

## Consumers' perception of the "Arte" seal in artisanal cheeses

Isabelle Correa Rochebois CAMPELLO<sup>1</sup> , Gustavo Luis de Paiva Anciens RAMOS<sup>1,2\*</sup> ,  
Jonas Toledo GUIMARÃES<sup>3</sup> , Denise Rosane Perdomo AZEREDO<sup>1</sup> 

### Abstract

The "Arte" seal is a certificate that guarantees that the product of animal origin was handcrafted with the characteristics of unique palatability. The objective of this study was to evaluate the consumption preference and perception of the "Arte" seal and inspection seals among consumers of artisanal cheeses. Through online questionnaires, it was observed that 99% of respondents recognize the seal of the Federal Inspection Service (SIF) and 57% do not recognize the "Arte" seal. Among those interviewed, 63% strongly disagreed with buying cheese without a seal, and 76% had completed higher education. When asked about purchasing a cheese produced with raw milk, 41% answered that they strongly agree that cheese produced with raw milk can cause an unfavorable effect on health. Finally, consumers chose cheeses visually with different stamps, where 98% opted for products with seals, regardless of the absence of heat treatment in processing. It is concluded that the recognition of the Arte seal and the inspection seals is related to the level of education of the interviewees, which can generate inequality in the perception of consumers in relation to the seals.

**Keywords:** arte seal; inspection seal; artisanal cheese; raw milk; pasteurized milk.

**Practical application:** This study provides information about the general population regarding the consumption of artisanal cheese, associating it with knowledge of the meaning of inspection seals. Also, aspects related to the knowledge of importance of heat treatment are addressed.

## 1 INTRODUCTION

Globalization has been pointed out as an influential factor in the increase of the so-called ultra-processed foods. Despite the commercial success of processed foods on a large scale, different actions have been taken to safeguard local and regional traditions, as well as the cultural and social context in which the individual is inserted, promoting traditional eating habits and encouraging local production (Brasil, 2012).

Consumer's food choice is a complex and interactive process, which is based on economic issues, as well as biological, religious, sociocultural, psychological, and anthropological factors, surpassing intrinsic aspects such as price, flavor, variety, nutritional value, appearance, and hygiene (Rocha et al., 2020).

Artisanal cheeses must be processed in rural establishments from milk produced at the same site or have their origin determined. Moreover, techniques and utensils used must be predominantly manual at any stage of the process. The production process must adopt Good Manufacturing Practices (GMP) for artisanal products to guarantee safe food for the final consumer. Artisanal cheese must be genuine and maintain its uniqueness and traditional, cultural, or regional features (Brasil, 2019). Brazilian legislation established the "Arte" seal, an old demand from the dairy sector in Brazil, addressed to regulatory agencies, to expand the producer market, allowing the commercialization of artisanal products of

animal origin (POA) throughout the country. In a broader sense, the "Arte" seal is directly related to aspects of sanitary quality, reliability, and value-added products (Pinto et al., 2020).

In addition to the quality assurance of artisanal cheeses, consumers need to understand the quality of these products. However, there is a shortage of information related to the positive attitude of consumers towards these products and their purchase intentions, as they may have negative inferences concerning the ingredients used and the understanding of quality seals (Ferreira, 2019). Considering the increasing importance of this product category, the objective of this study was to assess whether consumers' perception of the indication of the "Arte" seal in artisanal cheese labels has an impact on the purchase intention of this product.

## 2 MATERIAL AND METHODS

### 2.1 Elaboration of the research questionnaire

The questionnaire was created on the digital platform Google Forms and included 18 questions. Recognition of seals was assessed using a nominal scale (yes/no). The other approaches were measured using the 7-point Likert scale. The first section was intended to obtain sociodemographic characteristics such as gender, age, education, monthly income, and the role in the food purchasing decision. The second section was divided into

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<sup>1</sup>Instituto Federal de Educação, Ciência e Tecnologia do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil.

<sup>2</sup>Universidade Federal Fluminense, Faculty of Pharmacy, Niterói, Rio de Janeiro, Brazil.

