It can be said that, for both foods, the percentages of extra costs were high, which indicates the desire of the elderly consumer for a product tailored to their needs and their willingness to pay for it.

CAUSAL/EXPERIMENTAL RESEARCH

In view of the analysis of all the information obtained in this second questionnaire of the second stage of the research, and research carried out in the literature, the prototypes were then built, in addition to the third and last questionnaire for a causal research, this being the third stage of the work.

To design the prototypes, the first step was to choose the types of cheese and pasta that would be used. Three types were standardized for cheese and three for pasta, taking into consideration, those that received the most votes in the second questionnaire. This way, for cheeses it was defined: Minas Frescal, Minas Padrão and Mozzarella; and for pasta: Fusilli, Tagliatelle and Spaghetti.

As for innovation, to be used in the cheese prototype, the addition of lutein was chosen. Based on research in the literature, there were several studies proving the benefits of this component for human health, the main one in relation to the prevention of some eye diseases that affect the elderly (SILVIA, 2017). As the difficulty of seeing was one of the topics most voted by the elderly as sensory difficulties, the choice of adding this compound to cheese becomes justifiable, since it can help prevent these problems.

For the pasta prototypes, we opted for the addition of inulin, also after observing several studies in the literature proving the effects of ingestion of this component. As a prebiotic, it assists in various functions related to the intestine, as it serves as food for probiotics. With aging and in most cases the high use of medications, intestinal dysfunctions are a problem for many elderly people, thus, the addition of inulin becomes justifiable to help with these difficulties (SANGEETHA; RAMESH; PRAPULA, 2005; ROBERFROID, 2007; MIREMADI; SHAH, 2012).
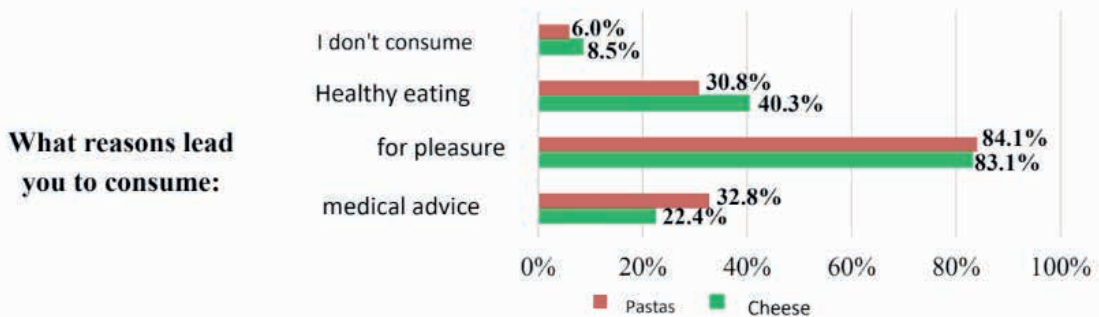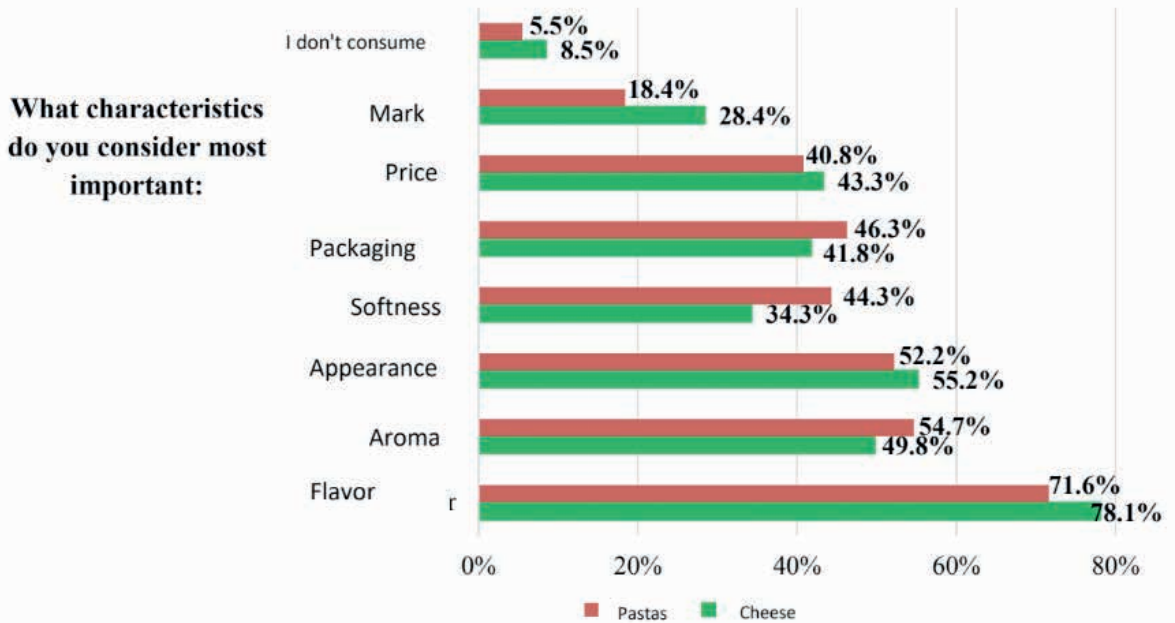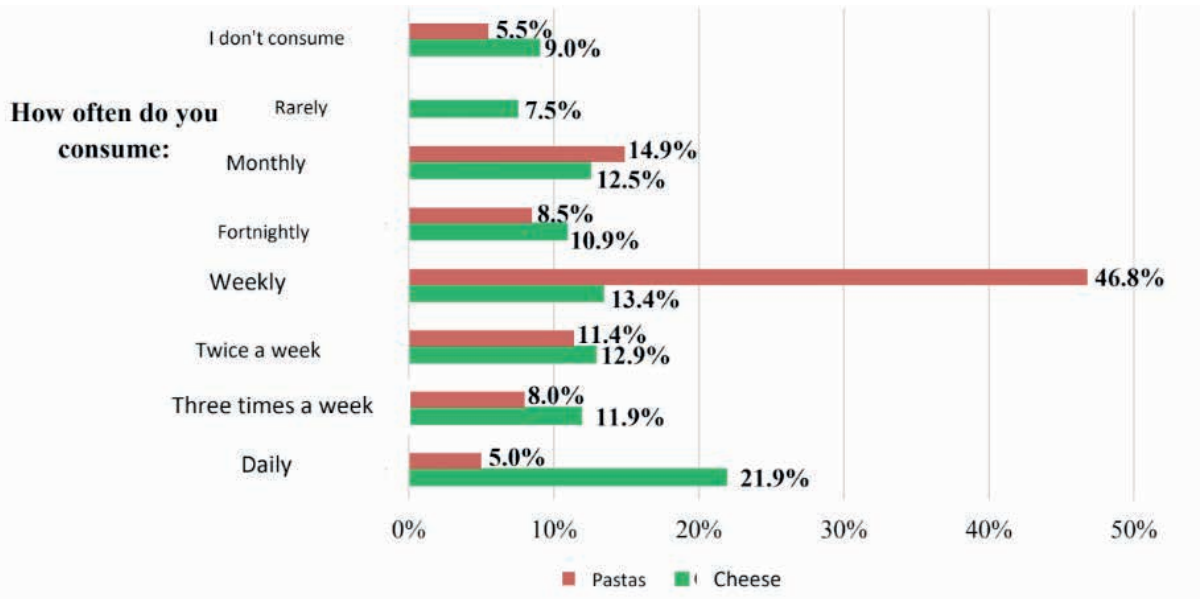
After selecting the foods and their respective innovations, the planning and construction of the virtual prototypes began. Despite being a difficulty that can be found in people of all ages, one of the greatest difficulties in relation to colors among the elderly is to distinguish between shades of blue and green and yellow and red. (FREITAS; PY, 2016).

