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Beyond the Traditional Mountain Emmental Cheese in "Ţara Dornelor", Romania: Consumer and Producer Profiles, and Product Sensory Characteristics

Doru Necula [1,2], Mădălina Ungureanu-Iuga [1,3,*] and Laurenț Ognean [2]

[1] Mountain Economy Center (CE-MONT), "Costin C. Kirițescu" National Institute of Economic Researches (INCE), Romanian Academy, 49th, Petreni Street, 725700 Vatra Dornei, Romania; doru.necula@usamvcluj.ro

[2] Department of Physiology, University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca, 3–5th, Mănăștur Street, 400037 Cluj-Napoca, Romania; laurent.ognean@usamvcluj.ro

[3] Integrated Center for Research, Development and Innovation in Advanced Materials, Nanotechnologies, and Distributed Systems for Fabrication and Control (MANSiD), "Ştefan cel Mare" University of Suceava, 13th University Street, 720229 Suceava, Romania

* Correspondence: madalina.iuga@ce-mont.ro

Abstract: Emmental or Swiss cheese is a hard, ripened cheese appreciated by consumers for its appearance and taste. This study aimed to investigate the profile of Swiss cheese consumers and producers from Ţara Dornelor area, Romania, along with the sensory analysis of the Dorna Swiss cheese produced there. For this purpose, a questionnaire was applied to 268 participants to evaluate consumer behavior. Consumers were grouped depending on consumption frequency (low—once or a few times a year, medium—once a month, and high—once a week or more), and the behavior of groups was evaluated. Producer opinion was assessed by interview and Swiss cheese sensory characteristics in two seasons were determined by sensory analysis using a semi-trained panel. The results showed that the main factors affecting consumer purchase decision are the ingredients (4.43), taste and flavor (4.41), appearance and texture (4.23), producer (3.98), nutritional value (3.88), and product history (3.67). Clustering of consumers depending on consumption frequency revealed significant differences ($p < 0.05$) regarding the purchase place and some factors influencing the purchase decision such as price, health benefits, and nutritional value. Producers asserted that the quality of milk is the main problem in Swiss cheese production. They consider that the raw material quality and origin, hygiene, utilities, and legislation have the greatest impact on the production process, while the trading is mainly affected by the product taste and flavor, appearance and texture, quality label, price, and product history. The sensory characteristics differed significantly ($p < 0.05$) between producers and seasons, with the sample produced in a stainless-steel tank and without exogenous microflora being the most appreciated in summer. These results could help producers adapt their product quality and marketing policy to consumer preferences.

Keywords: consumer behavior; sensory analysis; Dorna Swiss cheese; producer opinion; processing conditions

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1. Introduction

Consumer preference for traditional foods is increasing, following the actual trend of natural and organic product market development. Emmental or the so-called "Swiss cheese" is a hard, matured cheese type that gained consumer attention due to its unique flavor and appearance. The Emmental cheese is a ripened product with a springy texture and it has characteristic holes of different sizes varying from those of cherries to those of walnuts [1]. The biggest producer and consumer of Emmental cheese is North America, followed by Europe, which has proper climatic conditions and landscapes for producing this type of cheese [2]. The Emmental cheese market size in 2023 is 1639.9 million dollars

and it is expected to grow to 2404.2 million dollars by 2033, with a global growth rate of 3.90%, according to the predictions made by Future Market Insights [2].

Consumer behavior is influenced by a series of factors, including product sensory and physicochemical characteristics; individual affective motives like experience, knowledge, attitude, nutritional and safety aspects; consumption occasion which implies ambiance, time, and socialization [3]. Investigating the consumer profile related to Emmental cheese consumption is important to support the improvement and development of the final products in agreement with the market demand. Go et al. [4] studied the development of (dis)liking of some cheese types, including Emmental, among young Korean females and concluded that the liking of cheese can be increased by repeated exposure to the product tested. A study demonstrated that Canadian consumers are disposed to pay more money for a cheese product manufactured locally or produced in regions with traditional relevance [5]. Caspia et al. [6] revealed that the taste sensory attribute could be used to relate the sensory profile of Cheddar cheese with consumer perception, while the aromatic compounds were connected to the consumer acceptability and aroma characteristics.

The sensory profile of Swiss cheese depends on the processing technology and quality of the raw materials. Milk raw material's volatile profile is a key factor in the final product aroma, along with the ripening processes. The most suitable fodder to obtain the right milk quality for Swiss cheese production is grass in summer and/or hay in winter [7]. Products coming from cows grazed on natural pastures have added value among farmers and consumers compared to products originating from animals fed with preserved forages due to the fact that they are perceived as being healthier and environmentally friendly [8]. Milk volatile profile changes were assigned to feed, seasonal variation, and breed. The study conducted by O'Callaghan et al. [9] demonstrated that the feeding system and ripening period significantly influenced the volatile and sensory characteristics of the Cheddar cheese.

The history of Swiss cheese production in the Ţara Dornelor area started in 1827 [7]. The conditions in this area are ideal for obtaining a high-quality product because there is great biodiversity and the soil is rich in minerals like manganese, iron, and copper. Traditional Swiss cheese processing involves the use of copper tanks, but a convenient alternative for this equipment is a stainless-steel tank. The origin of the microflora for the lactic and propionic fermentation can be spontaneous or exogenous (standard bacteria cultures). These processing conditions are essential in determining the sensory characteristics of the Swiss cheese, along with the ripening time, temperature and humidity. Cheese ripening conditions influence the development of the sensory characteristics by various biochemical reactions like proteolysis, glycolysis, and lipolysis that arise during this process [10]. The cheese sensory profile could be also influenced by season. Giaccone et al. [11] reported increased "butter smell cream, rennet, barn, garlic, soft toasted, bread rind, boiled vegetables, smoked, hazelnut, and herbage smell and more pronounced sweet aroma" of Raschera PDO cheese in summer compared to winter when it had more evident smoked, hazelnut and herbage smell.

