

ORIGINAL ARTICLE

Geographical demarcation of the manufacturing territory of the new varieties of traditional artisanal Canastra cheese

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Abstract

In the microregion of the Canastra/MG/Brazil, with the growth and recognition of artisanal cheeses, producers have gradually inserted in the market cheeses that differ from the traditional ones. This study aimed to map, identify, and characterize the production sites of the varieties of artisanal Minas cheeses of the Canastra microregion. Data were collected from Canastra cheese producers who were producing artisanal Canastra cheeses with modifications to the original recipe, which we characterize as new varieties of artisanal Canastra cheese. Geographic coordinates and primary property data were collected. Questionnaires were applied to cheese producers through semi-structured interviews and milk samples analysed. The new varieties of cheese were described and photographed. Regarding the diversity of cheeses produced, we found that moldy cheeses were produced in Medeiros (31.25%), São Roque (43.75%), Bambuí (6.25%), Delfinópolis (6.25%) and Tapiraí (12.5%). Medeiros and São Roque also produced the cheeses “Merendeirinho” and “Canastrão”, which differ from the traditional in size. In Medeiros and São Roque, we also found seasoned *Merendeirinho* cheese, other seasoned cheeses, and cheeses cured in wine and coffee. And only Medeiros produced a cheese cured in beer. We found that in São Roque, Delfinópolis, and Tapiraí, the production of these cheeses is continuous. In the geographical demarcation of artisanal Canastra cheese manufacturing, the cities of São Roque and Medeiros stand out, due to the diversity of varieties of traditional cheese and the number of producers.

Keywords: Family farming; Dairy; Maturation; Tourism; Minas Gerais.

Highlights

- Canastra cheese is produced in an artisanal way, mostly by family farming producers
- The main new varieties of Canastra cheeses found are molded, seasoned and cured in drinks
- The new varieties of Canastra cheeses add value to the production chain, thus expanding the market



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1 Introduction

The production of artisanal cheeses in Brazil has been growing gradually, but few of them are still recognized for their origin, although they represent a cultural heritage of the country (Dupin, 2019). Today, in the country there is a wide variety of artisanal cheeses, often distributed by region, which are still little known, even among Brazilians (Penna et al., 2021).

The artisanal production of cheese in the state of Minas Gerais involves family tradition, local economic development, and the cultural values of a typical rural property in Minas Gerais (Brito & Silveira, 2016). Among the numerous roles that artisanal Minas cheese (AMC) plays, it can be highlighted the family economy, in which cheese production is frequently the only source of income for the small producers of the state of Minas Gerais (Pereira, 2018).

The consumption of these cheeses is quite diverse and has been widely consumed in the most diverse forms, beyond meals and side dishes (Nogueira et al., 2021). The growing demands of consumers about food quality, mainly linked to the concept of foods produced in a natural way, contribute to the added value of these products (Maiorki & Dallabrida, 2015). According to these authors, the process of valuing the artisanal market not only influences the modes of production but also requires a social reorganization so that these products are made available on the market with the characteristics and standards that meet the consumer's needs.

The market for artisanal cheeses is experiencing a promising moment due to the boom generated by tasting fairs, gastronomic fairs, press, cheese contests, and associations, which have given greater visibility to the product in the food market. This growth and visibility gave producers a series of information generated by studies, both national and international, and by visits of producers to France, *i.e.*, actions that led to the emergence of innovations, with special products different from the traditional ones, aiming at higher quality and wider appreciation of their products (Silva et al., 2021).

The Canastra cheese is among the most consumed by the AMC group. According to Ordinance no. 1810, of April 24, 2018 (Minas Gerais, 2004, 2018), the microregion of Canastra is composed of the municipalities of Bambuí, Delfinópolis, Medeiros, Piumhi, São Roque de Minas, Vargem Bonita, Tapiraí, São João Batista do Glória, and Córrego D'anta. Canastra's Minas artisanal cheese is a protected geographical indication for traditional cheese, handmade in the Canastra region from raw cow's milk recognized by the Brazilian National Institute of Industrial Protection under number IG201002 (Andrade et al., 2017).

The production of artisanal cheeses is a significant part of the Canastra region's economy, thus benefiting from high value and tradition since their production is passed down from generation to generation and is linked to regional characteristics, highlighting the value of their origins. Production in 2021 reached 6.96 thousand tons, contributing with 31.9% of AMC production. In this microregion, family farming represents 96.1% of the properties, characterized by product diversification and its consequent involvement in dairy activity (Empresa de Assistência Técnica e Extensão Rural, 2022).

