SELECTED SPECIFIC FOODS AND AGRICULTURAL PRODUCTS WITH PROTECTED DESIGNATION IN REGIONS OF THE SLOVAK REPUBLIC AS A MEMBER STATE OF THE EUROPEAN UNION

Eva Michaeli, Vladimír Solár, Jozef Vilček, Monika Ivanová

Prešovská univerzita v Prešove, FHPV, 17. novembra 1, Prešov 08001, Slovak Republic

Abstract

Foodstuffs and agricultural products with origins in individual regions of Slovakia constitute historically a specific part of the food assortment existing in Europe. Accession of Slovakia to the EU means an option for the country to protect its regional specialities, foodstuffs and agricultural products on the level of the European Union by inclusion of these products into the quality scheme. The registration of such items is carried out pursuant the Regulation (EU) No. 1151/2012 of the European Parliament and of the Council of 21 November 2012 on quality schemes for agricultural products and foodstuffs and Regulation (EU) 668/2014 effective from 3 January 2013. Quality policy of the EU is based on the philosophy of quality development of original, traditional agricultural products and foodstuffs, their protection and promotion of sale, what also means support to the regions where they are produced. The quality scheme has been created as a counter-measure to the increasing trade with faked products and foods misusing the traditional names of original products. The quality policy of the European Union accepts, protects, promotes, registers, and controls agricultural products and foodstuffs under three categories: 1. Protected designation of origin (PDO), 2. Protected geographical indication (PGI), and 3. Traditional speciality guaranteed (TSG). As of 31 January 2018, the Slovak Republic has registered 2 PDO products, 10 PGI products and 7 TGS products. The principal objective of the article is to identify and characterize regions of selected agricultural foodstuffs and products registered in categories PDO.

Key words: *foods, products, lowlands, Žitavská paprika, Stupavské zelé, European Union, Slovak Republic*

1. INTRODUCTION

The aim of the Quality Policy of the European Union concerning food safety is to protect consumers and to guarantee smooth functioning of the European single market. This policy was launched in 2003 and it is based on the principle of traceability of inputs (for instance, animal feed) as well as outputs (for instance, the primary production, processing, storing, transportation and retail sale). Slovak Republic with its total area of 49,035 km2 is one of small European countries. Out of 28 EU member countries there are seven states that are smaller (Cyprus, Luxembourg, Netherland, Belgium, Denmark, Malta, and Estonia) than Slovakia but the physical-geographical territorial structure of the Slovak Republic compared with some of the above-mentioned countries is very diverse. This fact has always influenced the character of individual regions and consequently the agricultural and food production both in the past and present. Surface of Slovakia is situated in two big morphostructural units of the European Continent: The Carpathians and the Pannonian Basin. For their geological and tectonic structures these two wholes belong to Neo-Europe, that is, the part of the European continent that owes its origins to Alpine folding in the Mesozoic and Tertiary eras. Slovakia is prevailingly a country of highlands that cover 60% of its overall area. The greatest part of the state's territory (45%) is occupied by low highlands. Moderately high highlands and high highlands cover 14% and 1% respectively of country's total area and the rest (40%) corresponds to lowlands (Table 1).

Table 1. Altitude of the surface of Slovakia

Categories degree of altitude	**Lowlands**	**Low highlands**	**Middle high highlands**	**High highlands**
Altitude	95 – 300 m a. s. l.	301 – 800 m a. s. l.	below 1,500 m a. s. l.	1,501 – 2,655 m a. s. l.
Acreage of categories in %	40%	45%	14%	1%
(in km^2)	20,045	22,124	6,350	515

Source: Lukniš, M. Slovensko Príroda, 1972, p. 126 (adapted)

Altitude above sea level determines climate and greatly influences all components in the natural landscape structure and the character of soil cover, its economic performance and structure of agricultural production. Moderately high highlands and especially high highlands boast an extraordinary and precious natural structure.