Another factor that influences a package for the elderly is a slightly larger space between the letters, facilitating perception and, therefore, helping understanding, precisely because it avoids confusion when reading. The issue of line spacing must also be considered, as a line spacing of 120% of the body of the typography already makes it possible to read clearly when talking about the general public. However, when it comes to the elderly, a longer line spacing facilitates reading, reducing the risk of reading the same line twice, skipping the line or even starting reading on a line and getting lost in the middle of it, due to the proximity between them. (LUPTON, 2015).

Thinking about these factors, it was decided to build a prototype with a neutral color and woody background, bringing a rustic touch, but at the same time familiar and peaceful, combining with both cheese and pasta. We sought to include adequate spacing for better understanding when reading the label, since according to the second questionnaire most elderly people said they had difficulties seeing the information on the package label. Still based on this questionnaire, on the issue of product visibility through the packaging, it was decided to emphasize the transparency in some parts of all products (Figures 9 and 10).

Regarding the fictitious name of the brand, a reference to the elderly was thought in a positive way. "Nonno" derives from the Italian language and its translation into Portuguese is "avô", which alludes to old age in a familiar way. Regarding the letter, fonts with little curvature were used, in order not to hinder understanding and reading.

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How often do you consume:

	Pastas	Cheese
I don't consume	5.5%	9.0%
Rarely		7.5%
Monthly	14.9%	12.5%
Fortnightly	8.5%	10.9%
Weekly	46.8%	13.4%
Twice a week	11.4%	12.9%
Three times a week	8.0%	11.9%
Daily	5.0%	21.9%

What characteristics do you consider most important:

	Pastas	Cheese
I don't consume	5.5%	8.5%
Mark	18.4%	28.4%
Price	40.8%	43.3%
Packaging	46.3%	41.8%
Softness	44.3%	34.3%
Appearance	52.2%	55.2%
Aroma	54.7%	49.8%
Flavor	71.6%	78.1%

What reasons lead you to consume:

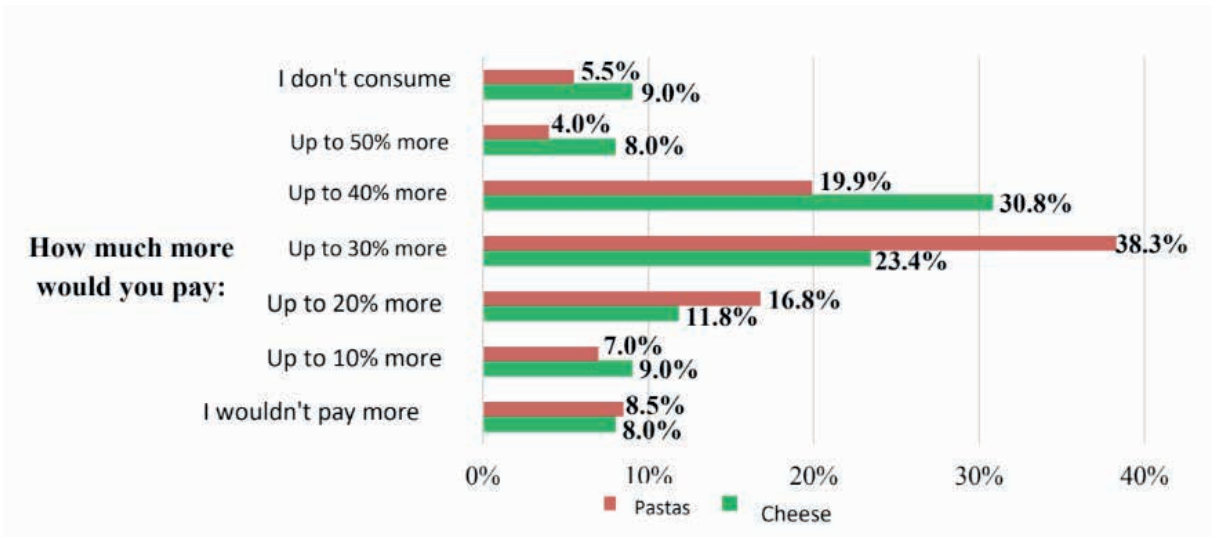|	Pastas	Cheese
I don't consume	6.0%	8.5%
Healthy eating	30.8%	40.3%
for pleasure	84.1%	83.1%
medical advice	32.8%	22.4%

Figure 8. Comparison of the answers obtained from the questionnaire of the 2nd Stage of the research referring to the consumption of pasta and cheese by the elderly.

