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"*Tradition and innovation in preservation of autochthonous breeds*"

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Influence of the traditional habitat on added value and product quality of Sjenica Zackel sheep

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Abstract

Organic production represents a process of sustainable development of the rural areas in accordance with the available resources and tradition, also implies comprehensive crop and livestock production, which ensures the preservation and restoration of natural resources, strongly supports return to the traditional values and knowledges. The new Strategy for Agriculture and Rural development in Serbia from 2014-2024 defines goals and priorities for further development of agriculture. One of priority topics is the promotion of organic production. Sjenica-Pester plateau belongs to High Nature Value region of Serbia and is well known for its rich biodiversity with favorable floristical composition of pastures and meadows. Organic sheep production is a perspective opportunity for rural regional development. Sjenica sheep is one of the most popular transboundry Zackel type, traditionally reared in the highly mountain regions of Sebia, mainly in the Sjenica Pester-plateu, where it was originally developed. The finding of favorable content of CLA and n-6:n-3 ratio, contribute to the advanced phenotypic characterization of Sjenica Zackel sheep type, the determination of locally adapted breed value and in making a realistic decision for the promotion of sustainable use of Sjenica Zackel sheep type.

Introduction

Intensification of agricultural production has a wide range of advantages, but also its negative effects are recognized. The main negative effects of the intensive, conventional agriculture are soil erosion, decrease of biodiversity, animal products from animals rared in ambience where the level of chronical stress is high, presence of residues of antibiotics and pesticides (SAVIĆ et al., 2013). Oppositely from the conventional, basic principles of organic production promote well adapted auththonous breeds, favorising pastures and meadows and rational use of natural botanical resources (SAVIĆ et al., 2014c).
Organic production represents a process of sustainable development of the rural areas in accordance with the available resources and tradition, also implies comprehensive crop and

livestock production, which ensures the preservation and restoration of natural resources, strongly supports return to the traditional values and knowledges. In order to achive economical income, the rational exploitation of animal and floristic resources, promotion of traditional products and definition of their added value is important (FAO, 2015).
Serbia has a strategy for sustainable development of rural areas and it could favorize the organic production. Rural areas represent 85% of the theritory of Serbia. They firstly cover mountain regiones with low population density (below 150 inhabitants on 1 square kilometers), negative demographic trend and insufficient infrastructure. Extensive and mixed agriculture with low productivity, minimal market surplus and diversification are dominant almost in all rural areas. From the aspect of organic production, these areas are highly valuable because the majority of natural resources with rich ecosystems and biodiversity are located in the rural regions. Organizing the sheep production in accordance with organic principles can greatly contribute to rational utilisation of local, well adapted autochtonous sheep and flora and give a big support for realising the strategy of sustainable development of mentioned rural areas.
Sjenica sheep is one of the most popular Zackel type, traditionally reared in the highly mountain regions of Sebia, mainly in the Sjenica Pester-plateu, where the type was developed. Sjenica sheep is the largest type of autochthonous Zackel sheep reared in Serbia. It is well adapted in harsh climatic and environmental conditions which exist on the mountain regions of south-west Serbia, especially on the High Nature Value Sjenica-Pester plateau (BECSKEI, 2011).

Material and Methods

The present status of Sjenica Zackel sheep within its natural habitat and the strategy for its future management were analyzed according to the FAO guidelines (FAO, 2010, 2015) and the National plan for animal genetic resource conservation. Firstly, the rearing area and the traditional habitat were identified and described.
Definition of the traditional habitat of Sjenica sheep was made using geographical descriptive method. Attention was given to the floristic composition of the natural pastures, as an important elemet of this High Nature Value region. Some of the added values and product characteristics of Sjenica sheep were evaluated using the results of previous studies, published in SAVIĆ et al. (2014a).

Results and discussion

The new Strategy for Agriculture and Rural development in Serbia from 2014-2024 defines goals and priorities for further development of agriculture. One of priority topics is the promotion of organic production. Organic sheep production is a perspective opportunity for development of rural regions.
Negative influence of climate changes and occurrence of new diseases in sheep makes the conservation of locally adapted sheep breeds important (FAO, 2010; HOFFMAN, 2010). Autochthonous locally adapted domestic animals gained resistance and adaptability through the evolution of breeds in their given ecosystems (HIEMSTRA, 2010). The most important autochthonous sheep breed in Serbia is the Zackel sheep. This breed has been developed under modest biogeographic conditions and exhibits a high degree of adaptation to environmental conditions, such as climate and specific phitocenotic conditions. Zackel sheep is triple purpose (meat, lamb, wool) low production breed, with prominent phenotype