<sup>3</sup>Universidade Federal Fluminense, Faculty of Veterinary Medicine, Niterói, Rio de Janeiro, Brazil.

\*Corresponding author: [gustavoanciens@id.uff.br](mailto:gustavoanciens@id.uff.br)

two parts (quantitative and qualitative) focused on the recognition of seals of animal origin, the consumer’s perception when analyzing cheese labels, and the image of four kinds of cheeses, namely, cheese with Arte seal, produced with raw milk; cheese without seal, produced with raw milk; cheese with Arte seal, produced with pasteurized milk; and cheese without seal, produced with pasteurized milk. Finally, the respondent was asked which cheese he/she would buy and why.

## 2.2 Participants

Convenience sampling, obtained through contacts of the researchers involved in this study, was used in this study (Carrillo et al., 2012). Convenience sampling is a non-probability sampling method, generally used in qualitative research to obtain an approximation of a specific topic (Andrade et al., 2016). The participant selection criterion was interest and availability to participate in the study. Individuals who agreed to participate in the study signed a Free and Informed Consent Form and knew the data would be collected for scientific purposes. Thus, 294 consumers completed the activities.

## 2.3 Cheese labels

Cheese labels exhibiting the list of ingredients were developed using the online graphic design software CANVA, totaling six labels (Figure 1) such as cheese with Brazilian Federal Inspection Service



Figure 1. Cheese labels showing the list of ingredients.

(SIF) seal, produced with pasteurized milk, *pingo* – a natural lactic ferment, and rennet (Figure 1A); cheese with SIF seal, produced with raw milk, *pingo*, and rennet (Figure 1B); cheese with “Arte” seal, produced with pasteurized milk, *pingo*, and rennet (Figure 1C); cheese with “Arte” seal, produced with raw milk, *pingo*, and rennet (Figure 1D); cheese without seal, produced with pasteurized milk, *pingo*, and rennet (Figure 1E); and cheese without seal, produced with raw milk, *pingo*, and rennet (Figure 1F). The objective of creating different cheeses, whose labels displayed a list of ingredients and a seal (or not), was to analyze whether the respondent observed the label in detail and purchased the product.

## 2.4 Statistical analysis

Data were analyzed using descriptive statistics, such as frequency for demographic features, and mean and standard deviation for variables that represent consumers’ perceptions when choosing food. Content analysis assessed open questions (Bardin, 2011) from the research’s categorization of results and data collection. To evaluate the difference between averages determined using the Likert scale, assessing the perception of inspection seals, ANOVA, and the Tukey’s test were carried out with a significance level set at 5%.

For the tabulation of open questions numbered 17 and 18 in the questionnaire, addressing which cheeses the respondent would buy and why, the procedures for the word cloud technique were used as recommended by Vilela et al. (2020), with adaptations. In addition, the Wordle software was used to build word clouds, as McNaught and Lam (2010) suggested as a support tool in data processing in qualitative research, inserting the most frequently mentioned words in the open questions. Word clouds are graphic-visual representations that show the frequency of words in a text. The more the word is used, the more attractive the representation of that given term. Words are shown in fonts of several sizes and different colors, indicating what is more or less relevant in the context (Vilela et al., 2020).

## 3 RESULTS AND DISCUSSION

This study was performed using a convenience sample in which 294 consumers were interviewed (223 women and 71 men, aged between 15 and above 60 years) (Table 1), who shared the purchasing decision with other people. Most respondents (65.7%) had completed higher education. Regarding family income, 56.8% of them reported having a monthly income between 4 and 20 minimum wages.

### 3.1 Recognition of inspection seals

According to Figure 2, when asked about the recognition of inspection seals for POA, 99% of the interviewees answered that they recognized the SIF seal. On the contrary, Vidal et al. (2013) reported that only 40.12% of respondents recognized the SIF seal, which could be attributed to the difference observed in the level of education of the volunteers. In this study, 65.7% of the participants had completed higher education, compared to only 15.52% in the study carried out by Vidal et al. (2013). Indeed, the education level represents the level of information accumulated throughout the life by individuals.

