Characteristics of large leaf tobacco Virginia 0842

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Abstract
The study was performed in 2019 - 2021 in the Plovdiv and Pazardzhik regions (Golyam Chardak vill.) under production conditions. Biological characteristics were determined and assessment was made of the basic quality indicators of the tobacco raw material from a new line of large leaf tobacco – Virginia 0842. The main physical values of raw tobacco were determined. The chemical indicators of tobacco were studied – nicotine, soluble sugars, total nitrogen and ash. The results show high values of nicotine (2.03 to 3.78) and total sugars (11.10 to 24.15) in Virginia 0842 in comparison with the reference Virginia 0514. The values of total nitrogen (1.95 to 2.85) and ash (8.01 до 9.61) in the Virginia 0842 line are with lower values in comparison with the reference Virginia 0514, mostly for class two. The free burning rate of Virginia 0842 tobacco was determined (2.74 to 2.82 mm/min).

Keywords: large leaf tobacco Virginia; biological characteristics; quality indicators; chemical indicators

INTRODUCTION

The tobacco from the variety group of Flue-Cured Virginia is the most grown tobacco in the world and a basic ingredient in the production of cigarettes of the American Blend and Virginia Blend type (Apostolova, 1991, 1997; Blake Brown, 2004). Large leaf tobaccos from this variety group were introduced for the first time in Bulgaria in the district of Maglizh in 1937. The results were highly promising so their production increased. Curing equipment of the Hansa type was used in Plovdiv, Stara Zagora, Vidin and Pleven in the 1940s of the past century (Ralovski & Chinchev 1991; Ralovski 1993, 1996).

Because of the high interest in this tobacco, production and curing technologies were gradually improved. Large scale production and bulk curing of tobacco stared in the early 1970s of the past century.

At present, several foreign varieties of the Virginia variety group (PVH-1, PVH-2023, Hevesi) and only two Bulgarian varieties – Virginia 0454 and Virginia 0514 that are included in the Official Variety List of Bulgaria are grown in Bulgaria (Kasheva et al., 2021).

In the country there are regions where the soil and climate are suitable for the production of 4-5 thousand tons of high quality Virginia tobacco with high nicotine content.

Growing tobacco of the Flue-Cured Virginia variety group is concentrated in the Thracian plain that is situated in South and Central Bulgaria and in the Danubian Plain in the north part of the country. In the past few years a large part (85%) of Virginia production comes from the Thracian plain (Bozukov et al., 2018).

The different ecological, climatic and soil conditions in our country presuppose a great diversity of varieties with specific quality indicators.

The tobacco from the Virginia variety group is the most grown one in the world and the main ingredient for the production of cigarettes of the American blend or Virginia blend type (Apostolova, 1991).

Virginia 0842 is a consolidated line created in the Tobacco and Tobacco Products Institute by prof. Boris Chinchev by means of intervarietal hybrid-

Figure 1. Virginia 0842

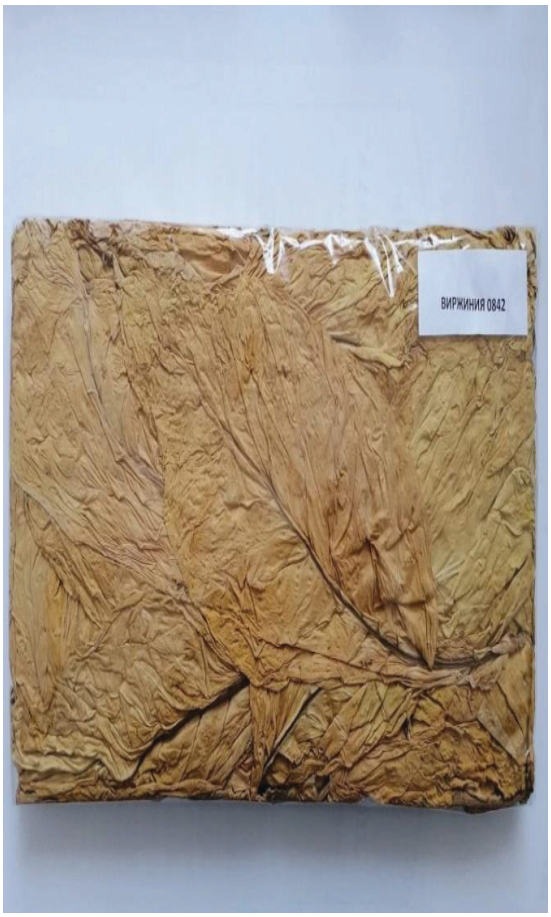

Figure 2. Commercial sample of Virginia 0842

Figure 3. Commercial bale of Virginia 0842

Figure 4. Cut Virginia 0842 tobacco

ization between the varieties Virginia D + Virginia 385. Plant height is 165-178 cm. The number of leaves is 28. The vegetation period from planting to mass flowering is 68-72 days. The line is resistant to PVY (Chinchev & Stoyanov 1987, 1989, 1991). Chemical composition of tobacco: nicotine content – 1.43-2.77%, soluble sugars – 6.18-20.20%, total nitrogen- 1.65-3.02% (Drumeva, 2020).

