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ANALYSIS OF THE CRITERIA FOR QUALITATIVE AND QUANTITATIVE EVALUATION OF RAW TOBACCO LEAF IN THE REPUBLIC OF MACEDONIA

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ABSTRACT

Evaluation of tobacco quality in practice, during the purchase in the last few years, has not been in compliance with the criteria listed in the existing Rules. It is a result of the high quality obtained from tobacco types and varieties grown and application of contemporary agrotechnical practices during their production. There are insertions which, according to their usability value, must be listed in higher grades in industrial classification. In the Rules and criteria for qualitative and quantitative evaluation of raw tobacco leaf of the oriantal tobacco types Prilep, Yaka, Dzebel and Basmak ("Official Gazette of R. Macedonia", 16/2007 and 144/2010), tobacco was divided into 6 grades for aromatic tobaccos (I, II, II-A, III-B, IV and V) and 5 grades for additional tobaccos (I, II, III, IV and V).

After the analysis, it was recommended to reduce the number of grades of oriental aromatic tobacco to four (I, II, III and IV) and those of additional tobaccos to two (I and II), which will enable a more real evaluation of tobacco quality of the labor of tobacco producers.

Key words: tobacco quality, tobacco types, prilep, yaka, basmak, djebel

АНАЛИЗА НА МЕРИЛАТА ЗА КВАЛИТАТИВНА И КВАНТИТАТИВНА ПРОЦЕНА НА СУРОВИОТ ТУТУН ВО ЛИСТ ВО Р. МАКЕДОНИЈА

Проценатa на тутунот при откупот во последниве години во практиката не соодветствуваше со мерилата пропишани во постојниот Правилник. Тоа е резултат на високиот квалитет на тутунот што го даваат одгледуваните типови и сорти и примената на современите агротехнички мерки во производството. Постојат инсерции кои според квалитетот на употребната вредност во индустриската класификација можат да се рангираат во повисоките класи. Во Правилникот за мерилата за квалитативна и квантитативна процена на суровиот тутун во лист за ориенталските типови на тутун прилеп, јака, џебел и басмак ("Службен весник на РМ" 16/2007 и 144/2010) се наведени 6 откупни класи за ароматичните тутуни (I, II, III-А, III-Б, IV и V) и 5 класи за дополнителните тутуни (I, II, III, IV и V).

По извршената анализа, предложено е намалување на класите на ориенталскиот ароматичен тутун на 4 класи и тоа: I, II, III и IV класа, и за дополнителните тутуни на две

класи: I и II класа, со што ќе се овозможи пореална процена и вреднување на квалитетот на тутунот и трудот на тутунопроизводителите.

Клучни зборови: квалитет на тутун, типови на тутун, прилеп, јака, басмак, џебел

INTRODUCTION

Due to the special importance of tobacco on the economy of the country, its production, purchase, processing and exports have been regulated by the Law on tobacco and tobacco products (Official gazette of R. Macedonia No 24/06 and 88/08), and the evaluation was based on the Rules and criteria for qualitative and quantitative assessment of raw tobacco leaf (Official gazette of R. Macedonia No 16/2007 and 144/2010).

According to this Rules, there were 6 grades were listed for purchase of the aromatic tobacco varieties Prilep, Yaka, Dzebel and Basmak (I, II, III-A, III-B, IV and V) and 5 grades for the additional tobaccos (I, II, III, IV and V).

Since in the last years the purchase of tobacco was not conducted in accordance with the above mentioned Rules, we have made analysis on tobacco purchase for a fivbe-year period (2005 - 2009).

ANALYSIS OF TOBACCO PURCHASE

In this paper, analysis will be made on the purchase of oriental tobacco, which will serve as a basis for the proposal for change and amendment of the Rules and criteria for qualitative and quantitative assessment of raw tobacco leaf.

The analysis was carried out in the period 2005 - 2009 and included the whole purchase of tobacco by grades and categories. According to the data on purchased tobacco by types (Table 1), the highest participation in the structure of purchased tobacco has the type Prilep, with an average of 11.758.3 tons. It is followed by Yaka, and Basmak with 5.436,3 tons and 2121.9 tons, respectively, and the lowest participation was recorded for the type Djebel. In percentages, the participation of tobacco types in the structure of purchased tobacco is as follows: Prilep - 60.11%, Yaka - 28.77% , Bamak 10.77% and Djebel - 0.35%.

With regard to the fact that oriental tobaccos are purchased in two categories: I - oriental aromatic and II - oriental additional, we have made analysis, the data of which are presented in Tables 2 and 3. It can be seen from the tables that the share of the IInd category (oriental additional tobacco) in total tobacco quantities is very low, ranging from 0.02% in 2008 to 6.11% in 2006. Accordingly, the participation of these tobaccos in the purchase are only symbolic.

