

TRADITION AND CONTEMPORATION IN THE PRODUCTION OF CRUDE DRIED MEAT PRODUCTS

Valentin Nikolov¹, Stanislav Radanski²

¹*Bulgarian Food Safety Agency, Sofia, Bulgaria*

²*University of Forestry, Faculty of Veterinary Medicine, Sofia, Bulgaria*

E-mail: dr_radanski@abv.bg

ABSTRACT

Production of traditional raw – dried meat products in Bulgaria is a historical fact that is increasingly fades into the background of innovative technologies that massively enter the meat industry. That's besides the massive high-tech production and European framework which imposes certain standards in the production of this type of meat products. However, they remain favorites in the local market as it is considered a traditional food for the region. As foods with protected designations and traditional specialties guaranteed in the European register were entered Elena fillet, sausage Panagyurska, Rolle Trapezitza and Kaiser neck Thrace. Studies over the hygiene status and quality characteristics of various assortments of raw dried meat products are diverse and indicate possible problems arising from the specificity of the products and the continuous development of technology. This study examines the quality of meat raw materials, the role of microflora in meat available and the impact of the added starter cultures in the production of fast ripening raw dried meat products as a key factor in maintaining the identity and authority of traditional Bulgarian food.

Key words: dried meat products; quality characteristics.

Introduction

The European Quality Scheme of Traditional Specific Food (TSG) was established in 1992 and seeks to provide a system for the protection of traditional food products of a specific nature. Unlike Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI), this quality scheme does not certify that a protected food product belongs to a particular geographical area. To be eligible for the TSG, it must be „specific“ and its raw materials, production or processing must be „traditional“. According to Art. 3 of Regulation (EU) No 1151/2012, „specific character“ is defined as „attributes characteristic of the production that distinguish a product clearly from other similar products of the same category. A period of at least 30 years that allows for intergenerational transmission in order to register a food under the TSG scheme it should be of a traditional or specific nature The TSG creates an exclusive right for the registered name of the product. But the name of the product can only be used by producers who meet the requirements of production and product specification 37 products such as TSGs have been registered in the EU so far These include Mozzarella (Italy), Serrano ham (Spain), Old Geuze beer and Faro (Belgium) and others.

The production of traditional raw dried meat products in Bulgaria is a historical fact that is increasingly fading against the backdrop of innovative technologies that are massively entering the meat industry. The reason is, on the one hand, mass production and, on the other, the European framework which imposes certain standards in the production of this category of meat products. Nevertheless, raw-dried meat products remain a preferred food on our market due to their traditional character.

In 2012, the Bulgarian Association of Traditional Raw Dried Meat Products prepared for the European Commission documents for six traditional Bulgarian meat products: „Govediva Pas-

torma“, „Kayserova Pastarmma“, „Trapezitsa“ Role, „Vrat“ Thrace, Elena „and Lukanka Panagyurski. Two years later, three products of traditional special character – Fillet“ Elena „, Lukanka“ Panagurska „and Role“ Trapezitsa „have been entered in the European registers as protected food names. In 2015, the Kaiservan neck „Thrace“ was included in the register of the same category.

In traditional methods for the production of raw-dried meat products, the origin of the raw material and especially the meat-based hygiene and the storage of the meat raw materials are of great importance. During the salting, ripening and drying of the meat complex microbiological and physico-chemical processes are carried out, which determine the formation of a stable color, good structure, pleasant taste and aroma of the finished products. In the technology of these products, the microflora of meat, air, spices, shells, workers' clothing and clothes, and the like, is particularly important. In fact, in individual plants this microflora is different, which allows the production of products with specific organoleptic characteristics (Коларов, 2001).

In classical technology, unlike traditional technology, not only the environmental microorganisms available, but the so-called Starter cultures - combinations of selected pure cultures of certain microorganisms. This is due to the limited selection of raw materials (Захариев, 2014, Leistner, Z., Marin, V. et al).

European food quality requirements require a continuous and detailed study of trends in the production of raw-dried meat products. The hygienic status and quality characteristics of traditional dried meat products are subject to constant control in the plant and have a preventive role in the process of their production. Any problems could arise due to the specificity of the products and the omissions during the protracted technological process. Process.