This is the third year of TTPI study of the new line Virginia 0842 under production conditions; the line shows good biological and quality indicators of tobacco.

The main purpose of the study is to assess the basic biological, technological and quality characteristics of the tobacco raw material from the candidate-variety Virginia 0842, grown under production conditions in different regions of the country. The main chemical indicators of dry tobacco should be determined.

MATERIALS AND METHODS

In 2021, for a third successive year, growing and monitoring under production conditions of the Virginia 0842 tobacco was performed in two regions of the country differing in their soil and climatic conditions-Plovdiv (South Bulgaria) and Golyam Chardak vill. (in the Pazardzhik region).

The following was performed for the purpose of the study:

• Determining the basic biological indicators of tobacco;

• Determining the stage of technical maturity of tobacco from the two regions;

• Determining suitable drying regimes;

• Forming average tobacco samples necessary for technological and chemical analysis;

• Determining the quality characteristic of dry tobacco;

• Determining the basic chemical indicators of tobacco.

The chemical tests were performed with representative average samples in the accredited testing laboratory complex in the Tobacco and Tobacco Products Institute, Markovo vill. The tests of nicotine and soluble sugars content were performed in standardized methods:

- ISO 15152:2003 – Tobacco – Determination of the content of the total alkaloids as nicotine – Continuous-flow analysis method.

ISO 15154:2003 – Tobacco – Determination of the content of reducing carbohydrates – Continuous-flow analysis method.

RESULTS AND DISCUSSION

Table 1 and Table 2 presents the results for the basic biological qualities of *Virginia* tobacco

The results in Table 1 show that the two varieties have very good resistance to overripening. The total

Table 1. Biological qualities of Virginia tobacco

Variety	Indicators		
	Resistance to over ripening	Total number of technically suitable leaves	Plant height, (cm)
Virginia 0514-Reference	Very Good	30/28	163.0
Virginia 0842-Line	Very Good	34/30	164.0

Table 2. Size of Virginia tobacco leaves

Variety	Length/width (cm)		
	7^{th} leaf	14^{th} leaf	18^{th} leaf
Virginia 0514-Reference	57/35	59/35	54/29
Virginia 0842-Line, harvest 2021	50/34	56/34	49/27
Virginia 0842 – Line, harvest 2020	52/35	58/37	53/29

number of technically suitable leaves is a little higher for Line 0842. The reference and line are characterized by almost equal plant height (163–164 cm).

Leaf size is the first external characteristic determined from organoleptic tobacco assessment. The length/height ratio of the tobacco leaf shows tobacco type. In large leaf tobacco, the larger size of tobacco leaves shows a greater presence of the typical variety characteristics.

Leaves 7th, 14th and 18th of Line 0842 from harvest 2020 and 2021 are with length similar to the reference length; their length is more than 50cm which is the typical length for the variety. Due to high temperature and low humidity in 2021, the leaves of the line are with size slightly smaller in comparison with harvest 2020 and the reference. The results in table 2 show that over 70% of the leaves of Virginia 0842 are with length of 50 - 60 cm, a characteristic typical of large leaf tobacco.

The technological indicator of number of leaves in a kilogram of tobacco shows best values for Virginia 0842, harvest 2021, for the two classes. Midrib percent is approximately the same for the reference and line.

From an economic point of view, the technological indicator of conditional cigarette output (number of cigarettes for a kilogram of tobacco) for each variety is very important. The correlation between cigarette output and the physical indicator of leaf density is inversely proportional. The best values for cigarette output are for the Virginia 0842 line from harvest 2020. The second place is for Virginia 0842 again but from harvest 2021.

The results in Table No. 4 show that the tobacco from the Virginia 0842 line for the two harvests has a very high percent in class one (35-40%). The values of the correlation between the classes for the Virginia 0842 line are slightly higher than the ones for the reference.

The typical Virginia contains about 2.0 – 2.5% nicotine. The chemical composition of Virginia tobacco is has some typical characteristics; the most

Table 3. Technological values of Virginia tobacco

Description of sample	Number of leaves in kg tobacco	% of midrib	Conditional cigarette output, number of cigarettes/kg tobacco
Virginia 0514 Reference – class I	83	25.50	1364
Virginia 0514 Reference – class II	95	28.20	1520
Virginia 0842 Line – class I, harvest 2021	92	24.20	1404
Virginia 0842 Line – class II, harvest 2021	113	27.20	1585
Virginia 0842 Line – class I, harvest 2020	83	26.46	1764
Virginia 0842 Line – class II, harvest 2020	95	27.32	1543

Table 4. Quality indicators for Virginia tobacco**.**

Variety	Class, %			Harvest (kg/da)
	Ist	IInd	IIIrd	
Virginia 0514-Reference	30	55	15	220.63
Virginia 0842-Line, harvest 2021	40	50	10	283.12
Virginia 0842-Line, harvest 2020	35	55	10	300.70