Relief of Slovakia is varied. It includes the fold-faulty relief of the nappe mountain ranges, the relief of structural basins and the relief of volcanic mountain ranges. Modelling medium reveals that the most frequent type of relief is the fluvial one. In terms of climatology, the territory of Slovakia is situated in the western part of the Eurasian moderate climatic subboreal zone. The driest regions are the Podunajská nížna lowland and the southern part of the Východoslovenská nížina lowland with yearly atmospheric precipitation totals lower than 540 mm. Basins in general get less atmospheric precipitations as they are situated on the lee side of mountain chains. It is the sea level altitude, exposition and situation of places regarding the prevailing directions of the rain bringing winds (western and north-western wind systems) that decide about the amount and distribution of atmospheric precipitations during the year in Slovakia. Higher mean yearly precipitation totals are typical for mountain ranges (the Vysoké Tatry mountains with 2,130 mm reach the maximum). The variety of relief in Slovakia in spite of the small size of the area of the country is responsible for great differences in the daily and yearly cycles of air temperature. The warmest place is in environs of Štúrovo in the Podunajská nížina lowland with the mean yearly temperature of 10.4°C and the coolest are the peaks of the Vysoké Tatry mountains (the Lomnický štít peak -3.7°C). Apart from the climate soil cover is also very important for agriculture first of all regarding the soil fertility. Slovakia is situated in the soil-geographic area of Central Europe in the zone of Cambisols and Luvisols with accompanying types of intrazonal Rendzina soils with the Rendzic process, Fluvisols and admixture of Molic soils with the pedogenic process of accumulation and transformation of organic matter, that is, humification of plant residues (Chermozems).

2. MATERIAL AND METHODS

The principal aim of this article is to characterise the geographical properties of landscape structure of particular regions where agricultural crops are grown and farm animals kept as sources for production of food in general but also for foodstuffs registered in the EU Quality Policy system. They are represented by three categories of products: 1. PDO, 2. PGI and 3. TSG. The first and the second categories of protected products are linked to concrete geographical regions and they are characterised by distinct attributes that have been formed by the natural structure of these regions where they developed and where they exist. In case of PDO products (Protected Designation of Origin) all stages of crop production and food production must take place in the particular region. This category is most closely united to the region of its origin. The Slovak Republic has two such products registered with the EU. Quality and properties of the product are associated with its geographical origin and they are linked to the character of natural landscape structure in a concrete region of Slovakia.

3. RESULTS

Two products of the Slovak Republic have been classified in the EU category of Protected Designation of Origin (PDO): Žitavská paprika and Stupavské zelé sauerkraut.

Paprika Žitava/Žitavská paprika (rare Slovacicum) is the first Slovak product that won the quality grade of EU Protected Designation of Origin (registered in 2014). Žitavská paprika is not a variety. It is a product obtained from bred varieties of spice red pepper recognised by the State. Expansion of cultivation has called for breeding of new varieties. Some of them were imported from Spain and Hungary. Spanish varieties failed while some Hungarian varieties were used to breed new national varieties adapted to the soil and climatic conditions of the Podunajská nížina lowland (varieties Považská hrubostenná sladká, Nitrianska tenkostenná sladká, Dunajská hrubostenná sladká, Žitavská hrubostenná sladká and Hodonínská sladká). The breeding activity started in the 1950s when new genetically determined regional varieties were bread. Today they form a sufficiently broad basis of varieties grown in the geographical region of the Podunajská nížina lowland. They are quoted in the Catalogue of Vegetable Varieties in the EU Official Bulletin. Today Žitavská paprika is produced only from the following varieties: Dvorská, Kolora, Kora Zel, Karkulka, Žitavská, Irokez, Rubin, Czárdás, Kármin, and Szegedi 80. Only ripe and perfect specimens are harvested and processed in a specific after-harvest way. Traditional procedures and methods are applied to the production of Žitavská paprika which has not changed in the course of more than hundred years of growing the red-pepper plants for spice. Milling of dry fruits of spice red-pepper results in a sweet pepper of outstanding flavour, taste, smell, consistence, and colour. To experts, Žitavská paprika is an extraordinary red-pepper terroir (Terre considérée du point de vue de la production agricole). Quality of Žitavská paprika is closely associated with the individual components of landscape in the geographical region of the Podunajská nížina lowland. Among the most important ones are climate, soil and hydrogeology of the region.

The Podunajská nížina lowland is the one of the northernmost areas where it is still possible to grow profitably the spice red-pepper. Spice red-pepper is grown first of all in the Podunajská rovina plain along the lower reaches of Rivers Váh and Nitra, in the basin of Rivers Žitava and Malý Dunaj (Figure 1).