To our knowledge, there are no studies presenting the consumer and producer profiles of Swiss cheese from Ţara Dornelor, corroborating the sensory characteristics of the final product. Furthermore, the influence of Swiss cheese consumption frequency on consumer behavior has not been addressed to date. Thus, this paper aimed to evaluate: (1) consumer preferences related to Swiss cheese in order to establish the consumption behavior, factors affecting the purchase decision, and impact of consumption frequency on them; (2) the Dorna Swiss cheese producer profile to determine the factors affecting production and trading; (3) Dorna Swiss cheese sensory characteristics as influenced by the processing technology and season.

2. Materials and Methods

This study was conducted in a mountainous region of Romania, in the so-called Ţara Dornelor region, which comprises 9 localities (Cârlibaba, Ciocănești, Iacobeni, Dorna

Arini, Panaci, Șaru Dornei, Dorna Candrenilor, Coșna, and Poiana Stampei) and 1 town (Vatra Dornei).

2.1. Evaluation of Consumer Preferences

A questionnaire (Supplementary Material, Table S1) was applied to evaluate the characteristics of the consumption of Swiss cheese and the factories that influence the purchase decision. The panel was selected randomly and comprised 268 participants who live in the geographical area considered or who work there. Another inclusion criterion was the consumption of Swiss cheese products: a negative response to this question determined exclusion from the panel. The maximum error was considered 5%. The questionnaire was applied on-site (in the market and supermarket areas) and online (on social media groups, via e-mail, and private messages), and verbal consent of the participants was obtained after the objectives and General Data Protection Regulation (GDPR) rules were presented. The questionnaire was anonymous and it was designed to collect socio-demographic characteristics (gender, age, revenue, education level, number of family members), information related to the consumption of Swiss cheese (frequency, quantity, price willing to pay, purchase place preference) and factors influencing the purchase decision (price, taste and flavor, appearance and texture, producer, product history of the product, health benefits, mood, ingredients used, advertising/popularity, convenience, and nutritional value). The questionnaire was adapted from the existing literature [12,13]. The importance of the factors that dictate the purchase decision was evaluated by using a 5-point scale: 1—not at all, 2—a little, 3—neutral, 4—much, and 5—very much [14].

2.2. Socio-Demographic Characteristics

The socio-demographic characteristics of the panel are presented in Table 1. A percent of 5% of the respondents mentioned that they do not consume Swiss cheese, so the questionnaire stopped for them and they were excluded from the further analysis.

Table 1. Socio-demographic characteristics of the panel.

Characteristic	Frequency	Percentage
Gender		
Male	162	40
Female	106	60
Age (years)		
<18	2	1
18–40	75	28
41–60	159	59
>60	32	12
***Revenue* (EUR)**		
<360	19	7
360–600	59	22
600–1000	127	47
>1000	63	24
Education		
Primary/general studies	7	3
High school diploma	63	23
University degree	198	74
Family members number		
1	17	6
2	63	24
3–5	168	63
>5	20	7
Swiss cheese consumer		
Yes	254	95
No	14	5

2.3. Investigation of the Producer Profile

There are two certified producers of Swiss cheese in the Dorna area. One is located in Neagra Şarului village and it is named Producer A in this study, and the other one is located in Şaru Dornei village and is named Producer B. The investigation of each producer profile was performed by using an interview (Supplementary Material, Table S2) that comprised 2 parts: the first one related to the business and production of Swiss cheese (open questions), and the second one related to the factors influencing Swiss cheese production (5 points scale with 5-point scale: 1—not at all, 2—a little, 3—neutral, 4—much, and 5—very much). Verbal informed consent was obtained before starting the interview and the objectives and GDPR rules were presented to the respondents. The spatial distribution of the sales was assessed by using ArcGIS Pro software with the data obtained in the interviews.

At the moment of this study, there are only 2 certified producers of Swiss cheese in the Ţara Dornelor area. Producer A started production in 2018 and this has been continuous to date, while Producer B started production in 2019 and had a break of 1 year in 2020 caused by the COVID-19 pandemic (Figure 1). Producer A processes between 500 and 850 L milk/day, while Producer B processes 500 L milk/day for Swiss cheese manufacturing. The weekly sales of Producer A are approximately 96 kg, while Producer B sells approximately 150 kg/week of Swiss cheese. Producer A is interested in business extension by increasing the production capacity and acquisition of equipment, while Producer B does not want to develop the business more. Both producers have implemented a Hazard Analysis Critical Control Point (HACCP) food safety system, which is required by the Romanian Veterinary Sanitary and Food Safety Organism for every food industry factory.

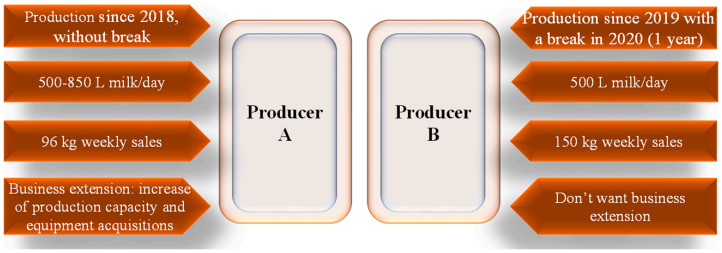

Figure 1. Characteristics of the producers.

2.4. Sensory Characteristics of Dorna Swiss Cheese

Swiss cheese samples were provided by the two producers from the Ţara Dornelor area and the main differences between them were related to the processing technology: the cheese coming from Producer A was made in a stainless-steel tank, without exogenous lactic bacteria addition, and with a maturation period of 70 days; the cheese coming from the Producer B was made in a copper tank, with standard bacterial culture addition, and with a maturation time of 90 days. A commercial Swiss cheese sample (coded with S) produced in Germany was acquired from the market. The samples were collected in two seasons, winter (ICA, ITC, and IS samples codes) and summer (VCA, VTC, and VS samples codes, Figure 2), and the sensory analysis was performed in two sessions.