According to the Technical Assistance and Rural Extension Company (Empresa de Assistência Técnica e Extensão Rural do Estado de Minas Gerais, 2020), the "traditional" Serra da Canastra artisanal Minas cheese presents the following physical-chemical and sensory characteristics: semi-hard consistency with a tendency toward soft, of a "buttery" nature; compact texture; yellowish-white color; thin, yellowish, and smooth crust; cylindrical shape; height between 4.0 and 6.0 cm; diameter from 15.0 to 17.0 cm; weight from 1.0 to 1.2 kg; and slightly sour, not spicy, and pleasant flavor.

Cheeses – of different sizes, moldy, seasoned with wine or fine herbs, and of different types of maturation – constitute varieties that are outside the AMC "traditional" standards, which have been causing great social and economic impact in the region. These cheeses, however, still have no record of their diversity, nor any specific regulations on their identity and quality. This differentiation from traditional artisanal cheeses has been particularly productive in the Canastra microregion due to market segmentation and the increasing value of

these products, which are rare and particularly sought after products (Crouzoulon, 2019). Producers seek their insertion in specific niches of products with high market value that have recently emerged in the country, *i.e.*, cheeses matured with fungi, without finishing, and with innovations in sales time (Dupin, 2019).

Thus, our study aimed to identify, map, and characterize the new varieties of artisanal Minas cheeses from the Canastra microregion.

2 Materials and methods

2.1 Characterization of the study site

The Canastra microregion (Figure 1) is part of the Territory of Artisanal Cheeses of Minas Gerais. According to the regulation of the production process of artisanal Minas cheese, the basic criterion for characterizing a microregion is the historical and cultural tradition of artisanal cheese production (Simoncini, 2017). The regulation establishes that the microregions and municipalities that compose them are identified in specific ordinances whenever there is a request from the Minas Gerais Institute of Agriculture (Brasil, 2002), via organizations representing the producers, studies made by the Technical Assistance and Rural Extension Company of the State of Minas Gerais (Empresa de Assistência Técnica e Extensão Rural do Estado de Minas Gerais, 2020), and via the Agricultural Research Company of Minas Gerais (*Empresa de Pesquisa Agropecuária de Minas Gerais* – EPAMIG), that verify the characterization of the region and its historical and cultural tradition in the activity.

Rural properties were included in this study after collecting data from Emater, including Canastra cheese producers who were producing Canastra artisanal cheeses with modifications to the original recipe, which we characterize as new varieties of Canastra artisanal cheese.

The geographic coordinates of the cheese production units in the researched area were collected with the aid of the GNSS receiver GARMIN eTrex® 30x. Subsequently, the data were transferred to a geographic information system (GIS), using the ESRI® ArcGis (ArcMap) 10.8 program, to map the location of these units.

2.2 Questionnaire

At the time of sample collection, questionnaires were applied to cheese producers through semi-structured interviews. Our study was submitted to the ethics council (Opinion 4,284,870). The interview at the selected properties was preceded by a personal presentation explaining the work to be developed, the reasons for it, the link with the Federal Institute of Minas Gerais (*Instituto Federal de Minas Gerais* - IFMG), and the confidentiality of the data provided. The interview was conducted “on-site” and the questionnaire (adapted from Paciulli, 2013) was carefully elaborated with accessible and organized language, allowing for a quick and effective collection of data (Appendix A). The questions elaborated sought to identify the breed of cattle, daily milk production, and nutritional management of the animals, characterizing the places of origin of the studied cheeses. Additionally, questions were also observed with approaches toward raising cultural and economic issues related to the production of cheeses named in this research, such as the new varieties. When applying the questionnaire, the new cheese varieties were described and photographed with a camera Canon® R EOS r t6i to record images.

2.3 Physical-chemical analysis of milk

Samples of 400 mL of milk, from the first milking of the day, were collected in sterile bottles, directly from the artisanal cheese production tanks of the properties participating in the study. The vials were packed in isothermal boxes with ice and were taken to the water and milk analysis laboratory of IFMG-Campus Bambuí for physicochemical analysis, according to the methodology established in Brasil (2019).