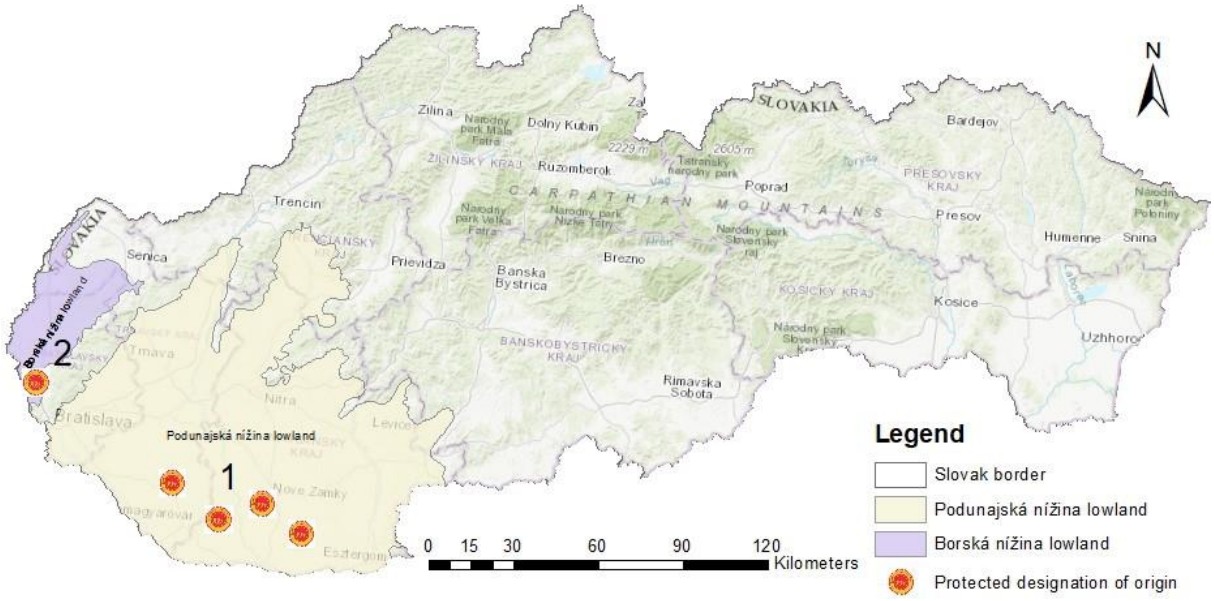


Figure 1. Geographical areas of growing and production of PDO products in EU

1 Žitavská paprika, 2 Stupavské zelé

Production areas of red-pepper are at the altitude above sea level of 120 m to 250 m in the relief of fluvial accumulation plains and floodplains built by the Quaternary Holocene floodplain deposits, fluvial gravel, sand and loam. According to Köppen's climatic classification (Zaťko according to Konček in Lukniš ed. 1972) the Podunajská nížina lowland is situated in the Cfbx climate (corn climate). It is a warm and very dry region with mild winters, warm summers and the maximum rainfall at the beginning of summer (by the end of May and the beginning of June) followed by dry summer period. Mean May to September temperature is 17.5°C and the mean annual temperature is 10.3°C. The coolest month is January with the mean temperature of -3°C and July is the warmest month with mean temperature of 20.5°C. The mean yearly atmospheric precipitations amount 500 - 550 to 600 mm. Number of summer days (daily maximum of 25°C and more) is 73 and more. Number of sun radiation hours is about 2,000 (1960 – 1980 observation period).

In soil cover of this geographically delimited region there are texture classes of soils: clayey-loamy, loamy and sandy-loamy soils. The soil types along the streams are represented by the Calcaric Fluvisols associated with gleyi and arenic Calcaric Fluvisols on carbonate alluvial sediments. In broader area there are calcaric Mollic Fluvisols associated with calcaric Gleyi-Haplic and Verti-Gleyic Chernozems with Calcaric Mollic Gleysols. Around the town of Dunajská Streda there are calcaric (Gleyi-) Haplic Chernozems, local calcaric Mollic Fluvisols to calcaric Mollic Gleysols on old carbonate fluvial sediments with neutral or slightly alkaline reaction (Šály and Šurina 2002). Soils are well permeable. Porous type of groundwater prevails. During dry summers groundwater supplies additional moisture to the grown crops (evaporation regime transports groundwater from the hyperhydrated zone to surface to the hyperaerated one, that is, to plant roots).