Source: Own author, 2020.

Figure 9. Prototypes of the three types of cheese selected from the majority of votes received in the second questionnaire: Minas fresh, Minas standard and Mozzarella.

Source: Author himself, 2020.

Figure 10. Prototypes of the three types of pasta selected from the majority of votes received in the second questionnaire: Fusilli, Tagliatelle and Spaghetti.
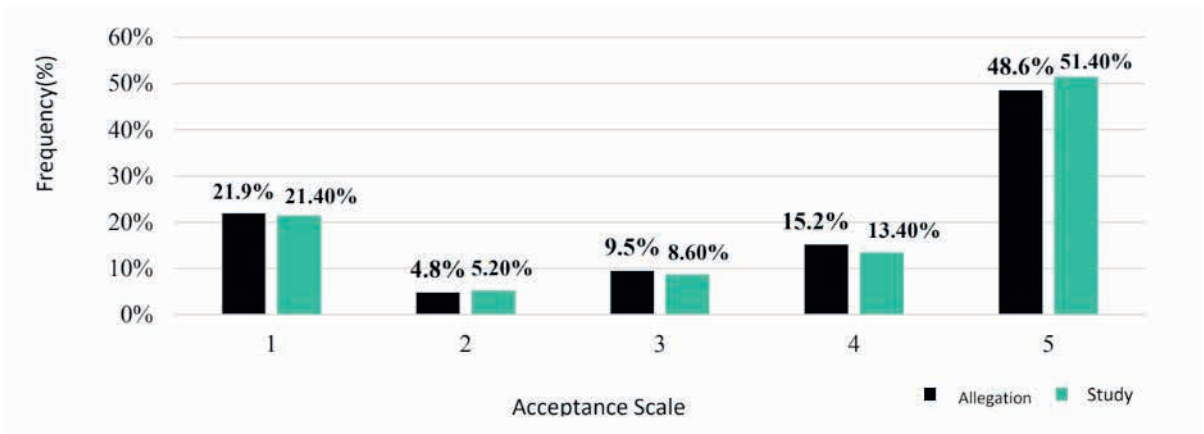
Source: Author himself, 2020.

Figure 11. Answers obtained from the questionnaire of the 3rd Stage of the research referring to the acceptance of the elderly regarding the claim of a functional product of lutein and excerpts from the study on this component.

Source: Author himself, 2020.

With the assembly of the prototypes, the third questionnaire was then elaborated, constructed in order to understand the reaction of elderly consumers to the compound's inulin and lutein, as well as their respective additions to pasta and cheese. There was a total of 210 responses to this third questionnaire.

In the first section, which referred to cheeses, the functional food claim described by ANVISA for lutein was placed (BRASIL, 2016). Below it was a scale for the elderly to mark on a scale of 1 to 5 how they felt about that statement, with 1 being "I don't think it's relevant" and 5 "I think it's very interesting". Analyzing the data, there was a positive acceptance by elderly consumers of the claim that lutein is a functional product, since adding points 4 and 5, which correspond to good acceptance on the scale, totaled 64.8% of votes for interesting.

Still in this section, there was an excerpt from a study on the benefits of lutein consumption and below a scale identical to the one used to study the claim, where the percentages of votes were close to the claim for all points on the scale, or that is, there was also a good acceptance. The higher percentages for points 4 and 5 show that practically more than half of the elderly respondents considered the information provided about lutein interesting, smaller portions either completely disliked it or were intermediate (Figure 11).

Likewise, in section two there was the same information for inulin, its ANVISA functional food claim and an excerpt from a study (BRASIL, 2016). The percentages of acceptance for the claim and the study were slightly lower than for lutein, but with the same trend of greater interest on the part of the oldest old (Figure 12).