The expansion of research in this field is necessary both from a theoretical and a scientifically applied aspect. Starting from the above, we set ourselves the task of conducting specific hygienic and quality studies in the production of some traditional assortments of raw dried products in 3 meat processing plants with different capacity.

Materials and methods

The studies were conducted in 3 meat processing plants with different production capacities:

1. Enterprise A with a high capacity - 20 tons of meat products per day
2. Enterprise B with an average capacity of 8 tonnes of meat products per day
3. Enterprise „B“ with small capacity - 3 tons of meat products daily

Two outlets of 3 assortments of raw-dried meat products, Fille „Elena“, Lukanka „Panagurska“ and „Sudjuk“, made by traditional technology, were taken from listed establishments of different capacity. Samples were tested for the following physico-chemical parameters:

1. A water content according to БДС 5712;
2. Fat content according to БДС 8549
3. Protein content according to БДС 9374
4. Content of connective tissue protein (hydroxyproline) according to ISO 3496
4. Table salt content according to БДС 7168-84
5. Content of nitrite according to БДС EN 12014-3 /

In the scope of microbiological tests for this category of meat products are included the indicators defined in Regulation (EC) No 2073/2005: Salmonella in 25g according to БДС EN ISO 6579 and Listeria monocytogenes in 25g according to BDS EN ISO 11290-1.

Results

Tables 1 to 3 present the results of the Sucuj, Lukanka Panagurska and Fille Elena from enterprises A, B and C on the indicators: water content, protein content, fat content, content Connective tissue protein, cooking salt and nitrite.

Table 1: Physico-chemical outcomes of three types of raw-dried meat products produced in plant “A“

Study Indicators	Research product		
	Suzhouk	Lukanka Panagyurska	Fillet Elena
Water content (% of total mass)	24.40	24.60	26.30
Protein (% of dry matter)	45.60	44.20	19.70
Fat (% of dry matter)	40.80	39.60	41.60
Connected Protein Protein (% of Total Protein)	10.90	12.50	11.90
Cooking salt (% of total weight)	4.45	3.70	3.60
Nitrite in mg per 100 g of product	13.05	4.20	45.70

Table 2: Results of physico-chemical studies of three types of raw dried meat products in B enterprise.

Study Indicators	Research product		
	Fillet Elena	Suzhouk	Lukanka Panagyurska
Water content (% of total mass)	28.60	29.10	29.10
Protein (% of dry matter)	28.20	19.60	21.60
Fat (% of dry matter)	53.60	47.60	49.40
Connected Protein Protein (% of Total Protein)	22.80	23.60	23.70
Cooking salt (% of total weight)	4.50	4.90	4.40
Nitrite in mg per 100 g of product	4.10	4.30	4.60

Table 3: Physico-chemical outcomes of three types of raw-dried meat products produced in enterprise B

Study Indicators	Research product		
	Suzhouk	Lukanka Panagyurska	Fillet Elena
Water content (% of total mass)	26.40	29.50	28.30
Protein (% of dry matter)	27.30	19.20	23.70
Fat (% of dry matter)	52.90	47.50	49.30
Connected Protein Protein (% of Total Protein)	12.90	13.10	11.80
Cooking salt (% of total weight)	5.60	4.30	4.60
Nitrite in mg per 100 g of product	3.80	3.90	4.10

Figures 1, 3 and 5 represent the water content of Fillets „Elena“, Lukanka „Panagurska“ and „Sudujok“ produced in its plants, B and C

Figures 2, 4 and 6 reflect the protein, fat and connective tissue protein content of fillets „Elena, Lukanka“ Panagurska and Sujuuk produced in plants A, B and C.

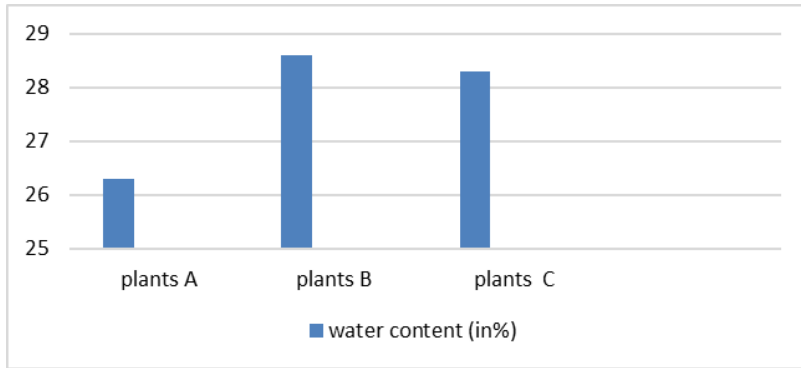


Figure 1: Comparative results of water content studies (in%) of Fillet Elena produced in plants A, B and C.

