PHYSICAL COMPOSITIONS OF TOBACCO OF THE VARIETY PRILEP 66 9, DEPENDING ON THE MATURITY OF THE TOBACCO LEAVES AT THE TIME OF HARVEST

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ABSTRACT

The physical characteristics of tobacco leaves are the basic indicator that enables the assessment of tobacco quality in practice. They reflect the structure and chemical composition of the leaf and are closely related to the smoking and flavor properties of the tobacco. Having in mind the previous knowledge in 2022 a field experiment by standard methodology was conducted on the surfaces of the experimental field of the Scientific Institute for Tobacco - Prilep, with oriental tobacco variety Prilep 66.
Three variants were included in the experiment – tobacco was harvested during technological maturity, before technological maturity (green state), as well as the harvesting of tobacco leaves after technological maturity (overripe state) were performed. The aim of this study was to perceive the quality of tobacco depending on the time of harvest.

Considering their great importance in the industrial processing of tobacco, we decided to analyze the following major physical properties: leaf substantiality, thickness and midrib content.

Keywords: oriental tobacco, variety Prilep 66 9, physical characteristics, maturity.

INTRODUCTION

The physical characteristics of tobacco leaves are the basic indicator that enables the assessment of tobacco quality in practice. Some of the visible characteristics of the tobacco leafs (dimension, form, color etc.) as their physical properties in most cases are the result of the anatomic structure of the leafs and their chemical composition. They reflect the structure and chemical composition of the leaf and are closely related to the smoking and flavor properties of the tobacco. So this is mostly used in determining the tobacco quality, the internal content is determined according to the visible characteristics of the tobacco leafs, and according to that an opinion for the technologic-smoking properties of the tobacco is formed.
The aim of this study was to perceive the quality of tobacco depending on the time of harvest. Among the most important physical properties in the oriental aromatic tobaccos are: Substantiality of leaf tissue measured in g/m^2, leaf thickness measured in microns and midrib content measured in %. Nuneski (1986) have come to the conclusion that Prilep type tobaccos have the best quality when the substantiality of the leaf tissue is between 57.7 to 81.9 g/m^2. According to Timov et al. (1974) the midrib content at oriental tobaccos is usually between 14 to 18%.
Considering their great importance in the industrial processing of tobacco, we decided to analyze the following major physical properties (leaf substantiality, thickness and midrib content) of the standard variety Prilep 66 9.

MATERIAL AND METHODS

The trial was set up in the experimental field of Scientific Tobacco Institute-Prilep, during the 2022 harvest. Tobacco that was harvested at the stage of technological maturity was used as a standard in the trials. For comparison in terms of quality and quantity, harvests were performed before technological maturity (green/unripe state) and after technological maturity (overripe state). The aim of this study was to perceive the quality of tobacco depending on the time of harvest.

The seedlings were produced in the usual way in cold prepared seedbeds, covered with polyethylene fabric, on an area of 40 m2, in the nursery of Scientific Tobacco Institute-Prilep.
The trial was set up in randomized block design, three variants in three replications and transplanting was done manually at 40cm × 15cm spacing (Figure 1). The tobacco was harvested by hand at technological maturity stage (standard), before technological maturity stage (green/unripe state) and after technological maturity stage (overripe state) (Figure 2). The tobacco is stringed by hand and sun cured on racks covered with polyethylene cloth, all placed in one or two rows (Figure 3, Figure 4). The qualitative assessment of the cured tobacco was carried out according to the Regulations for qualitative and quantitative evaluation of raw tobacco leaf for oriental tobacco types.

Figure 1 Tobacco plantation


Figure 2 Maturity of the tobacco leaves at different harvest

Figure 3 Dry tobacco leaves harvested in different maturity

Figure 4 Tobacco drying

RESULTS AND DISCUSSION

After the manipulation of the raw tobacco leaf, a qualitative assessment was performed according to the Regulations for qualitative and quantitative evaluation of raw tobacco leaf for oriental tobacco types. After that, samples were taken for laboratory testing. The laboratory examination referred to the technological and chemical properties of the obtained raw material depending on the time of harvest.