(**a**) (**b**) (**c**)

Figure 2. Swiss cheese samples used in sensory analysis: (**a**) Swiss cheese from Producer A, (**b**) Swiss cheese from Producer B, and (**c**) Swiss cheese from the market.

The sensory evaluation of the Swiss cheese samples was performed by using the method with unitary scoring scales, following the SR 6345:1995 [15]. Milk and dairy prod-

ucts. Sensory analysis standard. A panel of 25 semi-trained food engineering specialists from the Faculty of Food Engineering of the "Ştefan cel Mare" University of Suceava participated voluntarily in this study. They were trained for 3 months in the laboratory of Sensory Analysis of the Food Engineering Faculty from the Stefan cel Mare University. The training comprised the main groups of food products, including dairies. Verbal consent was obtained from each participant. The sensory analysis was performed in the laboratory of Sensory Analysis, with artificial lightning and at a temperature of 18 °C. All the participants were consumers of cheese and animal products. The samples were presented randomly to the panelists and the appearance and shape, color, consistency, smell, taste, and general acceptability were evaluated by using a 5-point scale described in the SR 6345:1995 standard (Supplementary Material, Table S3). A piece of approximately 20 × 30 cm was presented for appearance and color evaluation and then three pieces of each sample of 1 cm in length were provided for tasting. Water was provided for mouth cleaning between sample testing. The quality score was calculated according to the SR 6345:1995 by multiplying each characteristic score with the corresponding factor and by summing them. The products were classified in terms of the quality score obtained as: very good (18.1–20.0), good (15.1–18.0), satisfactory (11.1–15.0), unsatisfactory (7.1–11.0) and incompatible (0–7.0).

2.5. Statistical Analysis of Data

Information related to the factors influencing the purchase decision of the consumers and those affecting the production of Swiss cheese was transformed into numerical data, which were further processed by using SPSS trial version software. The significance level was considered to be 95%. The data of the consumer profile were grouped based on consumption frequency: low (once or a few times a year), medium (once a month), and high (once a week or more). Analysis of variance (ANOVA) was performed to compare the characteristics of the groups. The Kruskal–Wallis test was used to evaluate whether samples originated from the same distribution ($p < 0.05$).

3. Results

3.1. Consumer Preferences

The results of the frequency of the consumption characteristics included in this study are presented in Table 2. Most of the interviewed people (53.5%) buy a quantity of 200–500 g once, while the price they are willing to pay is between 5 and 15 EUR (38.2%) or between 15 and 20 EUR (34.3%). Consumers indicated the dairy store (51.2%) as the preferred place to buy Swiss cheese.

Table 2. Frequency of the attributes for consumption characterization.

Attribute	Frequency	Percent
	Quantity (g)	
100–100	40	15.7
200–500	136	53.5
500–1000	69	27.2
>1000	9	3.5
	Price willing to pay (EUR/kg)	
<5	33	13.0
5–15	97	38.2
15–20	87	34.3
20–25	31	12.2
>25	6	2.4
	Purchase place	
agro-food market	20	7.9
supermarket	72	28.3
local store	3	1.2
dairy store	130	51.2
particular houses	28	11.0
online	1	0.4

The factors influencing consumer decision to buy Swiss cheese are related to the product characteristics, commodity, mood and advertising. The highest importance was obtained for the ingredients (4.43), followed by the taste and flavor of the product (4.41), appearance and texture (4.23), producer (3.98), nutritional value (3.88), and product history (3.67). The convenience, popularity, mood and price were marked as having lower importance to purchase intention (Table 3).

Table 3. Descriptive analysis of the factors influencing the purchase decision.

Factor *	Mean	SE	SD
Price	3.04	0.07	1.06
Taste and flavor	4.41	0.05	0.75
Appearance and texture	4.23	0.05	0.79
Producer	3.98	0.07	1.06
Product history	3.67	0.07	1.15
Health	4.09	0.06	0.99
Mood	3.10	0.08	1.22
Ingredients	4.43	0.06	0.90
Popularity/advertising	3.30	0.08	1.20
Convenience	3.30	0.07	1.15
Nutritional value	3.88	0.07	1.09

* 1—not at all, 2—a little, 3—neutral, 4—much, and 5—very much.

3.2. Clustering of Consumers Based on Consumption Frequency

Consumers were clustered into three groups, depending on the consumption frequency of Swiss cheese: low—people consuming once or a few times a year, medium—people consuming once a month, and high—people consuming once a week or more. Regarding the quantity bought, all the 3 groups preferred to acquire 200–500 g of Swiss cheese and no significant differences ($p > 0.05$) were observed (Table 4). The price customers are willing to pay was revealed as between 5 and 20 EUR/kg, without significant differences ($p > 0.05$) among groups. The purchase place differed among groups ($p < 0.05$), with the low- and medium-consumption frequency group preferring the dairy store, while the high-consumption group preferred the local store.

Table 4. Characteristics of Swiss cheese consumption depending on consumption frequency.