Table 1 Dynamics of tobacco purchase by types (in tons)

Type	Year					$\overline{X}$	%
	2005	2006	2007	2008	2009		
Prilep	14.784,5	11.638,5	10.105,3	9.063,4	13.355,3	11.789,40	60,77
Yaka	7.085,6	5.139,3	4.156,4	4.463,3	6.257,1	5.420,34	27,94
Basmak	1.166,8	1.651,5	1.920,5	2.549,4	3.321,5	2.121,94	10,94
Djebel	0	0	86,2	46,6	212,3	69,02	0,35
Total	23.036,9	18.429,3	16.268,4	16.122,7	23.146,2	19.400,70	100,00

Table 2 Dynamics of tobacco purchase by years and categories

Year	Ist category (oriental aromatic) kg	IInd category (oriental additional) kg	Total prod. of I+II category kg
2005	23.036.952,0	111.390,9	23.148.342,0
2006	18.429.294,0	1.198.806,2	19.628.100,2
2007	16.268.450,0	17.991,9	16.286.441,9
2008	16.122.737,6	2.804,9	16.125.542,5
2009	23.146.258,6	12.721,1	23.158.979,7
$\overline{x}$	19.400.738,4	268.743,0	19.669.481,3

Table 3 Participation of the IInd category tobacco in total tobacco purchase

Year	I+II category kg	IInd category	
		kg	%
2005	23.148.342,0	111.390,9	0,48
2006	19.628.100,2	1.198.806,2	6,11
2007	16.286.441,9	17.991,9	0,11
2008	16.125.542,5	2.804,9	0,02
2009	23.158.979,7	12.721,1	0,05
$\overline{x}$	19.669.481,3	268.743,0	1,35

According to our analysis by years and grades, it can be stated that the highest share in tobacco purchase in the investigated period was that of the IInd grade, averaging 7.962.925,9 kg or 41.04%. It can be also noticed that this grade has the lowest oscillation in purchased quantities. The highest variability in purchased tobacco appears in the Ist grade, ranging between 6.25% and 74.06%. while the average purchase of I grade tobacco is 4.702.027,16 kg or 24.24%. Purchase of the IIIrd to the lowest Vth grade tobacco suddenly falls down, especially from III-b to V. The quantities of purchased tobacco from the IVth and Vth grade are very low. This is particularly valid for the Vth grade, which participation in the total purchase in all investigated years is insignificant (below 1%).

Table 4 Participation of purchased tobacco by grades and kgs

Year	Purchase I and II grade tobacco					
	Grade	kg	%	Grade	kg	%
2005	I	1.580.849,70	8,15	II	9.660.616,70	49,79
2006	I	1.389.879,30	7,16	II	6.557.598,60	33,80
2007	I	1.212.989,70	6,25	II	9.296.777,60	47,91
2008	I	4.959.271,30	25,57	II	8.200.540,90	42,26
2009	I	14.367.145,80	74,06	II	6.099.095,70	31,43
$\overline{X}$	I	4.702.027,16	24,24	II	7.962.925,90	41,04

Year	Purchase of III-A and III-B grade tobacco					
	Grade	kg	%	Grade	kg	%
2005	III-A	8.792.727,30	45,32	III-Б	2.424.782,80	12,49
2006	III-A	6.684.346,40	34,45	III-Б	2.562.495,60	13,20
2007	III-A	5.141.868,50	26,50	III-Б	570.501,90	2,94
2008	III-A	2.743.292,00	14,14	III-Б	201.443,60	1,04
2009	III-A	2.287.140,70	11,79	III-Б	362.971,00	1,87
$\overline{X}$	III-A	5.129.874,98	26,44	III-Б	1.224.438,98	6,31

Year	Purchase of IV and V grade tobacco					
	Grade	kg	%	Grade	kg	%
2005	IV	507.330,80	2,61	V	70.644,70	0,37
2006	IV	1.067.886,20	5,50	V	167.087,90	0,87
2007	IV	41.790,00	0,22	V	4.522,30	0,02
2008	IV	16.056,70	0,08	V	2.133,10	0,01
2009	IV	26.311,00	0,13	V	3.594,40	0,02
$\overline{X}$	IV	331.874,94	1,71	V	49.596,48	0,26

Data on Table 5 present the average purchase of tobacco by grades and kilos. It can be recorded that I and II grade are predominant in the average purchase with 65.28% , and together with grade III-A these quantities increase to 91.72%. The share of III-B in total purchase is 6.31%, and the share of the IVth and Vth grade is only 1.97%. From these data it becomes clear that the last two grades from the current Rules for tobacco purchase are actually not in function of the purchase.

