

RATIO BETWEEN GREEN AND DRY MASS IN SOME VARIETIES OF YAKA AND BASMAK TOBACCO

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ABSTRACT

Water content in tobacco plant is variable and is closely related to tobacco variety, stage of development, plant organs (root, stem and leaf), climate conditions during the growing season and other factors. In 2009, 2010 and 2011 investigations were carried out on green : dry mass ratio in four tobacco varieties - one of the type Yaka (YK 7-4/2), used as a check, and three of the type Basmak (MK-1 MB-2 and MB-3).

Varieties MK - 1 and MB- 3 participate with smaller amounts of green mass to yield 1 kg dry mass (MK - 1 with 4.983 kg and MB- 3 with 5.262 kg). Somewhat higher share of green mass to obtain 1 kg dry mass was recorded with the check variety YK 7-4/2 (5365 kg) and with MB-2 (5575 kg).

The aim of our investigations was to present qualitative characteristics of investigated varieties, since it is considered that varieties which contain lower amounts of water have a better quality.

Keywords: oriental tobacco, green and dray mass, varieties, Yaka, Basmak

СООДНОС НА ЗЕЛЕНА СПРЕМА СУВА МАСА ТУТУН КАЈ НЕКОИ СОРТИ ОД ТИПОТ ЈАКА И БАСМАК

Содржината на вода во тутунското растение е различна и е во тесна врска со сортата тутун, фазата на развој, органите на растението (коренот, листот и стеблото), од климатските услови кои владеат за време на вегетацијата и други фактори. Во текот на 2009, 2010 и 2011 година беа извршени истражувања на соодносот на зелена спрема сува маса тутун кај четири сорти тутун и тоа : ЈК 7-4/2 како контрола која е од типот јака и три сорти од типот басмак МК-1, МБ-2 и МБ-3.

Сортите МК-1 и МБ-3 учествуваат со помала количина на зелена маса за да се добие 1 kg сув тутун, каде МК-1 учествуваше со 4.983 kg зелен : 1 kg сув тутун а МБ-3 со 5.262 kg зелен : 1 kg сув тутун. Додека контролната сорта ЈК 7-4/2 и МБ-2 учествуваа со нешто поголема количина на зелена маса за да се добие 1 kg сув тутун, каде контролната сорта ЈК 7-4/2 учествуваше со 5.365 kg зелен : 1 kg сув тутун и сортата МБ-2 со 5,575 kg зелен : 1 kg сув тутун.

Цел ни беше со овие истражувања да се прикажат и квалитативните карактеристики на испитуваните сорти, затоа што се смета дека сортите што содржат помала количина на вода во себе имаат и подобри квалитативни карактеристики.

Клучни зборови: ориенталски тутун, зелена и сува маса, сорти, јака, басмак

INTRODUCTION

Water is an environment in which all physiological processes in living cell take place and a basic element in creation of organic matter in the process of photosynthesis. In the process of curing, water is separated from tobacco leaf, which causes loss not only of water but also of a part of dry matter. Water content in leaf usually decreases from the lower to the upper insertions and it differs in various types of tobacco. Karajankov (1995) in his three-year investigation concluded that technically mature leaves of Macedonian oriental varieties (P 10-3/2, YK 7-4/2 and Djebel No.1) contain approximately 77.43 % of water. Studying the water content in different organs of the plant, the author reported that 50.08 % of the water in YK 7-4/2 is found in the leaf, 25.15 % in the stalk, 12.87 % in the root and 10.90 % in the inflorescence.

According to Boceski (2003), the loss of dry matter is 16 to 20 % of its initial content. Dimitrov (1964) points out that the increase of nitrogen rates in green tobacco leaves leads to an increased amount of water. In cured tobacco, the higher amount of water indicates low quality of tobacco leaves and vice versa.

According to Uzunovski (1985), the water amount in technically mature leaves is considerably high (75 % - 90 %) and depends on the variety, growing conditions and insertion. The amount of water in cured leaves ranges 6 - 10 % of the total leaf weight.