The physicochemical evaluation of milk samples was performed in triplicate for the following analyses: titratable acidity (°D) and cryoscopic index (°H), using the electronic cryoscope LAKTRON 312-L, and the percentages of fat, protein, and non-greasy solids, density, lactose, and total solids were determined in ultrasonic equipment Lactoscan Milk Analyzer (Milkotronic, 2022). The somatic cell count was performed using the Lactoscan Somatic Cell Counter equipment (Milkotronic, 2022). The results were compared with the limit values established by Normative Instruction 76 (Brasil, 2018).

Descriptive statistics, including percentages and media, standard deviation, were used for data analysis.

3 Results and discussion

Of the nine municipalities belonging to the microregion of Canastra, 66.67% (n=6) produce artisanal cheeses different from traditional ones, either in size, maturation time or in maturation with fungi, wines or about the presence of seasonings. Nineteen (n=19) rural properties that produce artisanal cheese different from the traditional Canastra cheese were identified throughout the different municipalities of the Canastra. In Brazil, some territories retain the specificities of cheese culture, based on the know-how passed on by collective memory, without changes. In other territories, the agri-food system is multiple with the traditional production of cheeses with slight changes about those that evolve towards rural agro-industry meeting the needs of the consumer market. With this study, we observed that the total (n=19) of family farmers live in rural properties, in which the family is responsible for the production of AMC from Canastra. We also observed that what motivates these producers to follow the trend towards innovation is the search for a specialized market of quality artisanal cheeses, innovative and consequently with higher added value and recognition within the food market. After identifying rural properties, three producers did not respond to the questionnaire and did not send milk samples. Thus, of the 19 producers evaluated, 17 were collected according to the geographic coordinates of the cheese producing units, 16 responded to the questionnaire and provided samples of cheeses for photographic recording for milk analysis.

Simoncini (2017), while studying the microregion of Canastra, also verified the predominance of small and medium-sized family producers in the region, and that the artisanal cheeses of the new varieties, as well as traditional ones, are a product of family farming. According to Penna et al. (2021), in the last decade, Brazilian artisanal cheese has been receiving attention, not only for its traditional production but also for its innovations, with high quality ingredients, creative production techniques, and introduction of specific animal feed to obtain high quality milk.

All resided on the property and worked directly with the production of artisanal cheeses. We found that of the sixteen (n=16) rural properties participating in this study, 93.75% of the participants in this study were owners.

Regarding milk production, 56.25% (n=9) had been active for more than 21 years, which generates positive impacts on the efficiency of the activity, depending on the experience gained. Overall, 50% of the properties produce an average daily milk of 0-300 liters, 25% produce an average of 301-500 liters, and 25% produce 601-1400 liters. Of the total participating properties, 87.50% use mechanical milking, and 12.5% manual milking. The greater use of mechanical milking in relation to manual milking demonstrates a concern with the quality of the milk, which is fundamental to achieving the quality standards of the milk and cheese produced. Productivity is related, among other factors, to race and diet. Notably, most of the producers in this study had an average daily production of 198-640 liters of milk.

Most of the producers who are seeking innovations have been in the dairy business for over 20 years, and they either used to produce or still produce the traditional artisanal cheeses. Therefore, new varieties are emerging due to the cultural rescue of maturation, which has undergone hybridization in relation to the traditional way (Simoncini, 2017).

The milk intended for the production of cheeses of the new varieties comes primarily from a mixed-breed herd (Table 1).

Table 1. Characterization of properties by municipality of the Canastra microregion in relation to the number of animals, average daily production, animal breed, and feeding habits.

Municipalities	Average number of animals/property	Average daily milk production (Liters)	Liters/cow	Breed (%)	Feeding
Medeiros	55 ^a	593.57 ^a	10.79	57.14% -mixed race with Holstein-Friesians	Salt <i>ad libitum</i> in 100% of properties; supplementation with cattle feed in 100% of the properties; 28.57% of the properties use Guinea grass (<i>Panicum maximum</i> Jacq.), and 71.43% <i>Brachiaria</i> spp.
				28.57% - mixed race with Guzerá	
				14.29% -pure Holstein-Friesians	
São Roque	50 ^b	332	6.64	83% - mixed race with Holstein-Friesians	Salt <i>ad libitum</i> in 100% of properties; supplementation with cattle feed in 100% of the properties; 16.6% of the properties use Guinea grass (<i>P. maximum</i>), and 83.4% <i>Brachiaria</i> spp.
				16.6% - mixed race with Guzerá	
Tapirai	45 ^c	640	14.22	Girolando	Salt <i>ad libitum</i> ; Supplementation with cattle feed; <i>Brachiaria</i> spp. and Guinea grass (<i>P. maximum</i>)
Delfinópolis	55 ^c	300	5.45	73.4% - mixed race with Holstein-Friesians	Salt <i>ad libitum</i> in 100% of properties; supplementation with cattle feed in 100% of the properties; 16.6% of the properties use Guinea grass (<i>P. maximum</i>), and 83.4% <i>Brachiaria</i> spp.
				26.6% - mixed race with Guzerá	
Bambuí	32 ^c	198	6.19	100% - Half-breed with Holstein-Friesians	Salt <i>ad libitum</i> ; Supplementation with cattle feed; <i>Brachiaria</i> spp.