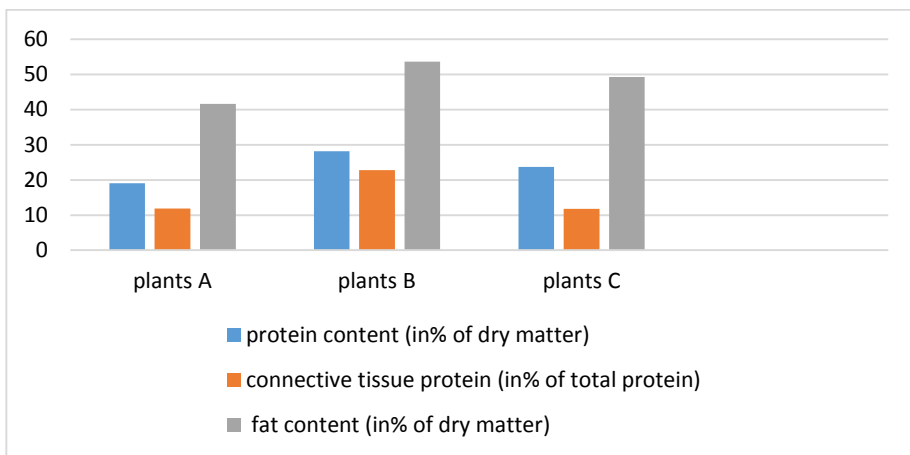


Figure 2: Comparative test results for protein and fat content (in% of dry matter) and connective tissue protein (in% of total protein) of Fillet Elena produced in plants A, B and C.

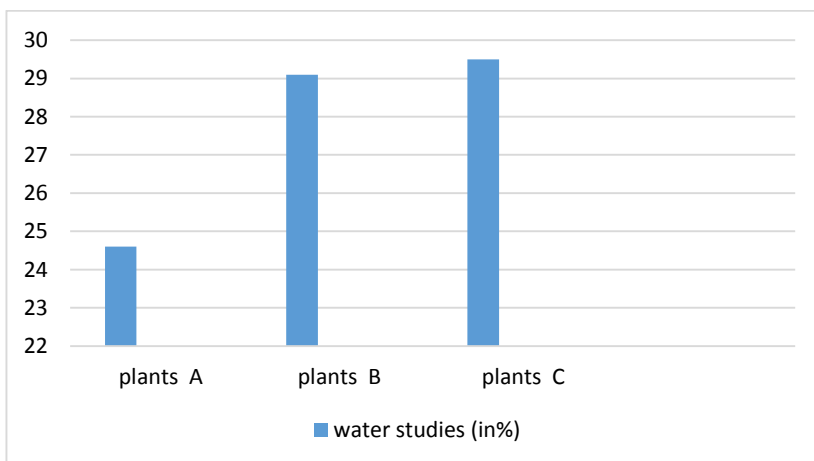


Figure 3: Comparative results of the water content studies (in%) of Panagyurskaya Lukanka produced in plants A, B and C.

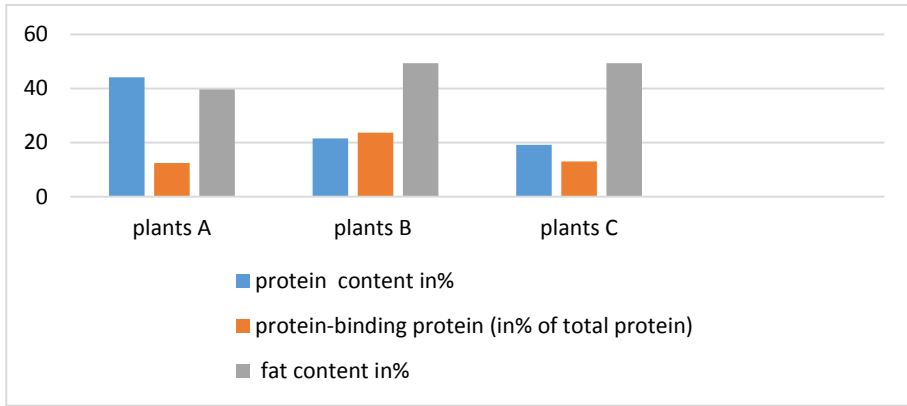


Figure 4: Comparative results of protein and fat content in% (as a percentage of dry matter) and protein-binding protein (in% of total protein) of Panagyurskaya Lukanka produced in plants A, B and C.

