


Use of milk mixtures and beverages in the food industry: case study on consumer knowledge with new and old products available on the market

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ABSTRACT

Brazil is a major consumer of milk, so there is a great consumption of its derivatives such as condensed milk, sour cream, milk powder, chocolate and other. The use of whey has been growing in the production

of dairy products with the main objective of reducing production costs, so the creation of terms such as dairy drink, dairy compound and dairy mixture. Considering that the value of the product is often the main factor in decision making at the time of purchase, the lower cost of products with drink denomination or milk mixture has attracted many consumers. This research then brings a review on the subject, as well as the application of form to assess whether the population in general can read and interpret the labels of these products and to ascertain, therefore, their previous knowledge on the subject. It was possible to notice that the interviewees in general have a good knowledge about mixtures and dairy beverages, however, 100% of the correct answers were not obtained in any of the items presented in the questionnaire. Another point analyzed was the negative influence that whey-based products may have, as they had answers stating that the product presented was a mixture or milk drink and were actually of original prescription. Thus, aiming at an improvement in understanding and wanting to mitigate errors, it can be concluded that there are still people, even though the majority are not, who confuse the willing products and do not know how to differentiate the original recipe from the generic, it was suggested then that it is necessary a greater awareness or even a possible change in legislation in order to reduce the gaps in food labeling, making the difference between the products as clear as possible.

Keywords: Dairy products, Packaging labels, Milk subproduct, Online form.

1 INTRODUCTION

Milk is a food of high nutritional value, produced in several cities throughout the Brazilian territory and consumed by a large part of the population (ZANELA et al., 2021). It is one of the most important agricultural products in the world, and every day billions of people consume milk in its most diverse forms. As a means of income it presents a great economic importance for a large part of the population, besides being a vital source of nutrition. In Brazil, where per capita consumption in 2018 was 166.4 L/inhabitant, milk production is the second most important segment of the food industry. (SIQUEIRA, 2019).

Like every production line, the milk chain has by-products that are consequences of processes, whey is a product used in the food industry it consists of a co-product of dairy production, the Ministry of Agriculture, Livestock and Supply (MAPA) regulates as being the liquid dairy product extracted from the coagulation of milk used in the cheese making process, casein and similar products (MAPA,2020).

This co-product has high nutritional value and can be processed and transformed into products with high added value (Nunes, 2018). The use of whey in derived products is just one of the items that is growing increasingly in the use of recipes with the main purpose of pricing existing products more cheaply. The food industry has had the term "dairy drinks" for some time, but today the use of mixtures and dairy compounds is increasing (Hugo, 2022).

In order to establish the identity and quality of the milk drink, dairy mixture and dairy compound we have its definitions by MAPA. Milk drink is the dairy product resulting from the mixture of milk, and whey may or may not be added to food products or substances, vegetable fat, fermented milk, dairy yeasts and other dairy products. The milk base is represented by 51% of the total ingredients (ATO, 2005).

The dairy compound has its definition as being with addition or without addition. The dairy compound without addition has in its final composition 100% of dairy products, soon in its elaboration there have to be exclusively dairy products present. It is a powder resulting from the mixture of milk, permitted and regulated dairy products or substances, suitable for human consumption through an appropriate technological process. In turn, the dairy compound with addition, is the final product whose preparation must present at least 51% of dairy ingredients, the rest being allowed and regulated non-dairy products, suitable for human consumption (ATO, 2007).

Milk mixture is present in decree 9013 of 2017, which contain the regulations of laws 1283/50 and 7889/89. Article 366 states that the milk mixture is the product containing in its final composition more than fifty percent of dairy products or compound dairy products, as consumed, permitted to replace the constituents of milk, provided that the sales name is "mixture of (the name of the corresponding dairy product) and (added product) ". Article 367 completes by saying that "The mixture of the same dairy derivative is allowed, but of different quality, provided that the lower standard prevails for classification and labeling purposes" (BRASIL, 2017).