Table 5. Chemical indicators of Virginia tobacco

Variety Class	Indicators (%)			
	Nicotine	Total sugars	Total nitrogen	Ash
Virginia 0514 Reference - class I	1.79	20.86	3.04	10.91
Virginia 0514 Reference – class II	2.22	5.21	3.61	15.09
Virginia 0842 Line class I, harvest 2021	2.42	24.15	2.65	8.01
Virginia 0842 Line class II, harvest 2021	2.67	20.29	2.85	9.46
Virginia 0842 Line class I, harvest 2020	3.78	11.10	2.81	9.41
Virginia 0842 Line class II, harvest 2020	2.03	20.10	1.95	9.61

Table 6. Free burning rate of Virginia tobacco, harvest 2021

Description of sample	Free burning rate (mm/min)
Virginia 0514-Reference, class I	2.66
Virginia 0514-Reference, class II	2.80
Virginia 0842-Line, class I	2.74
Virginia 0842-Line, class II	2.82

important one is the highest total sugar content that varies broadly (12 – 28%). Total sugar values in Virginia 0842 from the two harvests are very high in the two classes (11.10 – 24.15). Ash content is low – from 8.01% to 9.61%; this shows the high useful content of leaves. The total nitrogen for Virginia 0842 is 1.95 – 2.85%, and for the reference it is 3.04 – 3.61.

The burning rate of tobacco is presented as burned mass per minute. Better ability to burn shows higher burning rate. Free burning rate depends on the following factors – chemical composition, density and moisture of tobacco.

Cigarettes manufactured in the laboratory have been analyzed in order to determine their free burning rate in mm/min pursuant to the Bulgarian State Standard (BDS) 12976-93.

The results in table 6 do not show a significant difference in the values of this indicator for the reference and Virginia 0842 line.

CONCLUSIONS AND RECOMMENDATIONS

Tobacco quality is mainly determined by variety characteristics as well as the place, conditions and methods of growing.

The effects of sharp climatic changes on dry tobacco quality show it is necessary to select new tobacco varieties.

Large leaf tobacco of the Virginia 0842 line from harvests 2020 and 2021 has relatively short vegetation and the necessary qualitative and quantitative indicators that are similar to or better than the same indicators for the Virginia 0514 reference.

The values of basic chemical indicators are directly dependent on the technology of tobacco processing and treatment.

The specific smoking qualities of each tobacco type and variety depend on certain chemical values of tobacco.

The data of basic chemical values of tobacco from the two years of study give us a reason to present the Virginia 0842 line in the Patent Office in order to be recognized as a promising new tobacco variety from the Virginia variety group.

REFERENCES

Apostolova, E. (1991). Effect of Soil and Climate Factors on the Formation of Raw Material Quality, *Bulgarian Tobacco Journal, book 1*, pp.7-9 (Bg).

Apostolova, E. (1997). Problems with the Production of Big Leaf Tobaccos in Bulgaria, *Bulgarian Tobacco Journal, book 6*, pp. 2-6 (Bg).

Blake Brown, A. (2004). Flue-Cured tobacco situation and outlook. Flue-Cured Tobacco Information, North Carolina State University, U.S. (En).

Bozukov, H., Kasheva, M., Kochev, Y. &Varkova, I. (2018). Bulgarian tobacco. Publishers "Macros", Plovdiv, Bulgaria (En).

Drumeva, M. (2020). Assessment of Basic Morphological and Agricultural Characteristics and Tolerance to Abiotic Stress of Virginia Tobacco. Dissertation, Plovdiv, Tobacco and Tobacco Products Institute, Plovdiv (Bg).

Chinchev, B. & Stoyanov, B. (1987). The varietal structure should be in compliance with the concrete conditions and the market demands. *Bulgarian Tobacco Journal, book 1*, pp.13-16 (Bg).

Chinchev, B. & Stoyanov, B. (1989). Reaction of Tobacco Varieties against the Necrotic Strain of the Potato Virus Y, *Bulgarian Tobacco Journal, book. 2*, pp. 24-27 (Bg).

Chinchev, B. & Stoyanov, B. (1991). Agrobiological, technological and chemical characteristics of Virginia tobacco cultivars. *Bulgarian Tobacco Journal, book 1*, pp. 2-6 (Bg).

Kasheva, M., Bozukov, H. & Kochev, Y. (2021). Chemical and technological characteristics of large leaf tobacco Virginia 0842. *Bulgarian Journal of Agricultural Science, 27(1), 110-114.*

Ralovski, S. & Chinchev, B. (1991). A study treating introduced Virginia tobacco cultivars in the region of Northeastern Bulgaria, *Bulgarian Tobacco Journal*, *book.* 2, pp. 10-14 (Bg).

Ralovski, S. (1993). A production test of perspective Virginia tobacco cultivars, *Bulgarian Tobacco Journal, book. 6*, pp. 20-25 (Bg).

Ralovski, S. (1996). The structure of the tobacco varieties in the region of Northwestern Bulgaria, *Bulgarian Tobacco Journal, book. 3*, pp. 8-10 (Bg).