Žitavská paprika can be only produced from the varieties grown on the precisely geographically delimited territory and processed in plants of producers who live/reside only in this territory. Sea level altitude, sufficient supply of groundwater in floodplain sediments, permeable soil, summer with comparatively less sunny days are the factors responsible for the fact that the high content of saccharides does not change into colorant to such extent as it does in warmer climatic regions. Instead it remains as a taste component endowing to Žitavská paprika unique sweet aroma, taste void of traces of bitterness, and a bright orange-red colour.

Stupavské zelé (sauerkraut of Stupava) was granted the Protected Designation of Origin by the European Union in May 2017. It is the second Slovak produce with this designation. It complies with the strict registration criteria. Quality of the product and its properties are exclusively linked to the regional geographical characteristics and all stages of production take place in a limited geographical area. The production procedures are traditional without addition of any conservation substances apart from salt (NaCl). The product boasts the top added value in linkage to the geographical region. It is the reason why it cannot be grown and processed in any other place in the world. Late varieties of white headed cabbage (basic species: Brassica oleracea var. Capitata), original local variety referred to as záhorácka or any accessible and verified hybrid varieties grown in the delimited geographical region as quoted in the Catalogue of Vegetable Varieties in the EU Official Bulletin are used for the production of sauerkraut Stupavské zelé. The late varieties of white headed cabbage have specific properties such as fine structured leafs, earthy-spicy taste, and flat shape of head that distinguish them from other varieties. Long vegetation period of 180 days provides the plants the possibility to fully use the specific soil and hydro geological properties of the territory.

Geographical region where the product is cultivated and processed is situated in southern part of the Borski nížina lowland (Figure 1). Stupava and its environs is the region where late varieties of white cabbage are grown and simultaneously it is the location where Stupavské zelé is produced. The territory is delimited by the foothills of the Malé Karpaty mountain range in the east, by the River Morava in the west. The northern border of the area coincides with the Sedlisko canal, Záhorský potok brook and the Malina canal. The southern limit of the region is the Vápenický potok brook which mouths into the Mláka canal and further on into the River Morava. Altitude above sea level of this territory moves between 140 m next to the River Morava to 175 m at the foothills of the Malé Karpaty. Fluvial Quaternary floodplain and terraced gravel, sand-gravel, proluvial sandy in places boulder sediments and loam prevail in the geological structure of the territory. Locally Aeolian sand occurs. The Pliocene marl

and varied clay, the Miocene marl, marl-clay and politic rocks crop out west of Stupava. The relief consists of smooth fluvial plains and plain depressions. The climate in the southern part of the Borská nížina lowland is dry and warm with abundance of groundwater at the depth of about 1.5 m and closer to the surface. The regime of soils is slightly humid. Part of the region is situated in inundation area of the Morava and its tributaries which used to bring a sandy sediment load but also humus from soil horizons in the north of the territory during floods. It is how the soils in the region were enriched by nutrients almost every year.

Soil types north of the town of Stupava on the foothills of the Malé Karpaty mountains and in the western part of the delimited regions are: eutric Haplic Arenosols associated with eutric Cambic Arenosols and locally in the depressed areas are Arenic Gleysols formed from non-carbonate wind-blown and redeposited sands. Eutric Fluvisols associated with gleyic and arenic Eutric fluvisols on non-carbonate alluvial sediments; sporadically Haplic Arenosols on wind-blown sands are on the floodplain of the River Morava. The rest of the territory is covered by the arenic Mollic Fluvisols associated with Mollic Fluvisols and with arenic Mollic and Fluvic Gleysols prevailingly from lighter textured non-carbonate alluvial sediments. In terms of texture, these soils are mostly sandy and loamy-sandy, light with the neutral or slightly alkaline reaction (Šály and Šurina 2002) apt for growing vegetables and consequently the late variety of headed white cabbage. In spite of the high permeability and low retention capacity of these soils, specific hydrogeological circumstances provide them with what is referred to as the complementary moisture which is important in the dry and warm climate and favours growing of the above-mentioned variety of cabbage endowing it a special flavour along with other factors of natural structure. Stupavské zelé is a product with Protected Designation of Origin in the territory of the EU. The designation is linked to special geographical environment. Taste of Stupavské zelé is spicy with a touch of horseradish which distinguishes it from other varieties. It is attributed to the local soil. The product, sauerkraut, is the result of fermentation of white raw cabbage without addition of any conservation substances apart from salt and it takes place in wooden barrels in natural outdoor environment at a temperature below 25 degrees.