^aAverages obtained from 7 samples. ^bAverages obtained from 6 samples. ^cValue obtained from 1 sample.

Our findings showed that most properties have Holstein-Friesian crossbreeds. Studies carried out by Crouzoulon (2019) and Stafuzza et al. (2017), showed that crossbreeding has been used to generate cows with good dairy productivity and resistance to the natural conditions of the region, resulting in more rustic cattle with no breed pattern. In this study, we found production in the range of 198 to 640 liters/day/property and 5.45 to 14.22 liters/cow. Dupin (2019) found properties that had on average 170 liters of milk/property and had, in genetic terms, predominantly mixed-race cattle, producing on average 6.8 liters of milk/day.

Regarding feeding, the animals received salt *ad libitum* and the predominant forages were the *Brachiaria* and Guinea grass, abundant in the region, and in all properties surveyed the animals receive cattle feed supplementation and silage, especially in the dry season. Native grasses, are being gradually replaced by more productive ones, such as *Brachiaria* spp. a *Panicum*, Mombaça (*Panicum maximum* Jaqc. cv. Mombaça) and Tanzania grass (*P. maximum* cv. Tanzânia) (Meneses, 2006; Kamimura et al., 2020).

Table 2 shows the descriptive analysis of the physical-chemical parameters and somatic cell count (SCC) of the milk obtained in the properties evaluated in this study.

Table 2. Characterization of the physicochemical composition of milk by the municipality of the Canastra microregion.

Municipalities	Fat (%)	DDE (%)	Density (g/mL)	Lactose (%)	Salts (%)	Protein (%)	Total solids (%)	pH	SCC x 10 ³ /Cells/mL	Fat/ Prot
Medeiros ^a	3.51 ± 2.56	8.84 ± 0.26	1029.81 ± 2.16	4.86 ± 0.14	0.73 ± 0.02	3.23 ± 0.09	12.34 ± 2.64	6.75 ± 0.4	207.43 ± 170.7	1.09
São Roque ^b	3.62 ± 1.89	8.99 ± 0.45	1028.02 ± 2.93	4.93 ± 0.24	0.73 ± 0.04	3.29 ± 0.16	12.61 ± 1.56	6.62 ± 0.56	174.4 ± 15.3	1.10
Tapirai ^c	3.64	8.50	1028.11	4.56	0.71	3.03	12.14	6.72	351	1.04
Delfinópolis ^c	3.8	9.63	1028.19	5.29	0.79	3.52	13.43	6.8	168	1.2
Bambuí ^c	3.79	9.25	1034.33	5.09	0.75	3.40	13.04	6.74	380	1.11
Averages	3.67 ± 0.12	9.04 ± 0.43	1029.7 ± 2.70	4.95 ± 0.271	0.74 ± 0.03	3.30 ± 0.18	12.71 ± 0.56	6.73 ± 0.07	256.20 ± 101.44	1.11 ± 0.06

^aAverages obtained from 7 samples. ^bAverages obtained from 6 samples. ^cValue obtained from 1 sample.