Group	Low		Medium		High		ANOVA	
Attribute	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**	**F**	***p***
Quantity (g)								
100–200	19	17.9	9	12.7	12	15.6		
200–500	54	50.9	40	56.3	42	54.5	0.11	0.9
500–1000	30	28.3	21	29.6	18	23.4		
>1000	3	2.8	1	1.4	5	6.5		
Price willing to pay (EUR/kg)								
<5	14	13.2	8	11.3	11	14.3		
5–15	46	43.4	25	35.2	26	33.8	1.36	0.26
15–20	35	33.0	28	39.4	24	31.2		
20–25	10	9.4	9	12.7	12	15.6		
>25	1	0.9	1	1.4	4	5.2		
Purchase place								
agro-food market	13	12.3	2	2.8	5	6.5		
supermarket	38	35.8	14	19.7	20	26.0	7.56	<0.01
local store	1	0.9	2	2.8	40	51.9		
dairy store	48	45.3	42	59.2	12	15.6		
particular houses	5	4.7	11	15.5	5	6.5		
online	1	0.9	2	2.8	20	26.0		

The purchase decision was affected differently by some of the factors considered, depending on the consumption frequency group. According to the results obtained (Table 5), the price had a significant ($p < 0.05$) influence on the low-consumption group (3.27) compared to the medium- (2.93) and high-consumption (2.81) groups. The health benefits and the nutritional value factors were more important ($p < 0.05$) for the high (4.35 and 4.14, respectively) and medium-consumption (4.14 and 4.01, respectively) groups compared to low-consumption group (3.88 and 3.59, respectively). The other factors considered did not exert significant differences ($p > 0.05$) among groups.

Table 5. Comparison between groups regarding the factors influencing the purchase decision.

Group	Low		Medium		High		F-Value
Factor †	Mean	SD	Mean	SD	Mean	SD	
Price	3.27 ^{a}	0.97	2.93 ^{ab}	0.95	2.81 ^{b}	1.20	5.02 *
Taste and flavor	4.38 ^{a}	0.76	4.46 ^{a}	0.63	4.40 ^{a}	0.83	0.29
Appearance and texture	4.26 ^{a}	0.69	4.14 ^{a}	0.90	4.26 ^{a}	0.80	0.61
Producer	3.96 ^{a}	1.03	4.07 ^{a}	0.98	3.91 ^{a}	1.18	0.44
Product history	3.49 ^{a}	1.09	3.77 ^{a}	1.11	3.81 ^{a}	1.24	2.15
Health	3.88 ^{b}	1.06	4.14 ^{ab}	0.88	4.35 ^{a}	0.93	5.39 *
Mood	3.18 ^{a}	1.08	3.07 ^{a}	1.25	3.01 ^{a}	1.37	0.44
Ingredients	4.44 ^{a}	0.88	4.48 ^{a}	0.84	4.35 ^{a}	0.98	0.41
Popularity/advertising	3.29 ^{a}	1.16	3.24 ^{a}	1.14	3.35 ^{a}	1.31	0.16
Convenience	3.21 ^{a}	1.11	3.42 ^{a}	1.18	3.31 ^{a}	1.19	0.74
Nutritional value	3.59 ^{b}	1.16	4.01 ^{a}	1.02	4.14 ^{a}	0.98	6.64 *

^{a,b}—mean values followed by the same superscript in the same row are not significantly different ($p > 0.05$), * significant at $p < 0.05$. † 1—not at all, 2—a little, 3—neutral, 4—much, and 5—very much.

For the low-consumption group, the taste and flavor, appearance and texture, and ingredients factors were the most considerable factors affecting the purchase decision (level > 4). For the medium-consumption group, the taste and flavor, appearance and texture, producer, health benefits, ingredients, and nutritional value received an importance level > 4. The high-consumption group selected the taste and flavor, appearance and texture, health benefits, ingredients, and nutritional value as being the main factors (level > 4) affecting their purchase decision.

The results of the Kruskal–Wallis test (Table 6) revealed that the distribution is different across low-, medium-, and high-consumption groups ($p < 0.05$) for the purchase place variable and for the price, products history, health, and nutritional value factors.

Table 6. The Kruskal–Wallis Test results.

Variable	Null Hypothesis	Significance	Decision
Consumption			
Quantity	The distribution is the same across	0.927	Retain the null hypothesis
Price willing to pay	low-, medium- and	0.312	Retain the null hypothesis
Purchase place	high-consumption categories	0.001	Reject the null hypothesis
Factors affecting purchase decision			
Price		0.010	Reject the null hypothesis
Taste and flavor		0.825	Retain the null hypothesis
Appearance and texture		0.767	Retain the null hypothesis
Producer		0.797	Retain the null hypothesis
Product history	The distribution is the same across	0.050	Reject the null hypothesis
Health	low-, medium- and	0.003	Reject the null hypothesis
Mood	high-consumption categories	0.627	Retain the null hypothesis
Ingredients		0.706	Retain the null hypothesis
Popularity/advertising		0.826	Retain the null hypothesis
Convenience		0.452	Retain the null hypothesis
Nutritional value		0.001	Reject the null hypothesis

3.3. The Producer Profile

Producers were asked to mention the difficulties encountered during the production of Swiss cheese in the Ţara Dornelor area. Both of them mentioned that the quality of milk is a problem due to the hygienic conditions and because more and more farmers use hay bales, which favor fermentation of the forage that is not beneficial for Swiss cheese quality. The microflora of the milk is very important since only a small percent of the milk is pasteurized, according to the processing technology. Apart from the milk quality, it is difficult to find an appropriate quantity of milk for Swiss cheese production due to the drastic reduction in the herd of cows (Figure 3).

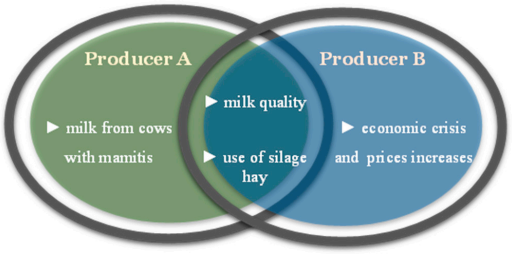

Figure 3. Difficulties faced by producers in Swiss cheese production.

Producer A also mentioned the frequent reception of milk samples coming from cows with mamitis, which is not accepted for processing. Producer B affirmed that the economic crisis and the price increases are other difficulties faced during the production of Swiss cheese.