Table 5 Average purchase of tobacco by grades and % (2005 2009)

Grade	Tobacco purchase			
	kg	%	%	%
I	4.702.027,0	24,23	65,28	91,72
II	7.962.926,0	41,04		
III-A	5.129.875,0	26,44	26,44	
III-Б	1.224.439,0	6,31	6,31	6,31
IV	331.875,0	1,71	1,97	1,97
V	49.596,0	0,27		
Total	19.400.738,0	100,00	100,00	100,00

Table 6 Summary table of dynamics of tobacco purchase by grades and kgs

Grade	Year				
	2005	2006	2007	2008	2009
I	1.580.849,70	1.389.879,30	1.212.989,70	4.959.271,30	14.367.145,80
II	9.660.616,70	6.557.598,60	9.296.777,60	8.200.540,90	6.099.095,70
III-A	8.792.727,30	6.684.346,40	5.141.868,50	2.743.292,00	2.287.140,70
III-Б	2.424.782,80	2.562.495,60	570.501,90	201.443,60	362.971,00
IV	507.330,80	1.067.886,20	41.790,00	16.056,70	26.311,00
V	70.644,70	167.087,90	4.522,30	2.133,10	3.594,40
Σ	23.036.952,00	18.429.294,00	16.268.450,00	16.122.737,60	23.146.258,60

The same statement can be made from the analysis in Table 6 and Figure 1, which clearly presents tobacco purchase by years and grades and dynamics of purchase expressed in percentages.

Table 7 Dynamics of tobacco purchase by grades, in %

Grade	Year					$\overline{x}$	
	2005	2006	2007	2008	2009		
I	6,86	7,54	7,46	30,76	62,07	22,94	91,90
II	41,94	35,58	57,14	50,86	26,35	42,37	
III-A	38,17	36,27	31,60	17,02	9,88	26,59	
III-Б	10,52	13,91	3,51	1,25	1,57	6,15	6,15
IV	2,20	5,79	0,26	0,10	0,11	1,69	1,95
V	0,31	0,91	0,03	0,01	0,02	0,26	
Σ	100,00	100,00	100,00	100,00	100,00	100,00	100,00

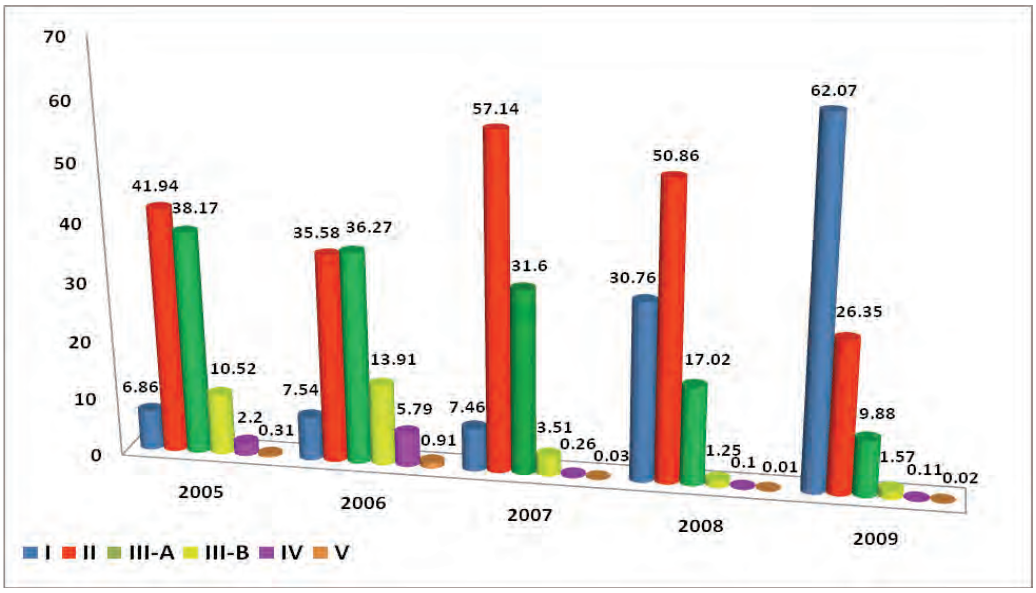

Figure 1 Dynamics of tobacco purchase by grades and years, in %

From the data presented (Table 8) it can be seen that 86.30% of the purchased IInd category tobacco is of a first grade and 12.13% is of a second grade, i.e. the total percentage of the first and second-grade tobacco is 98.43%. The average purchase of the third-grade tobacco is 1.09%, and together with the fourth and fifth-grade tobacco it is 1.57%. Such a low participation of the last three grades in total amounts of purchased additional tobacco (or IInd category tobacco) gives us the right to conclude that they are insignificant factor in the purchase and therefore they should be deleted from the Rules for tobacco purchase.