The averages of all physical-chemical parameters evaluated in milk samples are following the established legislation (Brasil, 2018). The levels of centesimal composition such as fat, protein, and defatted dry extract, are largely influenced by the nutritional management of animals (Rocha et al., 2018). We verified that, of the evaluated properties, the samples obtained in the municipalities of Delfinópolis (13.43%) and Bambuí (13.04%) presented milk with a higher total solids content in relation to the municipalities of São Roque (12.61%), Medeiros (12.34%), and Tapiraí (12.14%). Notably, the fat content of milk and defatted dry extract (DDE) are also higher in the municipalities of Delfinópolis (Fat= 3.8; DEE= 9.63%) and Bambuí (Fat= 3.79%; DEE= 9.25%). The differences observed in total solids concentration in different geographic regions may be directly linked to the breed, differences in climate, relief, soil conditions, and to animal feeding habits (Ribas et al., 2004). The results of our research corroborate this author, furthermore, we also highlight the average volume of milk (Liters/cow) which has a direct influence on the concentration of milk solids.

The milk fat/protein ratio varied between 1- 1.2 (min- max) in the samples from the properties evaluated, which is considered normal. According to González (2021), values below 1.0 suggest milk fat depression and values above 1.4 refers to an increase in the proportion of milk fat, which may be related to ketosis (clinical or subclinical).

The data showed that of the nineteen artisanal cheese producers of the new varieties in the Canastra microregion, 42.10% (n=8; one (1) cheese producing units did not have its geographic coordinates collected) are concentrated in the municipality of São Roque de Minas, 36.84% (n=7) in Medeiros, and 5.26% (n=1) in the municipalities of Delfinópolis, Bambuí, Tapiraí and Piumhi (one (1) cheese producing units did not have its geographic coordinates collected). Producers of the new varieties were not identified in the municipalities of Córrego D'anta, Vargem Bonita, and São Batista do Glória (Figure 1).

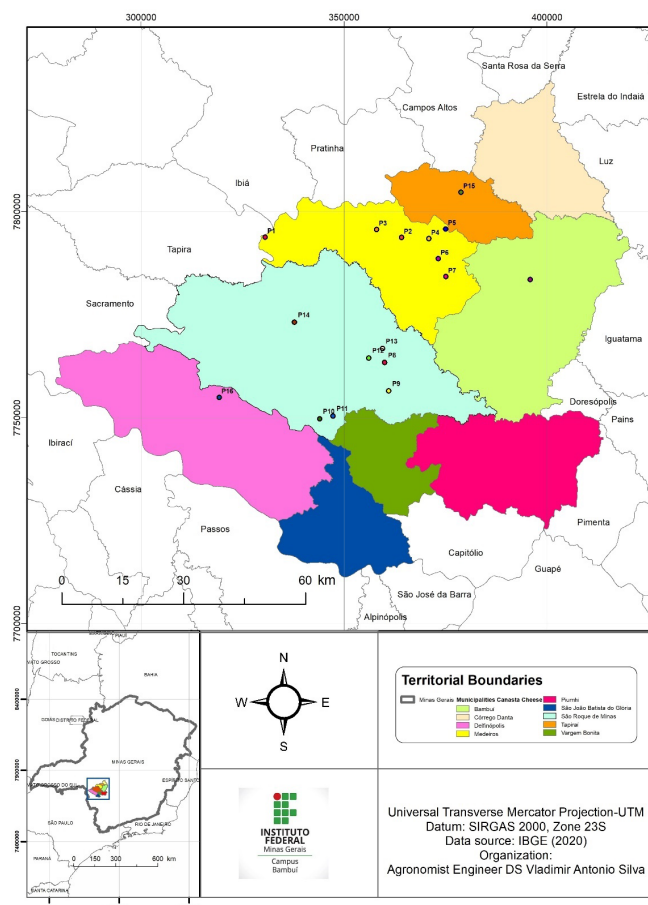


Figure 1. Map of the microregion of Canastra with emphasis on the regions where Canastra artisanal cheese producers of the new varieties were found.

The new varieties of Canastra cheese and their respective characteristics are shown in Table 3. Of the 16 producers evaluated, São Roque and Medeiros concentrate a greater number of producers of the new varieties of Canastra cheese. Regarding the diversity of cheeses produced, we found that moldy cheeses are produced in Medeiros (31.25%), São Roque (43.75%), Bambuí (6.25%), Delfinópolis (6.25%) and Tapiraí (12.5%). These cheeses are characterized by maturation with the presence of fungi. Medeiros and São Roque also produced the cheeses “*Merendeirinho*” and “*Canastrão*”, which differ from the traditional in size. In Medeiros and São Roque, we also found seasoned *Merendeirinho* cheese, other seasoned cheeses, and cheeses cured in wine and coffee. And only Medeiros produced a cheese cured in beer.