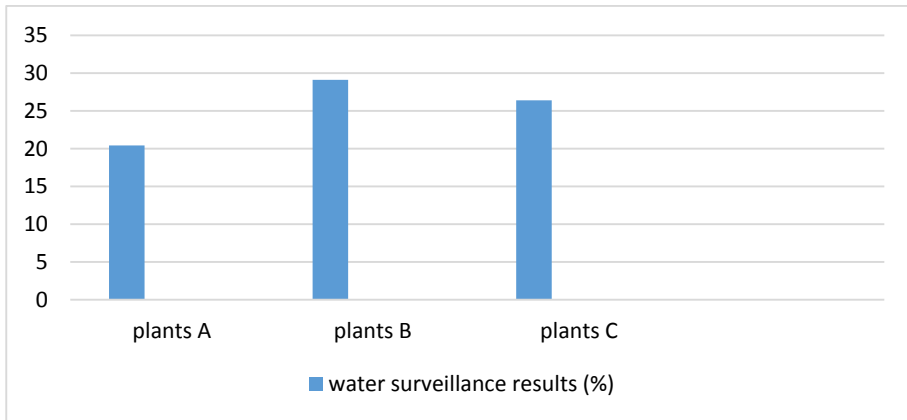


Figure 5: Comparative water surveillance results (%) of Sudujok produced in plants A, B and C.

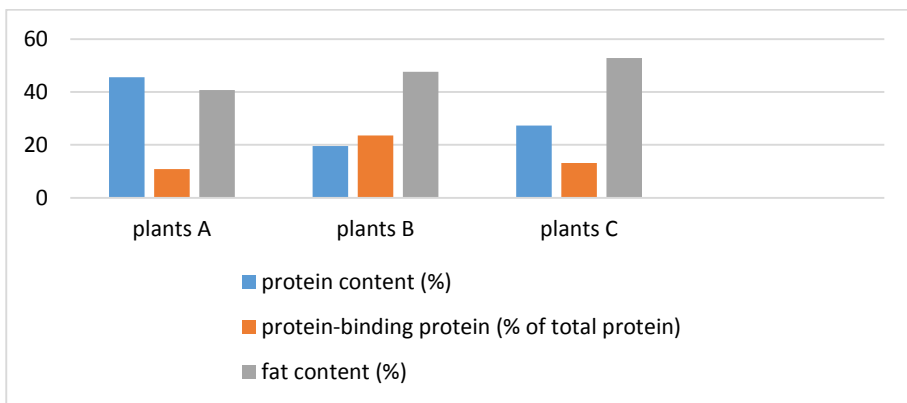


Figure 6: Test results for protein and fat content (%) and protein-binding protein (% of total protein) of Sudujok produced in plants A, B and C.

Tables 4 and 5 show the results of microbiological studies for the absence of *Salmonella* and *Listeria monocytogenes* in two of the traditional meat-specific meat products registered - Fillet „Elena“ and Lukanka „Panagurska“, produced in plant A.

Table 4: Results of Panagyurskaya Lukanka microbial study in plant A.

Indicator	Standards Validated methods	Value and tolerance of the indicator	Result	Test conditions
<i>Salmonella spp.</i>	BDS EN ISO 6579:2003	Absent in 25 g. n=5, c=0 According to the Regulation 1441/2007	n=5, c=0 It is not established in 25 g	37 °C+/- 1° C 41,5 °C+/- 1° C
<i>Listeria monocytogenes</i>	BDS EN ISO 11290-1:2000	Absent in 25 g. n=5, c=0 According to the Regulation 1441/2007	n=5, c=0 It is not established in 25 g	30 °C+/- 1° C 37 °C+/- 1° C

Table 5: Results of Fillet „Elena“ microbial study in plant A.