The decision to choose a product is often based on price, availability and accessibility, and at other times is also based on marketing involving the product, which are influenced by national health policies and regulations (Pereira et al., 2020). National Health Surveillance Agency (ANVISA), through RDC No. 259, brings the definitions of labeling and packaging in addition to identity and quality standards, as mandatory information and other content that should be of simplified knowledge to the consumer (ANVISA, 2002).

Such is the importance of labelling in the food industry that changes were made in both DrC no. 429 and Normative Instruction No. 75. The changes aim to improve the clarity and readability of food labels, and consequently assist consumers in understanding them, giving greater clarity in the information provided in the product (ANVISA,2022). For MAPA, the definitions are present in regulation no. 22/2005. The technical regulations for labelling are all inscription, caption, image or all descriptive or graphic material, written, printed glued on the packaging of the product of animal origin. Packaging is defined as

containers, package or packaging designed to ensure conservation and facilitate the transport and handling of products of animal origin (MAPA, 2005).

Given the information mentioned above, the objective of this research was to conduct a review on the subject and evaluate the consumer's understanding of the theme Milk Mixture/Milk Drink as well as the interpretation of labeling, and their previous knowledge to identify or not such products on supermarket shelves.

2 METHODOLOGY

The study consisted of two stages: First bibliographic reviews were performed on the proposed theme (Previous knowledge about the use of mixtures and dairy compounds in dairy products), later, a questionnaire was applied completely online containing questions related to the theme. The research was made available on the Internet obtaining a number of 175 responses that were collected during the months of September and October 2022.

The literature review was carried out to quantify data through research on academic sites such as Google Scholar, Scielo and Portal da Capes. Readings of articles related to the following keywords were made: Milks, Milks and their derivatives, Milk Industry By-Products, Dairy Compounds, Milk Mixtures and Labeling and Packaging Legislation in Brazil. The contents were filtered from 2018 until 2022 and based on the themes mentioned, being, therefore, excluded those that were not consistent with the focus of the research. Table 1 below presents the values found in the researches cited above.

Table 1 - Results found from search terms in 3 different databases

Research Bank	Searched term	Results found
Google Academic	Milks	11.300
	Milks and their derivatives	15.600
	Milk industry by-products	1.250
	Dairy compounds	5.840
	Milk mixtures	2.280
	Labelling and packaging legislation in Brazil	7.430
Scielo	Milks	1966
	Milks and their derivatives	4
	Milk industry by-products	1
	Dairy compounds	2
	Milk mixtures	-
	Labelling and packaging legislation in Brazil	1

Portal da Capes	Milks	112.278
	Milks and their derivatives	525
	Milk industry by-products	15
	Dairy compounds	164
	Milk mixtures	49
	Labelling and packaging legislation in Brazil	51

Source: Own authorship

The second part of the study was the conduct of a market research, where the focus is on the application of a questionnaire developed from the proposed theme. The list of questions was made available on the platform "GOOGLE Forms", which allows the realization of the questionnaire totally online and remote. The questions have already been established and have 3 stages. The first is a socioeconomic questionnaire where the interviewee will answer their age, gender, education and monthly income range.

The second stage of the questionnaire has questions focused on the theme (Appendix A), the interviewee will answer the questions: "Are you aware of the term "MILK MIXTURE"?" ; "Are you aware of the term "DAIRY DRINK"?" ; "Would you be willing to pay cheaper, even knowing that the products are the basis of MILK MIX and/or MILK DRINK?" ; "On the market, have you ever noticed a product that contained the name "Milk drink" and/or "Milk mixture"?" ; "Do you consume dairy products and their derivatives? What? " ; " In the case of milk and its derivatives, what most affects the choice of the product you buy on the market? " ; " Have you ever consumed any MILK MIXTURE and/or MILK DRINK?" ; " If so, have you noticed the difference between an INTEGRAL product and a MILK MIXTURE/MILK DRINK?" ; " Do you know how to interpret the information on the product label?".