Table 3. Description and photographs of the new varieties of the traditional Minas Artisanal cheese from Canastra.




Sample	Municipalities	Varieties	Maturation period (days)	Weight (g)	Height (cm)	Diameter (cm)
	Medeiros	Traditional Merendeirinho	21	520	9	12
	Medeiros	Seasoned Merendeirinho	21	533	8.2	11
	Medeiros	Cured in wine	41	592	4.2	16
	Medeiros	Cured in wine	21	1000	4.8	17
	Medeiros	Cured in coffee	21	992	4.5	16
	Medeiros	Cured in beer	21	998	4.7	16.2
	Medeiros	Merendeirinho	21	430	8.2	12
	Medeiros	Moldy cheese	30	1.08	5.08	17.53
	Medeiros	Canastra Real	At least 180	1800	11.6	19.4

Table 3. Continued...
























Sample	Municipalities	Varieties	Maturation period (days)	Weight (g)	Height (cm)	Diameter (cm)
	Medeiros	Moldy cheese	21	1100	4.9	15.9
	São Roque	Merendeirinho cured in wine	Average of 21	458	6	6
	São Roque	Merendeirinho cured in wine	21	479	5.5	8.5
	São Roque	Cured in wine	60	1100	4.5	17
	São Roque	Cured in coffee	60	1092	4.5	16
	São Roque	Merendeirinho Cured in coffee	21	402	6.95	9.27
	São Roque	Merendeirinho seasoned with basil	21	408	7.06	9.41
	São Roque	Merendeirinho seasoned with garlic	21	410	7.09	9.46
	São Roque	Moldy Merendeirinho	30	418	6	8.5
	São Roque	Moldy	30	852	3	14
	São Roque	Moldy	At least 30		5	17.5
	São Roque	Moldy	60	798	3.5	14
	São Roque	Merendeirinho	21	360	6.5	9

Table 3. Continued...

Sample	Municipalities	Varieties	Maturation period (days)	Weight (g)	Height (cm)	Diameter (cm)
	São Roque	Florido	90	732	3	14
	São Roque	Red Moldy	40-60		4.8	14.5
	São Roque	Canastra real	At least 180	2800	11.6	19.4
	São Roque	Merendeiro	21	312	5	6
	São Roque	Merendeiro	21	320	4.3	7.5
	Delfinópolis	Moldy	30 – 60	1030	10.7	16.71
	Tapiraí	Moldy	At least 21	1098	10.6	17.82
	Tapiraí	Moldy	240	1102	10.7	17.88
	São Roque	Goat cheese	21	332	5.74	7.66
	Bambuí	Moldy	21	1100	10.6	17.82

Only one (6.25%) of the 16 properties evaluated did not produce the traditional Serra da Canastra artisanal Minas cheese along with those of the new varieties. We also found that 100% (n=10) of the cheese samples collected in this study from the municipalities of São Roque, Delfinópolis, and Tapiraí have continuous production of the new variety of cheeses. In Medeiros (n=7), 38% have continuous production, and 62% are produced only on demand. In the municipality of Bambuí, they only produced on demand.

In our study, the presence of artisanal cheeses of the new varieties was significant, both in the diversity of varieties and in relation to the number of producers in the municipalities of São Roque de Minas and Medeiros, when compared with the other municipalities. In the municipalities with more than one producer of the new varieties, the producers were found to be located in the same region within the municipality. The production of artisanal cheeses develops in close relations between legislation and producers, but also among themselves, so it is common for them to be articulated in groups that are maintained by mutual interests. In

the spatialization of the farms visited during the field research, it was possible to observe continuity of the producers who are part of a cooperation network (Grelle, 2019). This closeness is widely explained by the history and relationship of these producers, and it indicates a sharing of culture and habits, but also of local knowledge.

According to Simoncini (2017), the emergence of new varieties cheeses arose due to the influences of consultancies and technical information, reinforced to some producers the importance of preserving the tradition and for others the potential of product differentiation beyond the traditional. The increase in value of these products aroused the interest of producers in experimenting and diversifying by incorporating ingredients and changing the size, environment, and/or maturation time. According to Dupin (2019), it is only with the participation of the various actors of the process – such as scientists, merchants, chefs, tuners – that the cheese gains forms, aromas, and cures, showcasing its versatility by constantly changing (in visual, gustatory, and olfactory aspects, as well as symbolic).