In addition to the allegations and studies, the prototypes of each cheese and each pasta were exposed, and for each one there was a scale equal to the one used previously and another one of purchase intention, this last one was also from 1 to 5, being 1 would not buy and 5 would buy, in order to assess whether the consumer was really interested in the product.

Regarding the cheeses, the best accepted by the elderly in relation to the prototype was Minas Padrão and the least accepted was Mozzarella, and for purchase intention the results were similar (Figures 13 and 14). As for pasta, the most accepted and with the highest purchase intention was Spaghetti (Figure 15 and 16).

According to Della Lucia et al. (2007) several surveys are conducted in order to observe the role of packaging and/or factors contained therein (such as brand, price, information about the food and design) in the consumer's purchase intention. Thus, according to the authors, an important characteristic in studies with packaging of food products is the amount of effects that each attribute present in it has on the consumer's purchase intention.

At this point, knowing the acceptability and purchase intention for the prototypes is fundamental to determine the viability of these products, considering that this last questionnaire evaluated the real acceptability of the elderly for these innovations. It is interesting to note that in all scales of the questionnaires there were considerable percentages of votes for options 1 and 2, which are related to little interest or negative purchase intention, this factor may be related to the apprehension that many elderly people still have in front of the new.

Although the elderly is more modernized and independent, their relationship with buying food is still very much linked to brand loyalty and fear of trying new things, even though the product is being developed for their specific audience and has claims of health benefits.
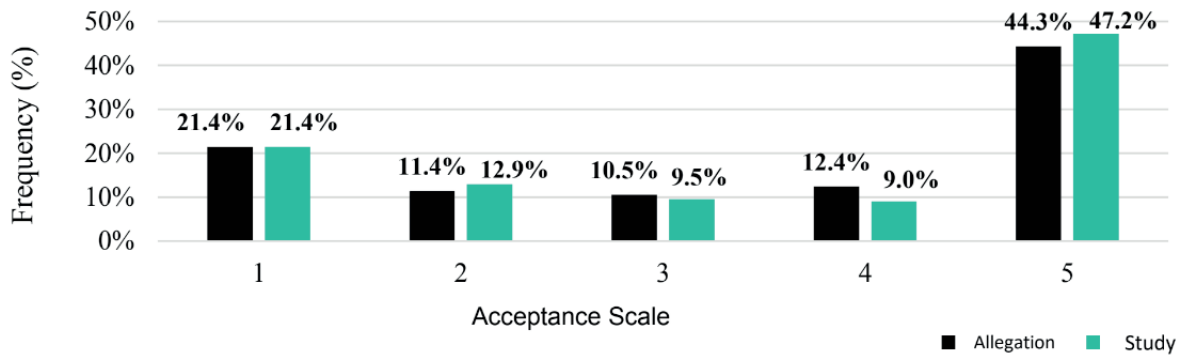
Figure 12. Answers obtained from the questionnaire of the 3rd Stage of the research referring to the acceptance of the elderly regarding the claim of a functional product of inulin and excerpts from studies on this component.
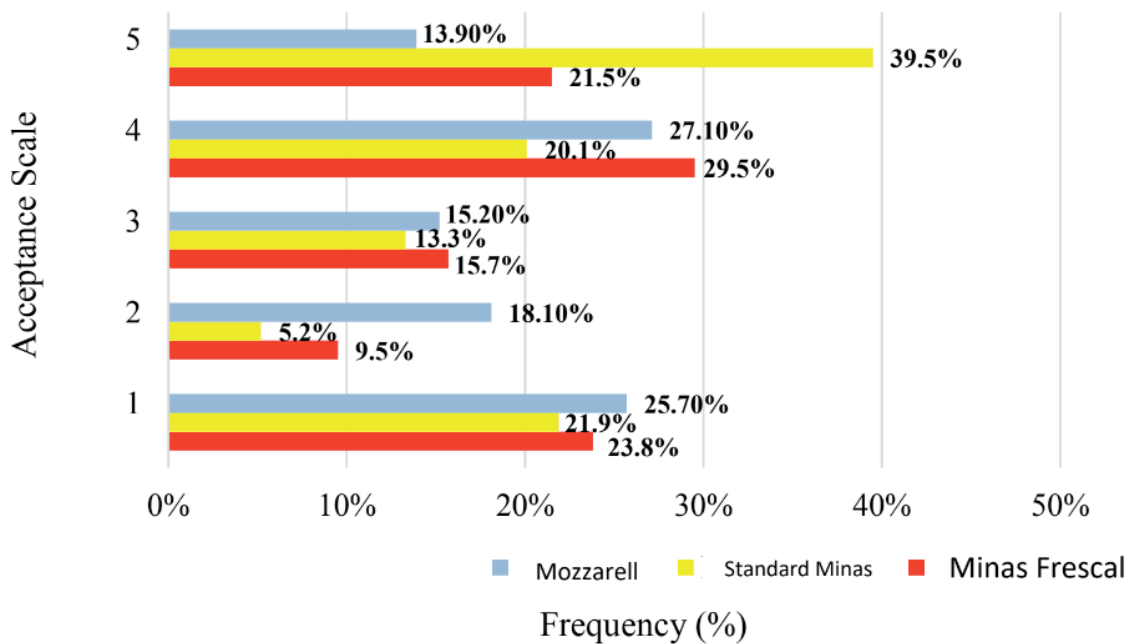
Source: Author himself, 2020.