Finally, the third stage had the provision of 14 random images, containing milk products, among them products that are dairy mixtures, dairy compounds, and whole products. The purpose of this stage is to understand whether the interviewee has the full capacity to know which of these products are mixtures and/or dairy compounds.

The validation of this questionnaire was performed with ten random interviewees who are not from the Food area, to understand if the questions are easy to understand for anyone. Validated the questionnaire and having all the answers together with the literature review of the theme, the results obtained on the theme addressed were discussed.

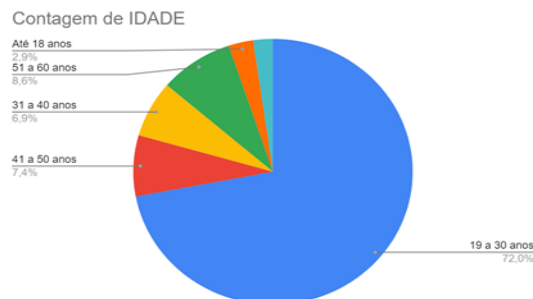
3 RESULTS AND DISCUSSIONS

3.1 SOCIOECONOMIC DATA

When analyzing the answers obtained in the socioeconomic profile, the interviewed public was represented in the age group by 2.9% up to 18 years, 72% from 19 to 30 years, 6.9% from 31 to 40 years, 7.4% from 41 to 50 years, 8.6% from 51 to 60 years and 2.3% were over 61 years old, as shown in Figure

1. The vast majority being represented by people aged 19 to 30 is due to the way the research was conducted (by form and online), this may have contributed to such a number of people in this age group, besides being very widespread in the academic environment.

Figure 1 - Age group of the interviewed public in the socioeconomic stage.



Source: Own authorship

Translation:

Age

Up to 18 years

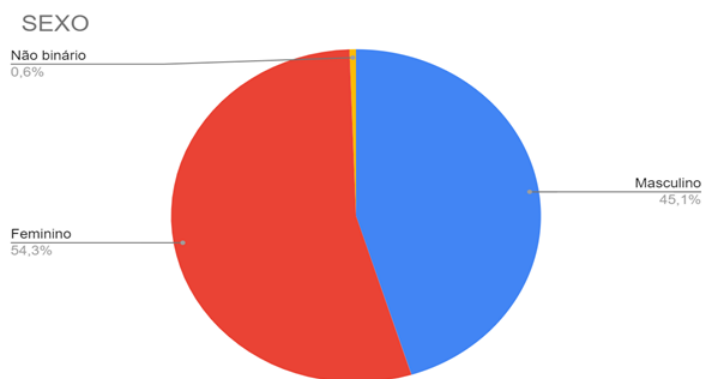
51 to 60 years

31 to 40 years

41 to 50 years

Regarding gender (Figure 2) 54.3% are women and 45.1% are men and 0.6% identified themselves as non-binary. Similar values were obtained in a research conducted by Bertoldo (2022) under the same conditions, however the author still mentions that these numbers may be different if this same research is conducted in person in places such as supermarkets and the like.

Figure 2 - Gender of the interviewees submitted to research.



Source: Own authorship

Translation:

Gender

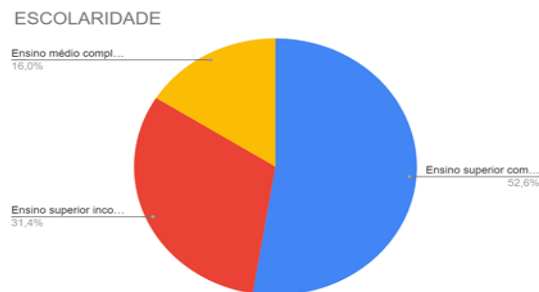
Male

Female

not binary

When schooling was questioned (Figure 3), only 3 answers were obtained, and more than 50% answered having completed higher education and the rest entered the categories "Incomplete higher education" or "Incomplete high school". Again, it is important to highlight that the fact that the vast majority of them are from higher education is a reflection of the place where the research was conducted.