According to Atanassov (1962), green : dry mass ratio of the oriental tobacco type Ustina ranged 5.5 : 1 to 6.7 : 1 in lower primings, 4.8 : 1 to 5.1 : 1 in middle primings and 3.9 : 1 to 5.0 : 1 in upper primings. The same author reported that in Burley tobacco this ratio is 6.7 : 1 to 8.3 : 1 and in Virginia 5.5 : 1 to 6.7 : 1.

Green : dry tobacco ratio in the investigated varieties is mainly a varietal characteristics. According to Mitreski (2011), the average ratio in some varieties of the type Prilep in 2009 and 2010 ranged from 6.11 : 1 in variety P 66-9/7 to 6.95 : 1 in P 12-2/1. According to Ristevski (2006), green: dry tobacco ratio in Burley varieties ranged from 6389 g : 1000 g in Croatian variety Chulinec to 6230 g : 1000 g in variety B -96/85. The green : dry tobacco ratio will be presented in our research.

MATERIAL AND METHODS

Investigations were carried out in 2009, 2010 and 2011 with four tobacco varieties, one of which Yaka YK 7-4/2 as a check (\emptyset) and three Basma varieties: MK-1, MB-2 and MB-3. Seedling from the investigated varieties was produced in traditional way, under polyethylene covered beds in Scientific Tobacco Institute - Prilep. Elite seed material of 5g/10 m² was used for investigation. During seedling production, all necessary cultural practices and protection measures were applied simultaneously. After preparation of the soil with one autumn and two spring ploughings, investigations

were set up with 5 replications designed in randomized blocks, with planting density of 45 × 12 cm. The length of the trial was 5 m and the width of the basic plot was 1,80 m. The main plot area in field was 9 m² and the useful plot area was 6.16 m².

Each plot consisted of 5 rows, three of which were used for harvest and two served for protection. The number of plants in the row was 42 and 38 of them were stalks for harvesting. The number of plants in the plot (for 3 rows) was 126 and the number of plants for calculation (3 rows) was 114. Total number of stalks from each variety in the whole trial was

1050. Harvesting and stringing of the leaves were carried out manually, in 7 primings in the stage of technical maturity and curing was performed in the sun, on horizontal frames. Green and dry tobacco of each variety was measured separately during the three years of investigation and

their ratio was obtained mathematically (Photos 1 and 2).

The obtained data were processed statistically by the method of analysis of variance (ANOVA) and tested with LSD test .



Photo 1. Green tobacco



Photo 2. Dry tobacco

RESULTS AND DISCUSSION

Basma tobacco is represented with a very small percentage in varietal structure of R. Macedonia, which is not satisfactory, given the fact that, compared to some other oriental tobaccos (Prilep, Yaka and Djebel), it has a good quality (strong and pleasant aroma).

According to the results of investigations carried out in 2009 (Table 1), the average green : dry tobacco ratio ranges from 5.256 kg : 1 kg in Basmak

MB- 3 to 5.805 kg: 1 kg in Basmak MB- 2, the index of which is 3.15 % higher than that of the check variety YK 7-4/2. In YK 7-4/2 this ratio was 5.617 kg green : 1 kg dry tobacco and in MK – 1 variety it ranged 5.359 kg green : 1 kg of dry tobacco. So, the investigated tobacco varieties showed no statistically significant differences in 2010 crop.

Table 1. Green : dry tobacco ratio in 2009

Varieties	Replications					Average	Index
	I	II	III	IV	V		
YK 7-4/2 Ø	5.233 : 1	5.206 : 1	6.111 : 1	6.214 : 1	5.321 : 1	5.617: 1	100.00
MK-1	5.500 : 1	4.580 : 1	5.428 : 1	5.918 : 1	5.367 : 1	5.359: 1	95.41
MB-2	5.879 : 1	5.470 : 1	5.442 : 1	6.424 : 1	5.808 : 1	5.805: 1	103.35
MB-3	5.229 : 1	5.347 : 1	5.040 : 1	5.675 : 1	4.991 : 1	5.256: 1	93.57

2009 crop

LSD 5% 0.460 g⁺ n.s.