When asked about recognition of the “Arte” seal, 57% of respondents could not recognize it (Figure 2). It should be noted that the “Arte” seal was created in 2018 by Law 13,680 and regulated by Decree 9,918, published in 2019, to ensure that the product of animal origin has been handcrafted, and it presents both recipe and process that comprise traditional, regional, or cultural aspects (Brasil, 2019). It is noteworthy to mention that there are few publications on consumer knowledge and behavior regarding inspection criteria, and recognition of seals indicating that the product has been inspected (Navarro, 2014).

The “Arte” seal differs from the inspection seals for POA. In fact, in addition to the Arte seal, artisanal products must be surveyed/inspected to get POA inspection seals from the municipality (SIM), state (SIE), and federal (SIF) entities.

### 3.2 Consumers’ perception of artisanal cheese labels

In this study, once questioned about the purchase of cheeses without any seal, 63% of the interviewees answered they strongly disagreed (Figure 3), and among those, 76% of them had completed higher education.

These results demonstrate that most respondents, especially the ones with a higher level of education, recognize the harm of purchasing products without an inspection seal, which corroborates the results observed by Bonadiman (2017). According to this study, 63.3% of consumers who had accomplished an undergraduate degree would be influenced by the decision to purchase healthy and high-quality products. These data are markedly different from those reported by Florindo et al. (2021). This researcher observed that 93% of respondents would not observe the inspection seal at the time of purchase. Similarly, Vidal et al. (2013) pointed out that 80.75% of respondents confirmed

that they did not seek to know whether the product had been previously inspected or not. In reality, the inspection seal identifies the product, demonstrating that the food has undergone inspection and hygienic-sanitary practices along the production chain, unlike a product without a seal, i.e., a clandestine product, in which both quality and origin are doubtful and therefore may lead to public health risks (Florindo et al., 2021).

Foods aim to satisfy consumers, but there is no guarantee of their intrinsic quality since, to a large extent, what determines the purchase decision are customers’ perceptions regarding seals, labels, or guarantees that the food item is indeed safe and high-quality. In this study, among respondents, 59% of them fully agreed to buy cheese with a SIF seal (Table 2). Studies performed elsewhere confirmed that the presence of an inspection service seal is a factor that does influence consumers’ purchase decisions. Furthermore, there is a growing interest in food labeling and traceability (Lopes et al., 2017).

### 3.3 Consumers’ risk perception

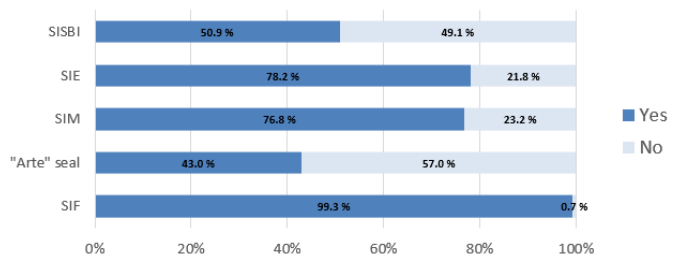
When asked about purchasing cheese produced with raw milk, 41% of the participants answered that they fully agree that cheese produced with raw milk can cause an unfavorable effect on health, corroborating the results obtained by a study carried out by Florindo et al. (2021). According to the author, 58% of respondents believed that raw milk could transmit diseases. Milk is one of the most relevant foods in the global trading system. It is estimated that one billion people make their living from working with milk in several dairy industries across the globe (EMBRAPA, 2017). The quality of milk is directly linked to herd health status, as milk can carry zoonotic pathogens (Callefe & Langoni, 2015).