Figure 3- Schooling of the studied public who was submitted to the socioeconomic profile survey

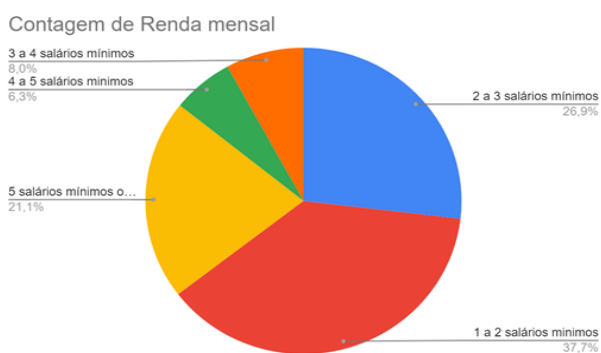


Source: Own authorship

Translation:
 Education
 Complete high school
 incomplete higher education
 complete higher education

The research showed (Figure 4) that most of the answers were in the age group of 19 to 30 years, and these are still belonging to class C and D according to the Brazilian Institute of Geography and Statistics (2020), but it was well divided in relation to women and men participating, as shown by Bertoldo (2022) in his research, were very related to the university scope, because their research also had great dissemination in the environment.

Figure 4 - Monthly income of respondents in socioeconomic research.



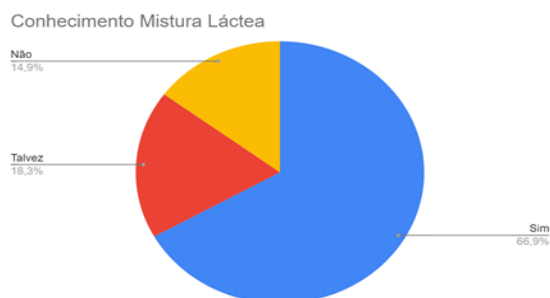
Source: Own authorship

Translation:
 monthly income count
 1 to 2 minimum wages
 2 to 3 minimum wages
 3 to 4 minimum wages
 3 minimum wages
 4 to 5 minimum wages

3.2 DAIRY COMPOUNDS AND DAIRY BEVERAGES

When questioned about milk mixtures (Figure 5) and dairy beverages (Figure 6), different responses were obtained. It can be seen that at this point, from the previous knowledge of the interviewees, 80% say they know what a milk drink is, but the term milk mixture is known by 66.9% of people.

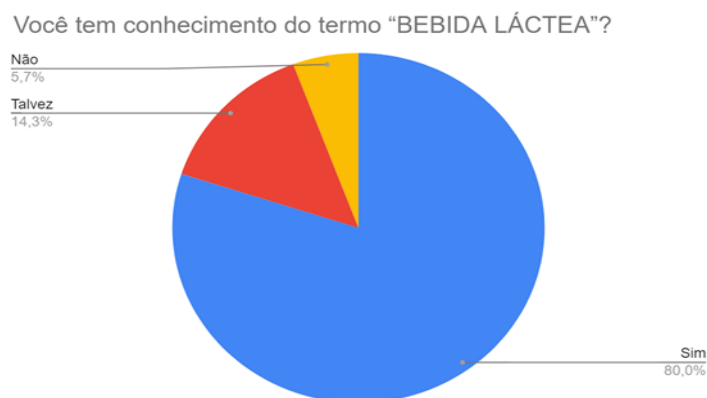
Figure 5 - Answer in percentage on the previous knowledge of Milk mixture.



Source: Own authorship

Translation:
Knowledge of milk mix
Yes
No
Maybe

Figure 6 - Answer in percentage on the previous knowledge of Milk drink.



Source: Own authorship

Translation:
Are you aware of the term "MILK DRINK"
Yes
No
Maybe

The milk mixture being less known among consumers, may come from the fact that this is a product that has been gaining strength recently, especially in the year 2022. News portals with the theme "Difference between milk mixture and condensed milk" or "What is milk mixture" are increasingly common.