Both producers listed the milk and auxiliary material quality, hygiene, origin of raw materials, utilities and legislations as having the highest importance (Figure 4a), while the equipment received a lower importance score. Producer A considered that the staff training and the environmental protection aspects are more important compared to Producer B opinion. On the other hand, for Producer B, the availability of raw materials has greater impact compared to Producer A.

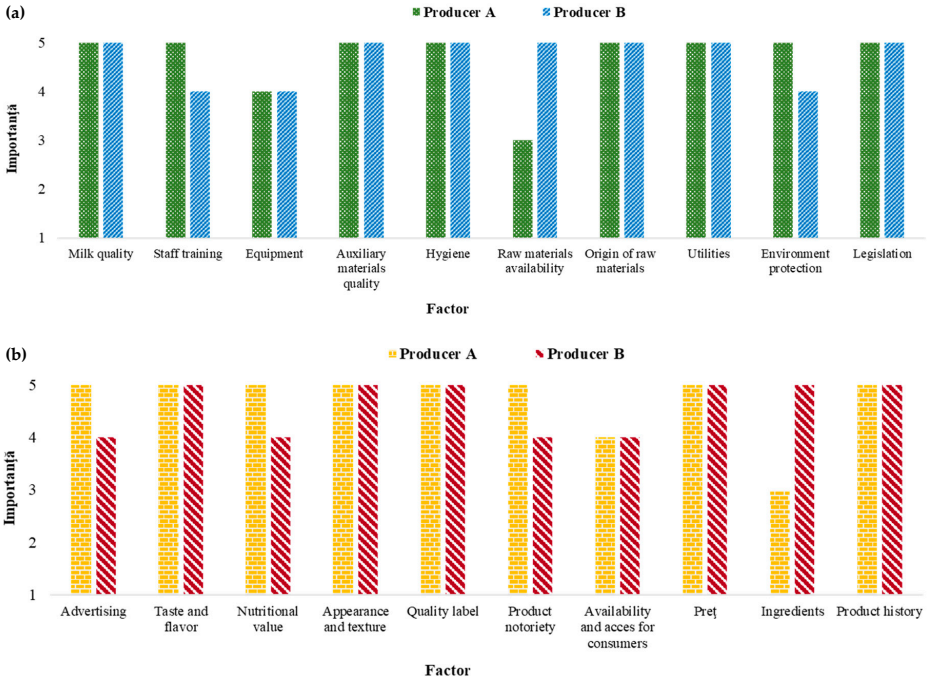

Figure 4. Factors influencing the production (**a**) and trading (**b**) of Dorna Swiss cheese: 1—not at all, 2—a little, 3—neutral, 4—much, and 5—very much.

With respect to Swiss cheese trading, both producers asserted that the taste and flavor, appearance and texture, use of quality label, price, and product history have the greatest impact on product trading, while the availability and access for consumers had less importance (Figure 4b). Advertising, nutritional value and product notoriety matter to a greater degree to Producer A than to Producer B. In contrast, Producer B appreciated the ingredients as being more important in Swiss cheese trading compared to Producer A.

The distribution place of Swiss cheese Is represented in Figure 5. As can be depicted from the maps, Producer B has a more intense distribution, with more locations across the Romanian market, while Producer A sells Swiss cheese mostly in the Moldova region. Producer B covers a higher part of the Romanian market, starting from the local region (Suceava) to the Moldova, Ardeal, Muntenia, and Oltenia regions. Producer A has a more intense distribution in the Suceava and Rădăuţi cities compared to other localities. Swiss cheese by Producer B is distributed in many locations in Cluj-Napoca and Bucharest, while the distribution is less intense in other regions.