1% 0.647 g⁺⁺ n.s.

In 2010, the lowest green: dry tobacco ratio was recorded in variety Basmak MK-1 (4.837 kg : 1 kg) and the highest in the variety MB-2 (5.591 kg : 1 kg), which is 5.27% higher than the check

(Table 2). In YK 7-4/2 this ratio averaged 5.311 kg : 1 kg and in MB-3 it reached 5.341 kg : 1 kg. Thus, no statistically significant differences were observed among investigated varieties.

Table 2 Green : dry tobacco ratio in 2010

Varieties	Replications					Average	Index
	I	II	III	IV	V		
YK 7-4/2 Ø	5.128 : 1	5.438 : 1	5.377 : 1	5.885 : 1	4.729 : 1	5.311: 1	100.00
MK-1	5.046 : 1	5.217 : 1	4.316 : 1	4.380 : 1	5.227 : 1	4.837: 1	91.08
MB-2	5.364 : 1	4.937 : 1	6.185 : 1	5.602 : 1	5.864 : 1	5.591: 1	105.27
MB-3	6.024 : 1	5.730 : 1	4.598 : 1	5.393 : 1	4.962 : 1	5.341: 1	100.56

2010 crop

LSD 5% 0.837 g⁺ n.s.

1% 1.176 g⁺⁺ n.s.

The data collected in 2011 (Table 3) show the lowest green: dry tobacco ratio in variety Basmak MK-1 again (4.753kg : 1 kg), and the highest ratio was observed in variety Basmak MB-2

(5.330kg : for 1 kg), which is 3.15% higher than the check. The Basma varieties showed no statistical differences compared to the check.

Table 3. Green : dry tobacco ratio in 2011

Varieties	Replications					Average	Index
	I	II	III	IV	V		
YK 7-4/2 Ø	5.290 : 1	5.294 : 1	5.000 : 1	5.000 : 1	5.250 : 1	5.167: 1	100.00
MK-1	4.720 : 1	4.760 : 1	5.219 : 1	4.446 : 1	4.622 : 1	4.753: 1	91.99
MB-2	5.150 : 1	4.895 : 1	5.709 : 1	5.211 : 1	5.686 : 1	5.330: 1	103.15
MB-3	5.385 : 1	5.352 : 1	4.364 : 1	4.970 : 1	5.896 : 1	5.193: 1	100.50

2011 crop

LSD 5% 0.592 g⁺ n.s.

1 % 0.832 g⁺⁺ n.s.

According to Table 4, the average green : dry tobacco ratio ranged from

4.983 kg : 1 kg in MK-1 to 5.575 kg : 1 kg in MB- 2, with relative difference being

lower for 7.12 % in MK - 1 and 1.92 % in MB - 3, compared to the check variety . It can be concluded from the results that MK - 1 and MB- 3 varieties participate with a lower amount of green mass to obtain 1 kg dry tobacco, but there are no

statistically significant differences compared to the check. According to the data obtained, the green : dry tobacco ratio is primarily a varietal trait varieties feature, but it also depends on other factors as cultural practices, climate, soil etc.

Table 4. The ratio between green and dry tobacco (in kg)

VARIETY	Year	green : dry tobacco	Average Period 2009 / 2011	Difference		Range
				Absolute	Relative	
YK 7-4/2 Ø	2009	5.617 : 1000	5.365 :1		100.00	2
	2010	5.311 : 1000				
	2011	5.167 : 1000				
MK-1	2009	5.359 : 1000	4.983 :1	- 382	92.88	4
	2010	4.837 : 1000				
	2011	4.753 : 1000				
MB-2	2009	5.805 : 1000	5.575 :1	+210	103.91	1
	2010	5.591 : 1000				
	2011	5.330 : 1000				
MB-3	2009	5.256 : 1000	5.262 :1	-103	98.08	3
	2010	5.341 : 1000				
	2011	5.193 : 1000				

The average ratio green : dry tobacco mass in investigated tobacco varieties is presented more vividly in

Figure 1 and it ranges from 5.58 : 1 in MB-2 to 5.00 : 1 in variety MK-1.