When asked about the cost of the product and the willingness of the interviewee to pay cheaper in milk mixture and/or dairy beverage, the vast majority of consumers (57.1%) answered that it depends on the product, as shown in Figure 7.

Figure 7 - Intention to purchase products milk mixtures and dairy beverages.



Source: Own authorship

Translation:

I would be willing to pay less, even knowing that the products are based on DAIRY MIX AND/OR MILK DRINK

Yea

Not

Maybe

It can be emphasized that today, the main products supplied by the market with these characteristics are condensed milk, sour cream and chocolate milk. In an article posted on the news portal "Veja" is quoted the following excerpt: "With the same objective of confusing the consumer, have emerged products that only look like their most expensive congeners." Milk mixture" is sold as condensed milk. "Milk drink", made from whey, passes through milk. " (Diniz, 2022).

3.3 PRACTICAL KNOWLEDGE ON THE SUBJECT

When questioning the interviewees if they had ever seen any product with the aforementioned names, an expected answer was obtained, the vast majority said they were aware of dairy beverages and/or milk mixtures, as can be observed in Figure 8, the graph shows that 89.7% answered yes to this question. Another point that was addressed are the people who said they had already consumed some product of the type, in this item there was also a large amount of positive responses, in this case 84% of the answers, as can be seen in Figure 9.

Figure 8 - Answers to the question if they have already observed the products mentioned.



Source: Own authorship

Translation:

Have you ever observed any product that contained the denomination "Drink Milk" and/or "mixture milk"?

I don't notice the description

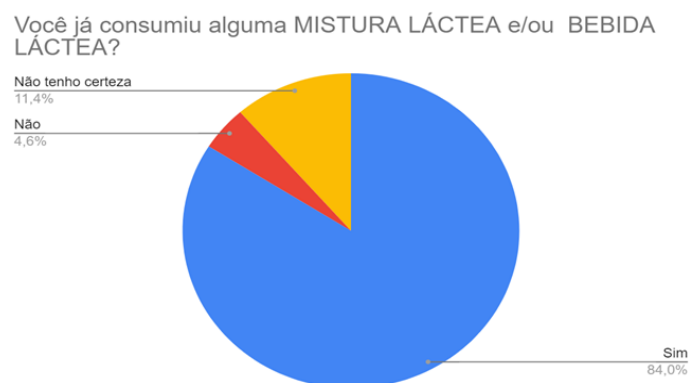
Yes

No

They were also asked about the sensory perception of consumers in relation to the products studied and an integral product, in which item the answers had different results. Figure 10 shows the graph for this question, and it can be observed that 42.3% perceive the difference, on the other hand, 18.9% did not notice a difference. Only 12.6% say they feel a lot of disparity in relation to original products, to finish 19.4% of respondents said they do not feel much difference between products.

It is important to highlight that the research method adopted may contain variations in true answers, since the individuals who answered the questionnaire may not be situated with what is actually the product mentioned. This does not mean that the answers are wrong, but as observed by Meijer et al., (2021) when they conducted a labeling survey, they realized that a quarter of the interviewees did not pay to the information provided, and that the incidence of reading was even higher.

Figure 9 - Answer to the question about the consumption of the products surveyed



Source: Source: Own Authorship

Translation:

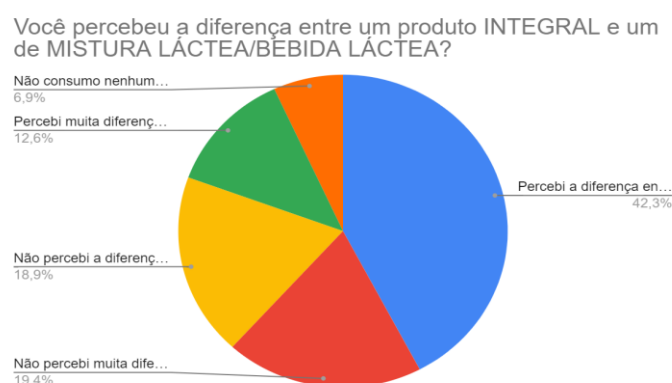
Have you ever consumed any "Drink Milk" and/or "mixture milk"?