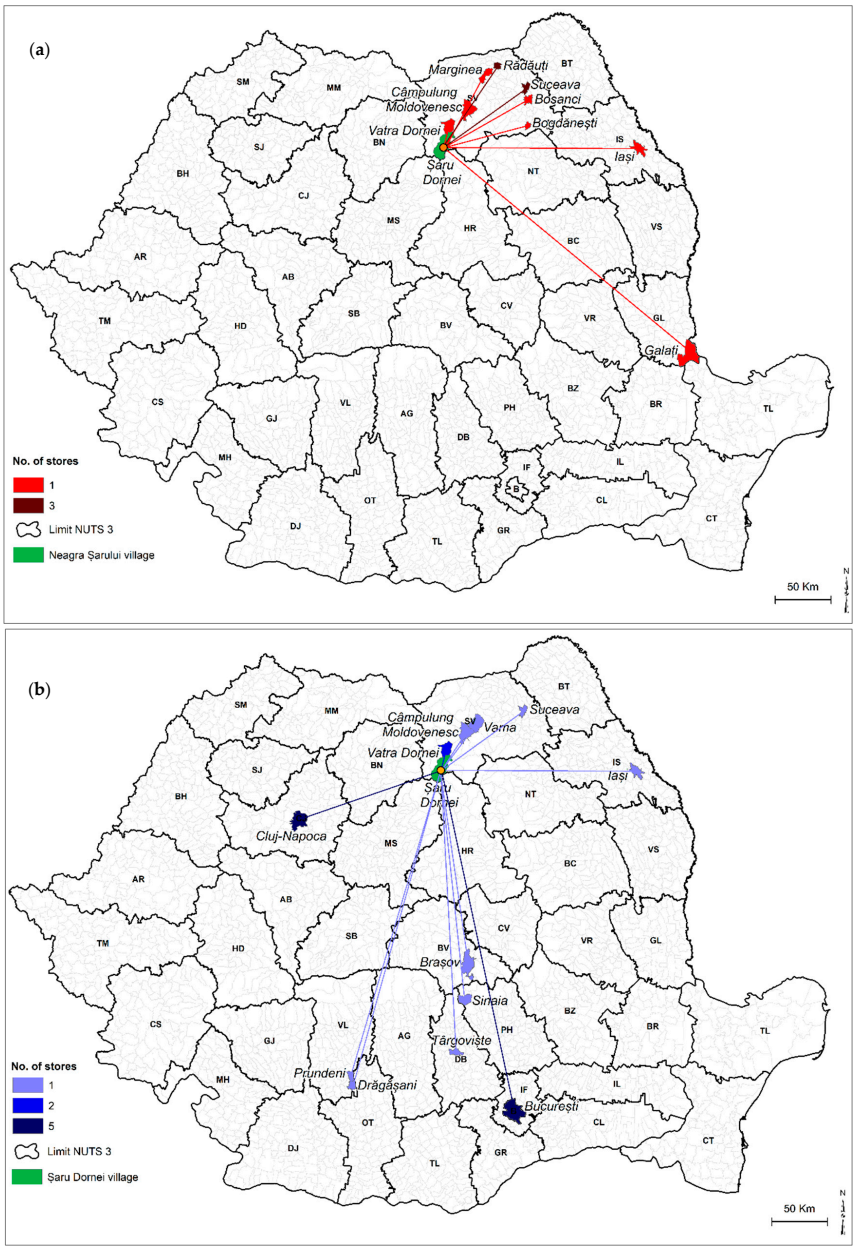

Figure 5. Maps of distribution places of Swiss cheese produced by Producer A (**a**) and Producer B (**b**) in 2023 (data source: interview of the producers).

3.4. Dorna Swiss Cheese Sensory Characteristics

The sensory characteristics of the Swiss cheese manufactured by Producers A and B, together with a commercial sample, are presented in Figure 6. Processing technology significantly influenced ($p < 0.05$) the sensory characteristics of Swiss cheese. In the winter season, the IS sample achieved higher scores for appearance and shape, color, consistency, smell, taste, and general acceptability, followed by the ITC sample. In the summer season, the VCA sample received the highest score for appearance and shape, color, consistency, smell, taste and general acceptability (Figure 6). No significant differences ($p < 0.05$) between the VTC and VS samples were obtained in terms of taste and general acceptability. With respect to the influence of season on the sensory characteristics of Swiss cheese, the CA samples were appreciated with a higher score in summer compared to winter for all the attributes considered. On the other hand, the TC cheese obtained in summer received a smaller score for appearance and shape attribute and color, while for smell, taste, and general acceptability, the scores were higher compared to winter. The commercial sample was evaluated with lower scores in the summer compared to the winter season for all the sensory characteristic attributes considered.

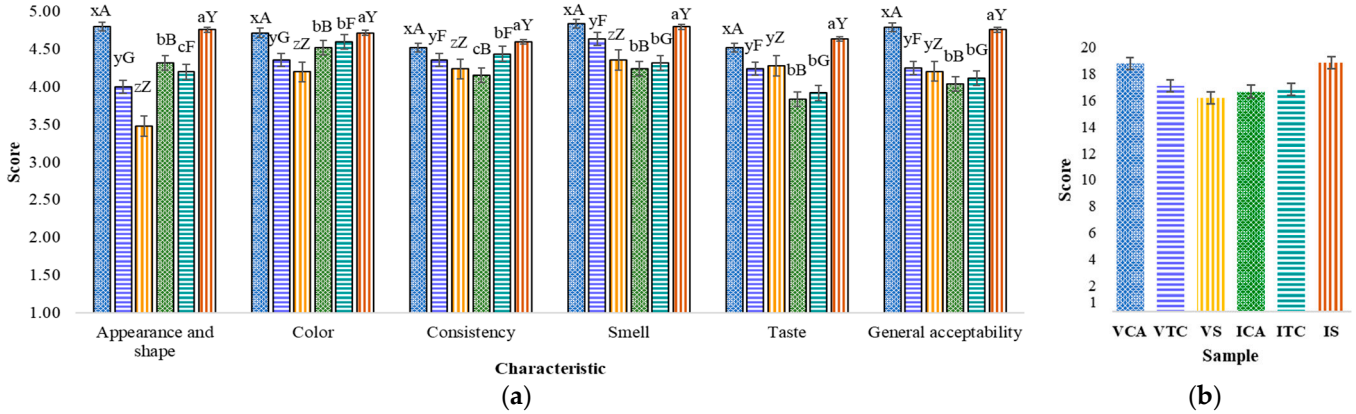

Figure 6. (**a**) Sensory characteristics of Swiss cheese, (**b**) quality score of Swiss cheese: VCA—Swiss cheese from Producer A in the summer season, VTC—Swiss cheese from Producer B in the summer season, VS—Swiss cheese from a supermarket in the summer season, ICA—Swiss cheese from Producer A in the winter season, ITC—Swiss cheese from Producer B in the winter season, and IS—Swiss cheese from a supermarket in the winter season. a–c (for the winter season) and x–z (for the summer season)—columns followed by distinct lowercase letters indicate significant differences ($p < 0.05$) between producers; A–B (for Producer A)/F–G (for Producer B)/Y–Z (for supermarket-originated sample)—columns followed by distinct capital letters indicate significant differences ($p < 0.05$) between seasons within the same producer.

The quality score of the analyzed samples showed that VCA and IS samples can be classified as very good quality (>18.1), while VTC, VS, ICA and ITC can be classified as good quality (15.1–18.0) according to the SR 6345:1995 standard (Figure 6b).