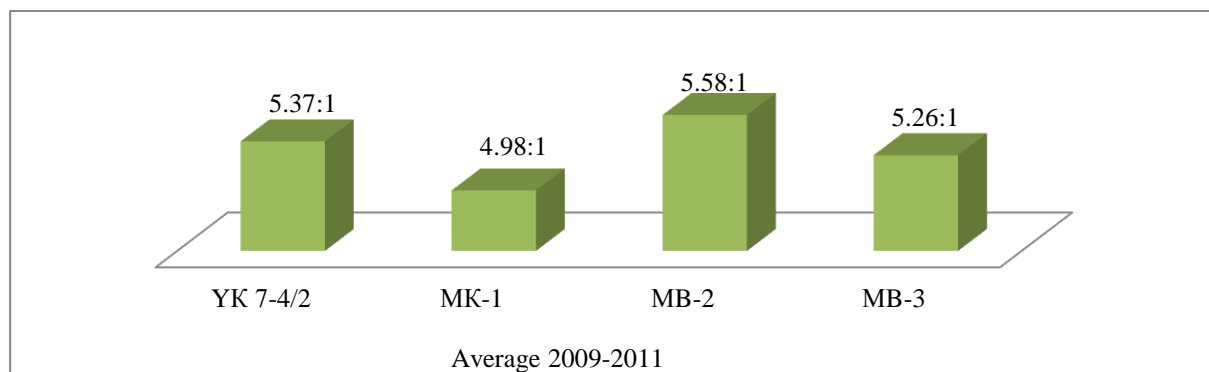


Figure 1. Green : dry tobacco mass in kg
(average values)

CONCLUSIONS

As a result of the obtained data, the following conclusions can be drawn:

Green : dry tobacco ratio in 2009 ranged from 5.256 kg : 1 kg in variety Basmak MB- 3 to 5.805 kg : 1kg in variety Basmak MB -2.

In 2010, green : dry tobacco ratio was the lowest in variety Basmak MK - 1 (4.837 kg: 1 kg) and the highest in variety MB-2 (5.591 kg : 1 kg).

Similar data were obtained in 2011 crop, when the lowest green : dry tobacco ratio was recorded in variety Basmak MK - 1 (4.753 kg: 1 kg) and the highest in variety Basmak MB-2 (5.330 kg : 1 kg).

From the three-year results it can be concluded that varieties MK - 1 and MB - 3 participate with smaller amount of green mass to obtain 1 kg dry tobacco, i.e. the shares of green tobacco from MK - 1 and MB - 3 to obtain 1 kg dry tobacco are 4.983 kg and 5.262 kg, respectively.

REFERENCES

1. Атанасов Д., 1962. Тютюнопроизводство, със сушене и манипулация,. Държавно Издателство Христо Данов, Пловдив, 430.
2. Боцески Д., 2003. Познавање и обработка на тутунската суровина. Институт за тутун – Прилеп, II дополнително издание, 677.
3. Димитров Ц., 1964. Дејствие на минералните и органичните торове врху тютюна. Издателство, Софија.
4. Карајанков С., 1995. Придонес кон запознавањето на динамиката на сува маса и водата во органите на тутунското растение кај македонските ориенталски сорти тутун. Докторска дисертација. Земјоделски факултет, Скопје.

5. Митрески М., 2012. Компаративни проучувања на поважните производни, технолошки и квалитетни својства кај некои сорти тутун од типот прилеп. Докторска дисертација, Научен институт за тутун-Прилеп 2012.
6. Ристески И., 2006. Сортната структура, начинот на бербата и сушењето, неопходни фактори за подобрување на квалитетот и зголемување на производството на типот берлеј во Република Македонија. Докторска дисертација. ЈНУ Институт за тутун - Прилеп.
7. Узуноски М., 1985. Производство на тутун. Стопански весник, Скопје.