From this survey, we can understand that the continuous production in São Roque and Delfinópolis is marked by the great flow of tourism present in these municipalities, which even have tours that lead tourists to the properties, requesting greater demand. In the case of Tapiraí, the producer can still sell their product throughout the year, and, despite the municipality not being a tourist site, producers make different cheeses for an audience that is characterized by the fidelity of demand, obtaining great added value to the differentiated product.

The results show a variation in maturation time, especially from seasoned cheeses to moldy cheeses. This is because, for those seasoned with wine, coffee, and herbs, the shorter maturation time allows for more intense changes in the color and taste of the cheeses. However, in the case of moldy cheeses, the different maturation times will directly influence the growth of fungi, as well as the sensory characteristics of these cheeses. Sobral et al. (2017) found that most cheeses sold in the Canastra microregion are not matured. According to Simoncini (2017), the producers realized that maturation develops a unique individual personality in these cheeses, which allows them to segment the market even more, generating greater profit than that obtained in the commercialization of traditional cheeses. This allows producers to create unique products, associating traditional family techniques with innovations, thereby promoting the emergence of new varieties and naming the product with its producer's name.

Moldy cheeses from the Tapiraí, São Roque, Medeiros, Delfinópolis and Bambuí regions cost 80%, 40%, 25%, 16.67%, and 0%, respectively, more than traditional artisanal cheese. Other cheeses, such as those cured in wine, coffee, or with seasonings, also add value to the product, but to a lesser extent than moldy cheeses. It was observed that the more tourism there is in the region, the greater added value the cheeses have. Grelle (2019) mentioned that the municipality of São Roque de Minas, which is traditionally a tourist route for those seeking natural attractions in the Serra da Canastra National Park, has also become of interest to gastronomic tourism for the Canastra cheese.

4 Conclusion

By geographically demarcating the manufacturing territory of the new varieties of the traditional artisanal Canastra Minas Cheese, we found a concentration of producers in the same area within the municipalities of São Roque and Medeiros. The other municipalities still have little, or no activity related to the new varieties. With this study, we were able to observe the relationship between the profile of producers and the production of innovative cheeses in the microregion of the Canastra. In the geographical demarcation of artisanal Canastra cheese manufacturing, the cities of São Roque and Medeiros stand out, due to the diversity of varieties of traditional cheese and the number of producers.

The production of artisanal cheeses of the new varieties adds greater value to the product as producers receive a higher value for these cheeses. We suggest future research that evaluates the relationship between cheeses and tourism in the Canastra region.

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Appendix A. Survey questionnaire properties profile rurals of the Canastra microregion

QUESTIONNAIRE

Date: _____

Name: Age:

Place of birth: Occupation:

Farm (address):

GPS Data

1. CHARACTERIZATION OF PROPERTIES

1.1 Owner Tenant

1.2 How long have you been producing milk?

Up to 10 years 11 – 20 years 21 – 30 years > 30 years

1.3 What is the daily milk production at the property?

1.4 Type of milking: Mechanical Manual

2. FEEDING:

2.1 Do you provide any supplements to the diet?

2.2 How many kilos are provided per cow per month?

2.3 What is the value of the kilo of the supplement?

2.4 How many kilos of common salt are supplied per month?

2.5 Do you provide any kind of silage? Which type?

2.6 What type of pasture is used?

3. MILK PRODUCTION:

3.1 How many cows are there on the property?

3.2 How many cows are producing and how many are dry?

3.3 How many liters are produced daily and/or monthly?

3.4 Breed of animals

4. ARTISANAL CHEESES

4.1 Is there a denomination for the artisan cheese produced on the property?

4.2 Why produce cheese other than “traditional Minas cheese”? Do you produce more than one different type of cheese? Which type?

4.3 Do you have any story about when you started producing artisanal cheese other than the traditional? Was it accidental, for research; any other report on what originated the cheese produced the property.

4.4 What is the yield of the cheese produced here that is not the “traditional Minas cheese”?

4.5 What is the value of selling cheese other than “traditional Minas cheese”?

4.6 Which cities sell the cheeses produced on the property that are not the “traditional Minas cheese”?

4.7 What is the daily amount of cheese produced that is not “traditional Minas cheese”?

4.8 What is the maturation time of the cheeses that are not the “traditional Minas cheese”?

4.9 Do you produce the traditional artisanal Minas cheese? If so, how much do you produce? What’s the price?