4. Discussion

4.1. The Consumer Profile

Swiss cheese is a niche product and its production history in Ţara Dornelor dates back to 1827 [7]. The results obtained in this study revealed that consumers are willing to pay between 5 and 20 EUR/kg of Swiss cheese, mostly from dairy stores. Our results are in agreement with those reported previously in the literature by Menozzi et al. [16], who studied consumer behavior related to cheese products with quality labels in France and Italy. For French consumers, the authors obtained the price customers are willing to pay (WTP) as between 11.6 and 20.8 EUR/kg of ripened hard cheese; for the Italian people, the WTP was comprised between 5.13 and 7.53 EUR/kg, depending on the interests of the consumer, cheese brand, and type of quality label. Regarding the factors that affect the purchase

decision, in our study, the highest importance was attributed to the product characteristics (taste and flavor, and appearance and texture), followed by the ingredients, health benefits, producer, nutritional value and product history. Castada et al. [17] demonstrated that the sensory characteristics of Swiss cheese (nutty malty, milkfat lactone, salty, umami, and sweet aroma) were correlated with consumer preferences and liking a nutty aroma. Another study revealed that the liking of Swiss cheeses was greatly influenced by flavor, with the diacetyl, whey, milk fat, and umami attributes being the drivers for liking and cabbage, cooked, and vinegar attributes for disliking [18]. Drake et al. [19] concluded that consumer preference for mild Cheddar cheese was influenced by the color of the product. It was proved that if the texture did not meet consumer expectations, the overall acceptability and/or purchase decision will be negatively affected [19]. Regarding producer and product history, Ojeda et al. [20] asserted that European consumers would be able to distinguish the quality characteristics of PDO compared to non-PDO cheeses originating from their own country rather than for imported products. This is in line with our results and supports the idea that cultural heritage and familiarity play an important role in consumer choice. The results obtained by Jacquot et al. [21] for consumer behavior related to Emmental and Compte cheese "health" and "tasty" labels demonstrated that the "tastiness" label raised the perceived aroma intensity, while the "healthiness" label reduced the perceived aroma intensity. The actual trend of consumer awareness of healthy diets is also reflected by the findings of the present study.

Swiss cheese consumer clustering depending on consumption frequency revealed significant differences ($p < 0.05$) regarding the purchase place between groups. While the low- and medium-consumption groups preferred a specialized dairy store, the high-consumption group preferred a local store. These results suggest that the commodity plays an important role in the choice of purchase place, since local stores are usually closer to the house than specialized dairy stores. Considering that this group consumes Swiss cheese at least once a week, it is time-saving for them to find the product at local stores. Kusz and Kilar [22] studied the preferences of consumers from Poland for dairy product purchase place and reported that 58.4% of the respondents selected small and medium shops. These findings suggest that short supply chains are a very good solution for the Swiss cheese market. Other studies highlighted the importance of direct sales of mountain products, which is in agreement with the results of the present study [23–25]. Significant differences ($p < 0.05$) among groups concerning the price, health benefits and nutritional value factors affecting the purchase decision were obtained in the present study. While the low-consumption group sets more value on the price factor, the medium- and high-consumption groups are more concerned with the health benefits and the nutritional value of Swiss cheese. Our results are in agreement with those obtained for Parmesan cheese consumers who linked consumption frequency with awareness of price and taste [26]. The importance of price in the purchase decision depends on budget constraints and purchasing motives, thus the price seems to have less importance for usual purchase of low-cost foods [26,27]. According to Topcu et al. [28], the consumer purchase decision regarding a Turkish PGI cheese was significantly affected by the intrinsic characteristics of the product, including nutritional value, sensory attributes and food safety. Mountain products were perceived by consumers as a useful tool for a healthy diet, with tasty and natural flavors [24]. The perception of mountain products as high quality is based on many aspects in addition to the intrinsic properties, as demonstrated by Bonadonna et al. [24,29]. Therefore, the orientation of consumers toward health benefits and nutritional values related to Swiss cheese in this study could be due to the origin of the product because they possibly associate the consumption of this kind of food with the two products manufactured in the Dorna area which are certified as "mountain products".

4.2. The Producer Profile

At this moment, there are only two producers of Swiss cheese in Ţara Dornelor, with the main differences between them being related to processing technology. Producer A

did not face with any break in activity since 2018, while Producer B was affected by the COVID-19 pandemic. This could be due to the fact that Producer A has a larger variety of products, including other cheese types and yoghurt, while Producer B is focused only on Swiss and Raclette-type cheeses. Producer A's desire to extend their production and enhance distribution could be related to their weaker distribution network compared to that of Producer B. Furthermore, consumer demand for organic and local food is increasing [24], thus this provides an opportunity for dairy plants to expand. On the other hand, Producer B encountered more difficulties, including milk quality and financial aspects, that have not fostered business extension, with an already strong distribution network across Romania. Regarding the challenges of Swiss cheese production, both producers mentioned that there are fewer and fewer farmers who can ensure proper milk quality, mainly because of the hygiene conditions required and the use of silage hay. An essential condition for Emmental cheese production is the use of milk from cows grazed or fed with hay only, due to the fact that silage could promote butyric bacteria spoilage of the final product [30]. Apart from milk quality, the hygiene conditions, raw material origins and staff training were mentioned by both producers as being very important factors for Swiss cheese production. The scientific literature also mentions the manufacturing of raw milk cheese like Emmental as being challenging because good agricultural practices must be rigorously respected and transport and storage times must be limited to achieve the desired final product properties [31]. The presence of *Clostridium* bacteria species in silages could raise the risk of contamination in Swiss cheese, which will negatively affect the production process [32]. In the present study, Producer A mentioned milk from animals with mastitis as a challenge in the manufacturing process. Milk from cows with mastitis will have a different chemical composition, which will disturb lactic bacteria activity, thereby enabling the development of pathogenic species [33].