Figure 13. Comparison of the answers obtained from the questionnaire of the 3rd Stage of the research, referring to the acceptance of the elderly for Minas Padrão, Minas Frescal and Mozzarella cheeses with added lutein.
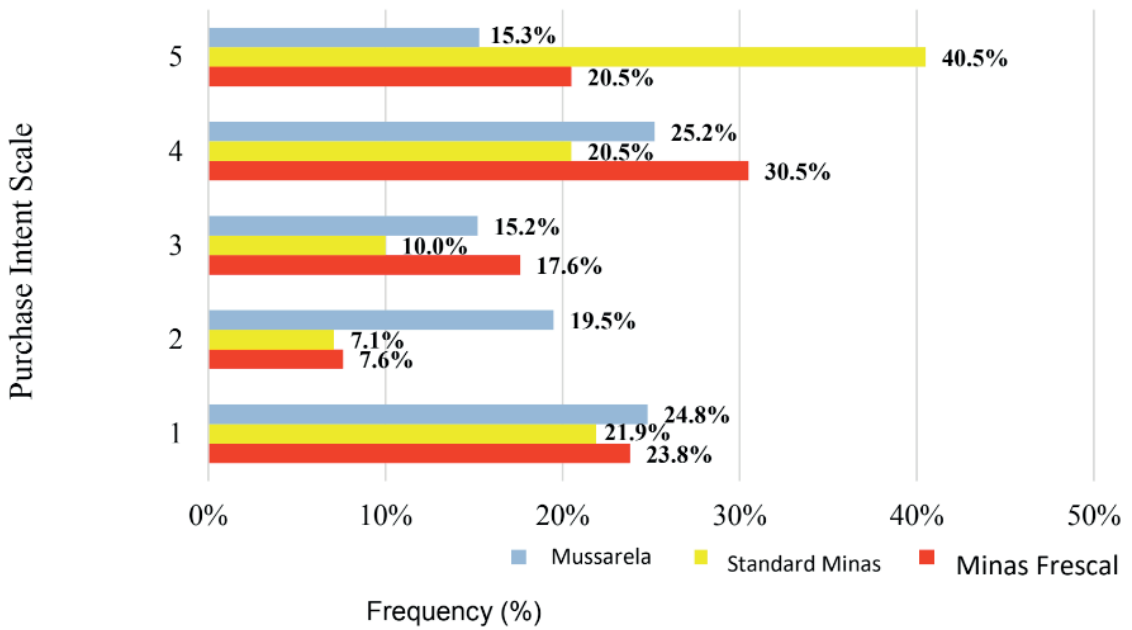
Source: Own author, 2020.