Indicator	Standards Validated methods	Value and tolerance of the indicator	Result	Test conditions
<i>Salmonella spp.</i>	BDS EN ISO 6579:2003	Absent in 25 g. n=5, c=0 According to the Regulation 1441/2007	n=5, c=0 It is not established in 25 g	37 °C+/- 1° C 41,5 °C+/- 1° C
<i>Listeria monocytogenes</i>	BDS EN ISO 11290-1:2000	Absent in 25 g. n=5, c=0 According to the Regulation 1441/2007	n=5, c=0 It is not established in 25 g	30 °C+/- 1° C 37 °C+/- 1° C

Discussion:

In order to discuss the results of the physico-chemical studies outlined in Tables 1 to 3, it is necessary to specify the normative values for the respective types of raw dried meat products. For Suzhou, according to БДС 2589 - 83 they are: Water content (% of total mass) – 25 to 40; Fat (% of dry matter) – from 40 to 68; Protein (% dry matter) in Kjeldahl – not less than 28; Cooking salt (% of total mass) not more than – 4.6; Nitrite, in mg per 100 g product – not more than 4.0.

For Fillet, the raw lean raw material „Elena“ according to the published product specification in the Official Journal of the European Union /C 70, Year 57/, the normative values are: Water content (% Of 55; Cooking salt (% of total mass) not more than – 3.5; Nitrite (residual amount in the finished product), not more than 50 mg/kg.

For the Panagyurishka lood, according to the published product specification in the Official Journal of the European Union /C 89, Year 57/, the values of the physico-chemical indicators are: Water content (% of total mass) More than 35, Fat (% of total mass) – not more than 42, Total protein (% of dry matter) in Kjeldahl – not less than 28, cooking salt (% .

In figure. 1 presents the comparative results for the water content of Fillet „Elena“ produced in enterprises A, B and C. It is evident from the above that the values are in the range of 26.30 to 28.60%, without significant deviations and well below the norm of 55% In the product specification.

In figure. 2 shows the comparative data on protein, fat, and connective tissue protein in the fillet „Elena“ produced in establishments A, B and C. It is noteworthy that the fat and protein values

are in a straightforward relationship and range from 28% to 43%. In the connective tissue protein, the change was 93%, indicating that its increase in product B was most likely due to gaps in the binding and decay of the raw material processed. The amount of cooking salt is higher and exceeds the standard rate in the products of the three plants. The residual nitrite is above the allowable value only in plant A.

In figure. 3 presents the comparative results for the water content in Lukanka „Panagurska“ produced in enterprises A, B and C. The values ranged from 24.60 to 29.50%. The observed deviations are within the range of 20% and below the limit of 35%.

In figure. 4 shows comparative data for protein, fat and protein content in the Panagurska Lukanka produced in the three enterprises. The fat content values are in the lower limit of the norm (not more than 48%) specified in the product specification. The protein content of the products from enterprises B and C is lower than the regulated rate (not less than 28%). In the connective tissue protein, the change was 89.6%. There is no correlation between total protein values and the high level of hydroxyproline in product B, where the low total protein content is at the expense of incomplete meat ingredient. The content of cooking salt and nitrite does not exceed the established standards in the product specification for the assortment produced in establishments A, B and C.

In Fig. 5 shows the comparative results for the water content in the raw dried Sudujok from enterprises A, B and C. The values obtained ranged from 20.40 to 29.10%, with deviations of 42% between the minimum and the maximum value compared to the norm established in БДС 2589 %. In Fig. 6 shows the protein and fat content (% of dry matter) and connective tissue protein (% of total protein). Fat values are within the lower limits of 40 to 68% specified in БДС 2589. Protein content as well as candy in plants B and C is below the norm (not less than 28%) in БДС 2589. At protein-protein binding values, deviations are very broad. There is no direct correlation between the amount of total protein and that of the connective tissue protein. The high level of the latter in plant B is most likely due to the use of a higher raw meal with collagen content. The data for this indicator in plant A testify that the total protein content in the juice is twice as much and that of the connective tissue protein is twice as good, indicating a higher quality of the meat raw material used. The amount of cooking salt exceeds significantly the standard rate (4.6%) for this product produced in plants B and C. The residual nitrite content is above the allowable level in plants A and B. In plant A the nitrite content exceeds 3.5 times The established standard (4.0 mg / 100 g) in БДС 2589.