4. CONCLUSION

The system of the EU Quality Policy in the sphere of food and agricultural products is the quality development philosophy of original, traditional agricultural products and foods and simultaneously support to regions where they are produced. The system was schemed as a response to increasingly occurring falsification of foods and misuse of traditional labels and names of regional food products. Fraud in the area of foods is spread and it does not respect any ethic or sanitary limits. In the European Union, 310,000 cases of food derivable bacterial diseases are yearly diagnosed and according to the WHO, death of about 2 million of people is caused by dangerous food. Free movement of food products in the EU member countries is guaranteed; nevertheless, the food trade between the EU and third countries only partially takes into account the principles of single food safety. The European Union protects, registers, and controls products classified into the above-mentioned three categories of PDO, PGI and TSG, but instead of systematic control of the remaining foods moving across the European market it is accidental in response to emergency situations.

ACKNOWLEDGEMENT

This work was supported by the Slovak Research and Development Agency under the contract No. APVV-15-0406 and by Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic projects VEGA No. 1/0116/16.

REFERENCES

Čurlík, J. and Šály, R. 2002, Map, no. 84 Soils texture, p. 110. Landscape Atlas of the Slovak Republic. 1st ed.. Primary landscape structure. Ministry of Environment of the Slovak Republik, Bratislava; Slovak Environmetal Agency, Banská Štiavnica, 2002. 344 p.

Dudríková, E., Michaeli, E. a kol. 2011, Potraviny špecifického charakteru. Univerzita veterinárneho lekárstva a farmácie v Košiciach. Katedra hygieny a technológie potravín. Košice 176 p.

Mazúr, E., Činčura, J. Kvitkovič, J. 2000, Map no. 20 Geomophological situation, p. 86. Landscape Atlas of the Slovak Republic. 1st ed. Primary landscape structure. Ministry of Environment of the Slovak Republik, Bratislava; Slovak Environmetal Agency, Banská Štiavnica, 2002, 344 p.

Mazúr, E., Lukniš, M. 1980, Geomorfologické členenie Slovenskej socialistickej republiky, mapa 1 : 500 000. Atlas Slovenskej socialistickej republiky. Bratislava: GÚ SAV a Slovenská kartografia, 1980.

Nariadenie Európskeho parlamentu a Rady (EÚ) č. 1151/2012 o systémoch kvality pre poľnohospodárske výrobky a potraviny (súhrn požiadaviek podľa článku 7) STUPAVSKÉ ZELÉ, viewed 19 January 2018, <https://www.indprop.gov.sk/swift_data/source/pdf/specifikacie_op_oz/SPECIFIKACIA_Stupavske_zele.pdf >

NARIADENIE RADY (ES) č. 510/2006 týkajúce sa chránených zemepisných označení a chránených označení pôvodu ŽIADOSŤ O ZÁPIS: ČLÁNOK 5 „PAPRIKA ŽITAVA“ / „ŽITAVSKÁ PAPRIKA”, viewed 19 January 2018, <https://www.indprop.gov.sk/swift_data/source/pdf/specifikacie_op_oz/SPECIFIKACIA_Paprika_Zitava.pdf >

Petrovič, Š. 1972, Počasie a Klíma. In: Lukniš, M. ed.: Slovensko príroda, 1972 pp. 203 – 275.

Šály, R. et al. 2000, Morfogenetický klasifikačný systém pôd Slovenska. Výskumný ústav pôdoznalectva a ochrany pôd v Bratislave. Societas pedologica slovaca. Bazálna referenčná taxonómia. Bratislava, 76 p.

Šály, R. and Šurina, B. 2002, Map no. 78, Soils, p.106. Landscape Atlas of the Slovak Republic. 1st ed. Primary landscape structure. Ministry of Environment of the Slovak Republik, Bratislava; Slovak Environmetal Agency, Banská Štiavnica, 2002. 344 p.