Figure 14. Comparison of the answers obtained from the questionnaire of the 3rd Stage of the research, referring to the purchase intention of the elderly for Minas Padrão, Minas Frescal and Mozzarella cheeses with added lutein.
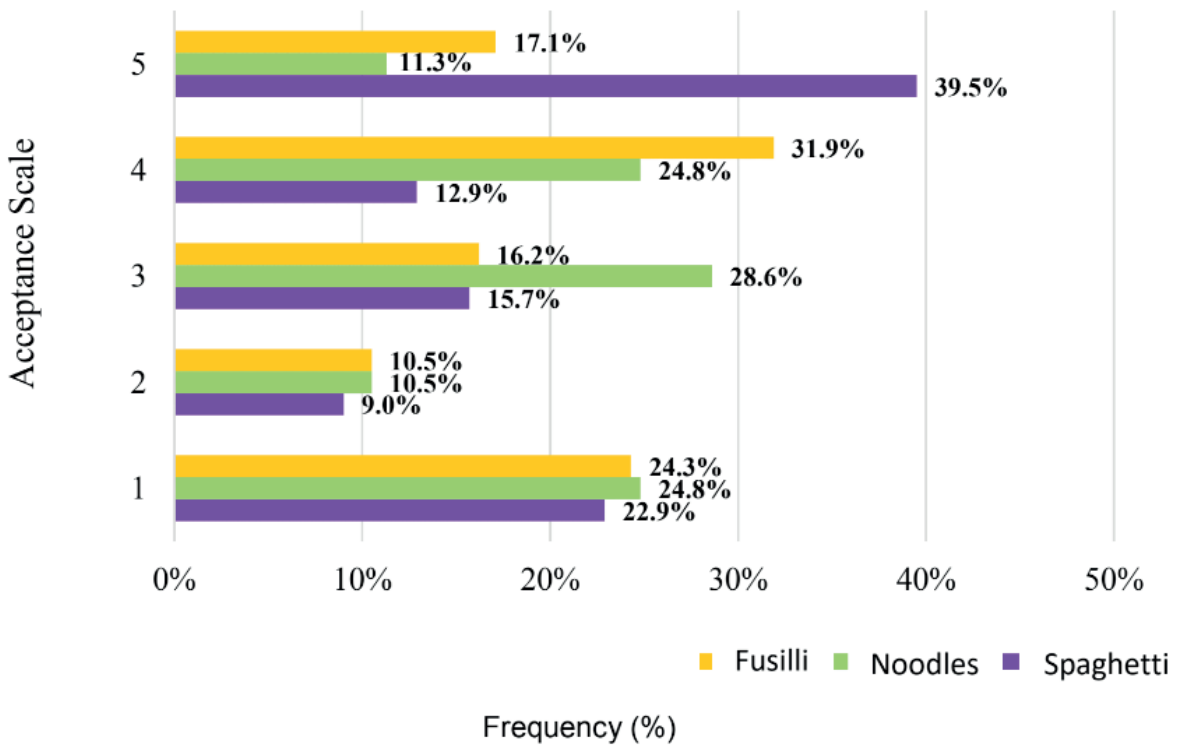
Source: Own author, 2020.