Cheese made with raw milk refers to cheese prepared from unpasteurized or unboiled milk. In reality, milk pasteurization is essential for the inactivation of bacteria, even if it is unsuitable to inactivate thermostable toxins (Rocha

**Table 1.** Sociodemographic profile of consumers.

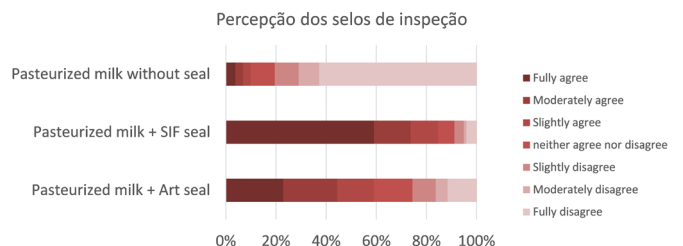
		N	Frequency (%)
<b>Gender</b>	Male	71	24.1
	Female	223	75.9
<b>Age (years)</b>	15–20	33	11.2
	21–30	121	41.2
	31–40	94	32
	41–50	24	8.2
	51–59	6	2
	≥ 60	16	5.4
<b>Education</b>	Elementary and middle school (completed)	14	4.8
	High school (finished)	87	29.6
	Undergraduate degree (completed)	117	39.8
	Graduate degree	76	25.9
<b>Income (MW)</b>	Up to 1	31	10.5
	1–3	77	26.2
	4–10	116	39.5
	11–20	51	17.3
	> 20	19	6.5
	<b>Total</b>		<b>%</b>
		294	100

MW: minimum wage.



SISBI: Brazilian system of inspection of POA; SIE: State inspection system; SIM: Municipal inspection system; SIF: Federal inspection system.

**Figure 2.** Research on the recognition of inspection seals.



**Figure 3.** Research on consumers’ perception regarding inspection seals.

et al., 2014). The microbiological control of milk at all stages of its production is a key point for consumer health (Montanhini & Hein, 2013). Several foodborne illnesses are caused by the consumption of raw milk and its derivatives, especially uninspected products (Vidal & Saran-Netto, 2018) or those sold clandestinely (Campos et al., 2018). Azevedo (2015) reported that 35% of respondents consumed informal milk because they believed it was more nutritious than pasteurized milk.

Finally, each interviewee was asked which of the following cheeses he/she would buy and the reason for his/her choice: cheese with “Arte” seal, produced with raw milk; cheese without seal, produced with raw milk; cheese with “Arte” seal, produced with pasteurized milk, or cheese without seal, produced with pasteurized milk. Overall, 98% of the participants chose to buy cheeses with a seal, regardless of whether it was produced with raw or pasteurized milk. This result is different from the one reported by Florindo et al. (2021). According to the author, merely 7% of respondents observed the inspection seal at the time of purchase. Vidal et al. (2013) mentioned that 80.75% of participants confirmed that they did not seek to know whether the product had been inspected or not. Moreover, Ribeiro Júnior et al. (2020) verified that 34% of consumers were unaware of the meaning of inspection seals on milk packages and their derivatives, and what they represent from a sanitary point of view.

Seeking to analyze the answers provided in the questionnaire, through the question “Which cheese would you buy?”, among the options, respondents could choose “Cheese with Arte seal, produced with raw” or “Cheese without Arte seal, produced with raw milk” and the reason for their choosing, a word cloud was created, highlighting the most frequent words (Figure 4A), to know: seal, quality, safety, inspected, inspection, milk, guarantee, and artisanal.

A second-word cloud was made from the answers of the interviewees to the question “Which cheese would you buy?” Among the options, participants could choose “Cheese with Art seal, produced with pasteurized milk” or “Cheese without seal, produced with pasteurized milk” and they should provide a reason for their choice. The most cited words were highlighted and comprised seal, pasteurized, safety, raw milk, pasteurization, quality, process, product, and cheese (Figure 4B and Figure 4C). Some selected excerpts, in which the terms “seal” or “pasteurized milk” were used by the respondents, are mentioned in Table 3.