I am not sure

Yes

No

Figure 10 - Perception of the difference between milk drink and/or milk mixture for whole products.



Source: Own authorship

Translation:

Did you notice a difference between a whole product and "Drink Milk" and/or "mixture milk"?

I don't consume any

I noticed a lot of difference

I didn't notice a difference

I noticed the difference in

I didn't notice much difference

In order to see if the consumer really knew about which product is the basis of milk mixture or milk drink, 13 images of products such as condensed milk, sour cream, chocolate milk, milk powder and milk, available in Appendix A, were made available, the vast majority of consumers present in the survey have a good understanding of the subject, as can be seen in Figure 11. It is noticed that products 2, 6, 7, 8, 9, 10, 11, 12, 13 had responses higher than 60% reaching 92% as is the case of product 7.

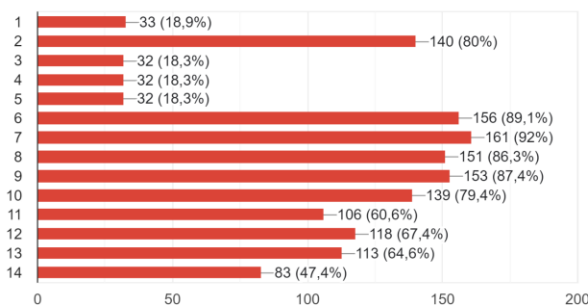
When evaluating products 13 (Fermented milk drink with strawberry preparation) and 14 (Fruit vitamin) it is noticed that 47.4% answered that product 14 was understood as a milk drink, but product 13 that really is a dairy drink product had little more votes, being confirmed only by 64.6% of those surveyed. This shows that some products are not yet of great knowledge of the large mass, and that even if they understand which product is a milk mixture, this issue can affect the judgment of similar products in a negative way.

Other values that show what was previously commented are those of products 1, 3, 4 and 5. These products are, respectively, condensed milk, sour cream, milk powder A, sour cream and milk powder B, which had votes, but all of them were products that did not have the addition of the items studied, however had their peers represented by items 2, 6, 7, 11, 12. It can be seen that even though it is not a dairy compound, the products suffer negative influence, because with only the understanding of labeling, it is known that these items should not have received any votes, however, as the research is focused on this, the answers to these items were biased.

Figure 11 shows that most consumers have a good knowledge about the products they are purchasing in the market, however this value was not 100% for any product presented, demonstrating that there are still improvements to be made in the disposition of information in the product. Anvisa recently published changes in both RDC no. 429 and Normative Instruction No. 75, these changes directly affect the provision of nutritional food information, making it clearer and more visible. For now this information is related only to the high content of fat, sugar and sodium, not being necessary in various food additives such as whey.

Figure 11 - Options you understand as dairy products

Assinale as opções que você entende como sendo produtos de mistura e/ou bebida láctea
175 respostas



Source: Own authorship

It is noted then that there is a need for changes in the most specific legislation for products that use ingredients that are not part of the original recipe, but aims to reduce costs and replace ingredients. Bertoldo (2022) also mentions that this information must be arranged in a clearer and simplified way so that the consumer can distinguish less erroneously.

4 CONCLUSION

The analysis carried out in this research allowed us to conclude that the understanding on the theme Milk Mixture/Milk Drink is not full, and that there are still difficulties and even confusion to differentiate the products.

With this, the hypothesis of the work that there is still the difficulty in part of consumers to distinguish the products, either due to lack of knowledge, or by difficulty in interpreting labels was confirmed, since the data obtained show us some confusion in the answers.

Thus, it is noted that the consumer still does not have full knowledge on the subject being of great importance the awareness and even actions of the inspection agencies to mitigate this problem. It is indicated as future research, conducting dissemination materials on the subject, and also face-to-face interviews, in places more favorable in with a greater audience diversity, in addition to collecting more information about the difficulties encountered at the time of the interpretation of labels.