Figure 15. Comparison of the answers obtained from the questionnaire of the 3rd Stage of the research, referring to the acceptance of the elderly for the pasta Fusilli, Noodles and Spaghetti with added inulin.
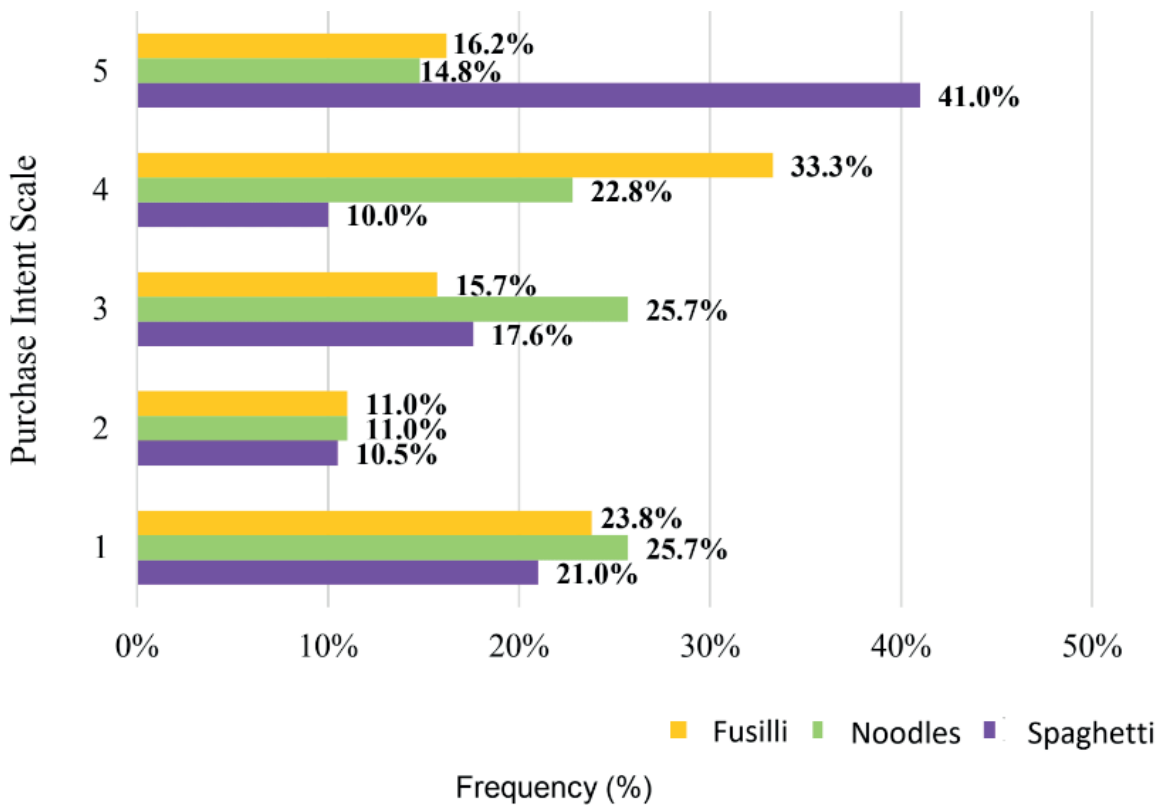
Source: Author himself, 2020.

Figure 16. Answers obtained from the questionnaire of the 3rd Stage of the research, referring to the purchase intention of the elderly for Fusilli, Noodles and Spaghetti pasta with added inulin.

Source: Author himself, 2020.

CONCLUSION

It was found that socioeconomic and health factors are of great importance when buying and consuming food for the elderly, since they can interfere in different ways, negative and positive, with the choice of this public, as discussed.

A large consumption of cheese and pasta by the elderly was observed, thus justifying the choices of these food categories to be innovative. As well as their preferences in relation to various aspects of these foods, such as the predilection for Minas Frescal, Minas Padrão and Mozzarella cheeses and Spaghetti, Fusilli and Talharim pasta, as well as factors associated with frequency of consumption, price, characteristics more important, packaging and etc.

With the knowledge of these needs, it was possible to develop prototypes and analyze the acceptance and interest of the elderly in these foods. Minas Padrão cheese added with lutein and Spaghetti pasta added with inulin were the foods with the highest acceptability in their categories.

However, it must be noted that all prototypes were well accepted by the elderly, as well as the claims and studies regarding inulin and lutein, since this public's fear of innovations is still great.

Finally, it was possible to verify that the use of market research and the development of prototypes proved to be effective in designing new products in accordance with the desires and needs of the elderly, as well as evaluating their acceptability. This way, the use of these tools proves to be useful and necessary as a feasibility study for the development of new products and guarantee of acceptance at launch.

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