**Table 2.** Average results obtained from the questionnaire and evaluated using the Likert scale.

Perception of inspection seal	Average ± SD
Pasteurized milk + Arte seal	4.7±1.9 <sup>b</sup>
Pasteurized milk + SIF seal	6.0±1.6 <sup>a</sup>
Pasteurized milk without seal	2.1±1.7 <sup>c</sup>
Risk perception	Average ± SD
Raw milk	5.0±2.3 <sup>a</sup>
Pasteurized milk	3.7±2.2 <sup>b</sup>

SD: standard deviation. Different superscript letters in the same column indicate statistical differences ( $p < 0.05$ ).



**Figure 4.** (A) Word cloud obtained from interviewees’ comments regarding their reasons to buy cheese with the Arte seal, produced with raw milk, or cheese without the Arte seal, produced with raw milk. (B) Word cloud obtained from interviewees’ comments regarding their reasons to buy cheese with the Arte seal, produced with pasteurized milk, or cheese without the Arte seal, produced with pasteurized milk. (C) Word cloud obtained from interviewees’ comments regarding their reasons to buy cheese with the Arte seal, produced with pasteurized milk, or cheese with the Arte seal, produced with raw milk.

**Table 3.** Excerpts selected from respondents' comments in which the terms "seal" or "pasteurized milk" were used.

Excerpts in which the term "seal" was used	Excerpts in which the term "pasteurized milk" was used
"We always have to be careful when buying any food product, whether of animal origin or not! We must always check if the product we want to purchase has the inspection seal, as this seal gives us a certain level of security since we know that this food was inspected before reaching the supermarket shelves."	"Because pasteurized milk is inspected."
"Due to the presence of the seal, there is a certain level of security."	"Pasteurized milk is safer than raw milk about pathogenic microorganisms."
"The presence of the seal means it has been tested and approved."	"Pasteurized milk with a seal provides higher security during purchase."
"Despite being raw milk, it has a seal. This means it is inspected."	"Pasteurized milk and Art Seal. It evidences inspection."
"The seal would show me the origin of the cheese, and that it is inspected."	"I prefer pasteurized milk, as I feel safer concerned about contamination."
"A product without a seal is clandestine."	"Because the taste of raw milk is differentiated and once inspected, it is safe."
"Because I feel safer with the presence of a seal, someone has evaluated the product."	"Because pasteurized milk makes me feel safer."
"Because the presence of the seal indicates that the product is undergoing inspection and there is greater quality control of this product, and it is very unlikely that this food, which has the seal, will cause undesirable effects on my health."	"Because raw milk transmits diseases. Therefore, pasteurized milk is safer."
"Because the seal identifies that there was any inspection or technical follow-up."	"Pasteurized milk reduces the risk of this food being contaminated by microorganisms that can harm the health."
"Because the cheese that has a seal means that it has gone through an inspection process."	"Between a cheese made with raw or pasteurized milk, I certainly feel more comfortable consuming a cheese that has gone through the processing process."

Thus, it is noticeable that the word seal was the most mentioned in all responses, which demonstrates that interviewees who joined this study recognize its importance on the product of animal origin.

#### 4 CONCLUSION

The respondents' perception regarding the Arte seal and inspection seals in artisanal cheeses was observed, even if only a small portion of society was covered. From the data collected, it was noticed that consumers have a preference to buy cheese with an inspection seal (irrespective of SIF, SIE, SIM, ARTE, or SISBI). In reality, 98% of the participants chose to buy cheese with a seal regardless of whether it was produced with raw or pasteurized milk. It is possible to observe that in this study the product choice is related to the seal, and this item was pointed out by interviewees as of great importance at the time of purchase.

It can be inferred that consumers in this study have a higher perception of the consumption of safe and reliable foods. They also demonstrated special attention to the consumption of raw milk and recognition of inspection seals, as 99% of consumers recognize the SIF seal. These data must be analyzed cautiously since the majority of consumers interviewed belong to a relatively small portion of the population with a distinctive (higher) level of education, compared to the majority of society. Nevertheless, only 43% of the respondents recognize the Arte seal, and since it was recently created, the role of media and artisanal cheese producers in its popularization is indeed relevant.

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