The study of the dependence between the quality of tobacco and its physical properties is of particular importance, since they first determine the so-called technological-commercial quality of tobacco leaf (Uzunoski, 1985). Physical properties vary depending on the variety, insertion, agro-ecological conditions and the applied agronomic measures (Dimitrieski et al. 2019). In most cases there is a consistent relationship between chemical composition, anatomical structure, numerous external organoleptic properties and physical traits of tobacco leaf, which are widely used in determination of tobacco quality (Timov et al.,1974).

Materiality as a physical indicator of quality is of particular importance to the fabrication, because it indicates the total dry matter content of the leaf, it depends on the volume weight, which determines how many cigarettes you will get from one kg of tobacco in leaf (Dimitrieski 1990).

Obtained results of the technological examinations are presented in Table 1.

Table 1. Technological properties

Harvest time	Harvest	Components		Thickness μm	Materiality g/m^2
		Rib %	Leaf blade %		
Technological maturity	Middle belt	16,84	83,16	77,0	78,85
	Upper belt	14,45	85,55	81,5	83,90
Green (unripe) state	Middle belt	16,90	85,10	75,0	72,35
	Upper belt	14,88	85,12	78,0	77,85
Overripe state	Middle belt	15,84	84,16	72,5	60,10
	Upper belt	14,35	85,65	72,5	72,02

Technological properties that have been processed are significant because they affect the quality of tobacco and the factory's yield in manufacturing. Tobacco as a crop is grown i.e. it is used in a dry condition. In order to obtain raw material that can be used in cigarette manufacturing, it is important high level of quality to be obtained during production and further processing. More important and more significant for the tobacco quality are the thickness of the leaf and the materiality, i.e. representation of the rib and the leaf blade. From the obtained results, it can be seen that the highest thickness was measured in leaves harvested at technological maturity stage, upper belt 81.5 μm and middle belt 77 μm, and the smallest value was measured in tobacco leaves picked after technological maturity - 72.5 μm. Bogdancheski et al. (1988), examining the technological properties of tobacco in several varieties of the Prilep type in the region of Delchevo, found an average thickness of the upper zone of the leaves from 78 to 95 μm.

These values are an indicator of the nutrition of the leaf, which means that if the leaf is more nourished during the vegetation, it will be thicker and vice versa. In overripe leaves, the chemical decomposition processes are more intense and therefore the leaf is thinner. The higher insertions, which are also more nourished, have a greater thickness. This is confirmed by the obtained results shown in Table 1. The thickness of the leaf also depends on the leaf nervature expression, i.e. on the representation of the rib and the leaf blade. If the nervature is more pronounced, the leaf appears thicker, because the side ribs are disproportionately thicker than the blade. It is a sign of poorer quality, while a thicker blade with a fine nervature is not an expression of poor quality. From the results shown in terms of the representation of the rib and the leaf blade expressed in percentages, the leaves harvested at technological maturity have the best quality, 16.84% rib and 83.16% leaf blade on the leaves from the middle belt and 14.45% rib and 85.55% leaf blade on the leaves from the upper belt. Tobacco leaves harvested after technological maturity have lower values of rib representation for the middle and upper belt, as a result of insufficient nutrition and improper decomposition of chemical compounds. The leaf is more delicate, thinner with indistinct nervature. Materiality represents the absolute amount of matter per unit area. According to the materiality, it is estimated whether the tobacco is with high content, full or empty. From the results shown in Table 1, the lowest values in terms of materiality have the leaves from the middle and upper belt of the tobacco harvested after technological maturity (60.10 g/m2 and 72.02 g/m2), which means that the leaves are empty, without content and are of low quality.

CONCLUSIONS

- According to the representation of the rib and leaf blade, expressed in percentages, the leaves harvested at technological maturity stage have the best quality, 16.84% rib and 83.16% leaf blade on the leaves from the middle belt and 14.45% rib and 85.55% leaf blade on the leaves from the upper belt.
- The upper inserts, which are also more nourished, have a greater thickness. The greatest thickness was measured in leaves harvested at technological maturity stage, upper belt 81.5 μm and middle belt 77 μm, and the smallest value was measured in tobacco leaves harvested after technological maturity, 72.5 μm.
- According to materiality, it is assessed whether the tobacco is with high content, full or empty.
- The lowest values in terms of materiality have the leaves from the middle and upper belt of tobacco harvested after technological maturity (60.10 g/m2 and 72.02 g/m2), which means that the leaves are empty, without content and are of low quality.

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