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Appendix A - Online search form

30/10/2022 09:58

Pesquisa de percepção da rotulagem de produtos lácteos

Pesquisa de percepção da rotulagem de produtos lácteos

Olá, me chamo Rodrigo, sou graduando do curso de Engenharia de Alimentos pela Universidade Estadual de Maringá (UEM). Estou realizando uma pesquisa sobre o entendimento da população em relação as informações presentes em rotulagens de produtos lácteos. A seguir, vou colocar diversas perguntas, peço que responda apenas com o seu entendimento prévio sobre o assunto, não existem respostas erradas. Todas as perguntas são relacionadas a misturas lácteas e compostos lácteos e se você entende a diferença para produtos integrais. Muito obrigado pela ajuda!

***Obrigatório**

1. IDADE *

Marcar apenas uma oval.

- Até 18 anos
- 19 a 30 anos
- 31 a 40 anos
- 41 a 50 anos
- 51 a 60 anos
- 61 anos ou mais

2. SEXO *

Marcar apenas uma oval.

- Feminino
- Masculino
- Prefiro não identificar
- Outro: _____

3. ESCOLARIDADE *

Marcar apenas uma oval.

- Educação infantil completo
- Educação infantil incompleto
- Ensino fundamental completo
- Ensino fundamental incompleto
- Ensino médio completo
- Ensino médio incompleto
- Ensino superior completo
- Ensino superior incompleto

4. Renda mensal *

Atualmente o salário mínimo é de R\$ 1212,00.

Marcar apenas uma oval.

- 1 a 2 salários mínimos
- 2 a 3 salários mínimos
- 3 a 4 salários mínimos
- 4 a 5 salários mínimos
- 5 salários mínimos ou mais

Conhecimentos prévios sobre bebidas/misturas lácteas

5. Você tem conhecimento do termo "MISTURA LÁCTEA"? *

Marcar apenas uma oval.

- Sim
- Não
- Talvez

6. Você tem conhecimento do termo "BEBIDA LÁCTEA"? *

Marcar apenas uma oval.

- Sim
 Não
 Talvez

7. Você estaria disposto a pagar mais barato, mesmo sabendo que os produtos são a base de MISTURA LÁCTEA e/ou BEBIDA LÁCTEA? *

Marcar apenas uma oval.

- Sim
 Não
 Depende do produto

8. No mercado, você já observou algum produto que continha a denominação "Bebida láctea" e/ou "Mistura láctea"? *

Marcar apenas uma oval.

- Sim
 Não
 Não reparo na descrição

9. Você consome produtos lácteos e seus derivados? Quais? *

Marque todas que se aplicam.

- Leite
 Creme de leite
 Leite condensado
 Leite em pó
 Queijo Petit suisse (Danoninho)
 Iogurte
 Achocolatado de caixinha (Choco milk, Toddynho, Pirakyds, Italakinho)
 Não consumo derivados do leite

10. No caso do leite e seus derivados, o que mais afeta a escolha do produto que você compra no mercado? *

Marque todas que se aplicam.

- Preço
 Qualidade
 Marca
 Composição do produto
 Não consumo Leite e seus derivados

11. Você já consumiu alguma MISTURA LÁCTEA e/ou BEBIDA LÁCTEA? *

Marcar apenas uma oval.

- Sim
 Não
 Não tenho certeza

12. Se sim, você percebeu a diferença entre um produto INTEGRAL e um de MISTURA LÁCTEA/BEBIDA LÁCTEA? *

Marcar apenas uma oval.

- Percebi a diferença entre os dois
 Não percebi a diferença entre os dois
 Não percebi muita diferença entre os dois
 Percebi muita diferença entre os dois
 Não consumo nenhum produto de mistura/bebida láctea

13. Você sabe interpretar as informações dispostas no rótulo do produto? *

Marcar apenas uma oval.

- Sim
 Não
 Tenho uma noção básica

14. Assinale as opções que você entende como sendo produtos de mistura e/ou bebida láctea

Marque todas que se aplicam.





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