Tables 4 and 5 reflect the results of the microbiological studies of two assortments registered in the EU such as TSG - Fillet „Elena“ and Lukanka „Panagurska“ produced in plant A. As required by Regulation (EC) No 2073/2005 on microbiological criteria for This food category should not detect the presence of Salmonella and Listeria monocytogenes in 25 g of product. The data obtained from the samples Fille „Elena“ and Lukanka „Panagyurska“, tested in the three plants, showed the absence of these microorganisms in 25 g. These results lead to the conclusion that the used raw materials and spices and the technology applied do not create a hygienic risk in the production of this category of raw-dried meat products in the three plants.

Conclusions

1 The water content values found in the Fillet „Elena“ samples of the three plants surveyed are significantly lower than the established standard in the product specification registered in the Official Journal of the European Union. On the other hand, the low water content is the most likely cause of the increased salt content of the finished product. Total protein and connective tissue protein

values are directly proportional, which is determined by the homogeneity of raw material - pork fillet.

2. In the case of samples of raw dried meat of Lukanka Panagyurishte and Sujuyk, the established fat content is lower but within the limit of the product-specific limit. The amount of protein in two of the establishments (B and C) for these assortments is below the statutory minimum value. There is no correlation between the content of total protein and connective tissue protein. The salt content in Suzhou produced in the three establishments exceeds the standard.

3. Succulent and Fille „Elena“ samples produced in plant A show increased nitrite content, requiring appropriate corrective actions on the part of the manufacturer.

References

1. БДС 2589. *Салами трайни сурово сушени и сурово сушени и пушени*. Общи изисквания.
2. БДС 5712. *Месо и месни продукти. Определяне съдържанието на влага*.
3. БДС 8549. *Месо и месни продукти. Определяне на мазнините*.
4. БДС 9374. *Месо и месни продукти. Определяне на белтъчното съдържание*.
5. БДС 7168. *Продукти от преработката на плодове, зеленчуци и месо. Консерви месни и месо-растителни. Методи за определяне съдържанието на хлориди*.
6. БДС EN 12014-3. *Храни. Определяне съдържанието на нитрати и нитрити. Част 3. Спектрометричен метод за определяне на съдържанието на нитрати и нитрити в месни продукти след ензимна редукция на нитратите до нитрити*.
7. БДС EN ISO 6579. *Микробиология на храни и фуражи. Хоризонтален метод за откриване на Salmonella ssp.*
8. БДС EN ISO 11290 – 1. *Микробиология на храни и фуражи. Хоризонтален метод за откриване и изброяване на Listeria monocytogenes*.
9. Захариев, И. (2014). *Сурово сушени месни продукти. Традиционни, класически и иновационни технологии. Климатични сушилни*. София: Джи Пойнт Плюс.
10. Коларов, К. (2001). *Процеси и апарати в хранително-вкусовата промишленост*. Матком.
11. ISO 3496 *to Content of connective tissue protein (hydroxyproline) according*.
12. Leistner, Z. (1979). *Anferderung an Starterkulturen, Bundesanstalt fur Fleischferschung*. Kulmachq BDR.
13. Marin, V., L. Magnan, P. Zulian. (1987). *Use of the Culture of Bacteria, Non-mafia Falls*. Food Industry, 26, No. 2, 139–141.
14. Official Journal of the European Union. (2014). *Publication of an application pursuant to Article 50(2)(b) of Regulation (EU) No 1151/2012 of the European Parliament and of the Council on quality schemes for agricultural products and foodstuffs*. C89, Volume 57, 28 March 2014, p. 57.
15. Official Journal of the European Union. (2014). *Publication of an application pursuant to Article 50(2)(b) of Regulation (EU) No 1151/2012 of the European Parliament and of the Council on quality schemes for agricultural products and foodstuffs*. C70, Volume 57, 8 March 2014, p. 6.
16. *Regulation (EU) No 1151/2012 on Agricultural product and food quality schemes*.
17. *Regulation (EU) No 835/2014 on quality schemes for agricultural products and foodstuffs*.
18. *Regulation (EU) No 941/2014 for the entry of names in the register of traditional specialties guaranteed*.
19. *Regulation 2257/2015 of 04.12.2015 on the entry of names in the register of traditional specialties guaranteed*.