Regarding the factors influencing Swiss cheese marketing, both producers interviewed in this study considered that the taste and flavor, texture and appearance, price, product history and use of a quality label hold great importance. These results were in agreement with the consumer sentiment indicating the high contribution of the intrinsic characteristics of the product along with the price and the producer to the purchase decision. On the other hand, producers considered that advertising and product notoriety are also essential factors for Swiss cheese marketing. However, consumers did not appreciate these aspects as having a big influence on their decision and attributed a neutral influence. Consumers of specialty cheese products like Emmental have greater knowledge of cheese, are willing to pay more and consume better varieties of cheeses, with a certain brand preference [33]. The purchase decision of people consuming specialty cheeses is influenced by many aspects, including location of producer, price, size and quality characteristics [34]. Producers interviewed in this study appreciated that availability and access for consumers are less important than the other factors mentioned before. However, high-consumer preference for local store purchases indicates that they have an opposite opinion. Therefore, producers should adapt their marketing policy and enhance, if necessary, the access of consumers to the product.

4.3. Dorna Swiss Cheese Sensory Characteristics

The processing technology and the season significantly ($p < 0.05$) affected the sensory characteristics of Dorna Swiss cheese. The use of a copper tank and a standard bacteria culture in sample VTC (Producer B) resulted in lower sensory characteristics scores in summer compared to the VCA (Producer A) sample made in a stainless-steel tank and with spontaneous microflora. In the winter season, an opposite trend was observed between the two samples, with the ITC cheese receiving better scores than ICA. High amounts (18 mg/kg) of copper may have negative effects on the appearance and flavor of Swiss cheese—copper increases the levels of proteolysis, and affects lactic and propionic bacteria activity [35,36]. Our previous study regarding the mineral profile of Swiss cheese revealed that ITC and VTC samples made in a copper tank had 10.80–19.81 mg/kg of copper, while ICA and ITC made in stainless-steel tank had less than 1.70 mg/kg [37]. Compared to

the commercial sample (VS) acquired from the supermarket, both local cheeses presented better sensory properties in the summer season, while IS received higher scores in winter. The industrial processing of Emmental cheese usually supposes constant milk characteristics, pasteurization and addition of starter bacterial cultures for lactic and propionic fermentation, in contrast to traditional processing, where raw milk is used [31]. The results obtained could be related to the richness of bioactive aromatic compounds from pasture in summer, compared to the hay used as forage during winter for the traditional cheese of Producer A and Producer B. It was demonstrated that there is a direct transfer in milk of some terpenes and other volatile substances from fresh pasture or from hay; some of them were related to herb metabolism or forage fermentation produced during storage, while other volatile compounds are transferred indirectly to milk after being transformed in rumen [8,38,39]. The sensory characteristics of Swiss cheese are determined by the changes in milk chemical profile due to seasonal livestock management, along with different processing and ripening conditions [40]. This can explain the differences among TC sensory characteristics which were better scored in summer compared to winter, while the opposite results were observed for CA and the commercial sample. Seasonality was related to variations in milk raw material chemical composition, cheese water content, yield and quality [35,41]. The study conducted by Fröhlich-Wyder and Bachmann [42] showed that cheese manufactured in winter with milk coming from cows fed with hay and silage presented a lower acidification rate and greater occurrence of secondary fermentation than cheese made from summer grass-fed originated milk. Another study demonstrated that cheese manufactured from summer milk had higher moisture than the winter sample, which could lead to raised proteolysis levels that may affect the texture of the final product and promote secondary fermentation through the release of small peptides and amino acids [43]. Giaccone et al. [11] reported differences regarding the aroma of Raschera PDO cheese in summer and winter: in summer, the "butter smell, cream, rennet, barn, garlic, soft toasted, bread rind, boiled vegetables, smoked, hazelnut, and herbage smell, along with a sweeter aroma" were predominant, while the cheese presented a smoked, hazelnut and herbage smell and flavor in winter. The results of the sensory analysis, which showed high scores for the traditional-made Swiss cheese samples, supported the consumer preferences from Ţara Dornelor for these products.

4.4. Limitations of This Study

This study was conducted in the Ţara Dornelor area, which comprises 10 localities. One of the limitations of this study is related to the distribution of the participants, which was unequal within these localities. For the study of the consumer and producer profiles, a mixture of open and closed questions were used. The producer profile was designed only based on the data provided by the two producers existing in Ţara Dornelor, without comprising any official data.

5. Conclusions

The preferences of consumers from Ţara Dornelor were investigated regarding the consumption of Swiss cheese. The results obtained revealed that consumers prefer to buy 200–500 g of Swiss cheese and are willing to pay a price of 5–20 EUR/kg. Their favorite purchase place is the dairy store, and the taste and flavor, appearance and texture, health benefits and the ingredients used are the most important factors affecting purchase intention. The clustering of consumers depending on consumption frequency revealed that the favorite purchase places for the high-consumption group are the local stores, compared to medium- and low-consumption groups that chose the dairy store. The low-consumption group scored the price as being more important compared to the other two clusters, while the health benefits and the nutritional value presented the greatest effect on the purchase decision for the medium- and high-consumption groups. The producers asserted that milk quality is a big challenge in Swiss cheese production. Other important factors affecting production are staff training, hygiene, utilities, and legislation. Regarding trading, the

taste and flavor, appearance and texture, use of quality labels, price, and product history were mentioned as the key factors by both producers. The sample made in a stainless-steel tank and without exogenous microflora obtained the highest score in the summer season, while the commercial sample was more appreciated in winter. The smell, taste, and general acceptability of the summer cheese were scored as better compared to that of the winter season, except for the commercial sample. These results could be of great interest to producers in developing and enhancing the technologies involved as well as product quality depending on consumer expectations. Furthermore, producers can adapt their marketing practices to better promote their products considering the preferences of the consumers. Further research perspectives should be directed to an in-depth study of the relationship between product nutritional and sensory attributes and consumer preferences. Additionally, the investigation of the main factors affecting Swiss cheese production is recommended in order to reduce the impact of some difficulties encountered by the producers.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/agriculture14040621/s1, Table S1: Consumer questionnaire items, Table S2: Producer questionnaire items, Table S3: Description of the sensory analysis scale.

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