diversity (BECSKEI, 2011). It has traditionally reared with a special emphasis on some traits such as health status and robustness, wich are important for organic production too.
Sjenica sheep is the most numerous, locally adapted, autochthonous Zackel sheep type, inhabiting the mountain regions of south-western Serbia, traditionally reared in Sjenica-Pester plateau (900-1400 m altitude). Sjenica-Pester plateau belongs to High Nature Value region of Serbia and is well known for its rich biodiversity with favorable floristical composition of the pastures (47300 ha) and meadows (26200 ha). The region has a specific microclimate with harsh and long winters, often with low temperatures up to -37ºC. In addition to this, one of the important factors of climate influence on the vegetation is the amount of rainfall and its distribution throughout the year as well as relative humidity. The annual rainfall precipitation is as much as 700 mm per square meters per year (BECSKEI, 2011).
Botanical analysis of vegetation from High Nature Value pastures and meadows of Sjenica Pester-plateau shows high biodiversity. The most frequent plants are from the families of grasses 48.4% and legumes 9.6% and other herb families made up 42.0%. Yearly yield of hay on pastures is around 4 t/ha. Based on nutritional value and look, hay is in I category (Table 1.). Results of floristic analysis suggests that grasses and legumes of high and mild quality are predominantly present. A large number of grass species were detected. From the family of *Poacea: Anthoxanthum odoratum, Arrhenatherum elatius, Briza media, Danthona calycina, Bromus raceomus, Agrostis vulgaris, Dactylis glomerata, Festuca rubra, Festuca ovina, Phleum pretense*. The family of *Fabacea* were mainly presented by *Genista saggittalis, Lathyrus latifolius, Lotus corniculatus, Trifolium pretense, Vicia cracca, Trifolium alpense, Trifolium alpestre, Trifolium panonicum, Trifolium montanum* (VUČKOVIĆ et al., 2010). The chemical composition of mixed hay from Sjenica Pester-plateu is shown in Table 1.

Table 1. Chemical composition of mixed hay from Sjenica Pester-plateu
(according VUČKOVIĆ et al., 2010)

Ash g/kg DM	Protein g/kg DM	Fat g/kg DM	Celluloze g/kg DM
55.3	81.9	15.9	332.6

DM – in dry matter

The specific botanical composition and high diversity of favourable plants in grasslands of pastures and meadows in Sjenica-pester plateau provides specific, high quality lamb meat products. The results of sensory analysis of tested lamb meat samples classified Sjenica sheep as a Zackel type with very attractive sensory characteristics (BECSKEI et al., 2015). It was shown that lamb meat has very favorable fatty acid contet (Table 2). Favorable fatty acid profile of lamb meat is important for human health and especially for infant and children nutrition (RAMIREZ-REMATA et al., 2014; SCHMID et al., 2006). These facts raises the interest for sustainable sheep production of Sjenica Zackel type. The finding of favorable content of CLA and of n-6:n-3 ratio, contribute to the advanced phenotypic characterization of Sjenica Zackel sheep type, the determination of locally adapted breed value and in making a realistic decision for the promotion of sustainable use of Sjenica Zackel type (SAVIC et al 2014a, 2014b).

Table 2. Saturated, monounsaturated, polyunsaturated, CLA, omega-6 and omega-3 fatty acid content in lamb meat of three Zackel sheep types (according to SAVIC et al., 2014a)

Fatty acids	Sjenica Sheep M±SD
Σ SFA (Saturated fatty acids)	56.38±2.91
Σ MUFA (Monounsaturated fatty acids)	34.42±2.75
Σ PUFA (Polyunsaturated fatty accids)	3.74±0.57
CLA	4.49±0.59
Σ n-3	1.34±0.44
Σ n-6	2.38±0.20
n-6/n-3	1.77±0.45

M – mean , SD – standard deviation

Conclusion and recommendentation

Sjenica sheep has a great potential in sustainable, organic production in Serbia. This breed has been developed under modest biogeographical conditions and exhibits a high degree of adaptation to environmental conditions, such as climate and specific phitocenotic conditions. As the traditional habitat contains specific floristic composition, it has a big impact on the quality and uniqueness of meat and milk products of Zackel sheep. Evaluation of both chemical and sensory Sjenica lamb meat characteristics have confirmed added value to traditional products of regional origin.

According to the preliminary results of favorable fatty acid profile and sensory characteristics of lamb meat obtained in Sjenica sheep during the conversion process, it represents the opportunity for organic production in traditional habitat.

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