Table 8 Purchase of additional tobacco by grades in 2005 - 2009 (in %)

Grade	Tobacco type			Average % of purchased tobacco	
	Prilep	Yaka	Basmak		
I	82,96	83,71	92,22	86,30	98,43
II	15,16	13,80	7,43	12,13	
III	1,65	1,54	0,10	1,09	
IV	0,12	0,27	0,12	0,17	1,57
V	0,11	0,68	0,13	0,31	
Σ	100,00	100,00	100,00	100,00	100,00

For better understanding of the problem and with the aim to make correct conclusions and suggestions which will improve the present situation in tobacco purchase, we've also made analyses on the percentual tobacco share by insertions (belts), (Boceski 2003), since they certainly are one of the most essential indicators in evaluations of tobacco quality (Table 9). It was revealed that the share of the highest quality insertions was 32%, that of the middle belts was 32% and of the lower belts only 8 %.

Table 9 Participation of insertions (belts) in oriental aromatic tobaccos in %

Tobacco belt	Insertion	Participation in %	
Upper belt	top	7	32
	undertop	10	
	kovalama	15	
Middle belt	upper middle leaves	20	**60**
	middle leaves	25	
	lower middle leaves	15	
Lower belt	primings	5	8
	lugs	3	
Total		100	100

CONCLUSIONS

According to the presented data and their analysis, the following conclusions can be drawn:

1. Tobacco produced in the Republic of Macedonia yields a high quality raw for treatment and processing of final tobacco products with a high demand on world markets.

2. Evaluation of tobacco quality in practice, during the purchase in the last few years, has not been in conjunction with the criteria listed in the existing Rules. It is a result of the high quality obtained from tobacco types and varieties grown and application of contemporary agrotechnical practices during their production. There are insertions which, according to their usability value, must be listed in higher grades in industrial classification.

3. In the existing criteria for evaluation of tobacco quality, tobacco is divided in too many grades, which is impractical and makes tobacco treatment more difficult. On the other hand, some of the classes are not functional and the others are out of use (III-B and V grade in oriental aromatic tobaccos and III, IV and V grade in additional oriental tobaccos). Therefore, these grades should be deleted from the Rules for evaluation of oriental aromatic and oriental additional tobaccos.

4. By reducing the number of grades in purchase of oriental tobacco to four (I, II, III and IV), and for additional tobaccos to two (I and II), a more real evaluation of tobacco quality and of tobacco producers labor will be obtained.

5. In practice, tobacco purchase will be more simple, purchasers will be more effective and possibilities for improved industrial manipulation will be made.

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INDICATOPRS OF PURCHASED QUANTITIES OF TOBACCO TYPES IN THE REPUBLIC OF MACEDONIA

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ABSTRACT

Purchase of oriental tobacco types Prilep, Yaka, Djebel and Basmak were analysed by purchase grades and their values. Investigations were carried out in 2006, 2007 and 2008. In the purchase structure, tobacco type Prilep has the largest share ranging from 56.20% in 2008 to 65.82% in 2006. The share of Yaka is somewhat lower (25.68% in 2006 to 27.70% in 2008). Tobacco type Basmak has the lowest share, ranging from 8.5% in 2006 to 15.81% in 2008. The highest quantities of purchased tobacco by grades was of the II and III^{A} grade. The average purchase price ranged from 118.14% denars/kg in 2006, 140.57 denars/kg in 2007, up to 167.42 denars/kg in 2008. The total quantities of purchased oriental tobacco were as follows: 19.681.162,3 kg in 2006, 16.288.439,7 kg in 2007 and 16.126.379,1 kg in 2008. The purchase of additional tobacco was symbolic in the three years of investigations.

Key words: tobacco, Prilep, Yaka, Djebel, Basmak

ПОКАЗАТЕЛИ НА ОТКУПЕНИТЕ КОЛИЧИНИ НА ТУТУН ПО СОРТИ ВО РЕПУБЛИКА МАКЕДОНИЈА

Во овој труд е анализиран откупот на ориенталските типови на тутун прилеп, јака, џебел и басмак по откупни класи и нивната вредност. Истражувањата се извршени во 2006, 2007 и 2008 година. Во структурата на откупот типот прилеп има најголем дел кој се движи од 56,20% во 2008 година до 65,82% во 2006 година. Помал дел има типот јака со учество од 25,68% во 2006 година до 27,70% во 2008 година. Типот басмак најмал дел во откупот има во 2006 година со 8,5%, а најголем во 2008 година со 15,81%. Во структурата на откупот на тутунот по класи тутунот најмногу се откупил во II I III^{A} класа. Според просечната откупна цена на тутунот во 2006 година имаме најниска цена од 118,14 денари/kg тутун, во 2007 година таа е повисока и изнесува 140,57 денари/kg тутун и највисока просечна откупна цена се има добиено во 2008 година која изнесува 167,42 денари/kg тутун. Вкупните откупни количини на ориенталски тутун изнесуваат во 2006 година 19,681.162,3 kg, во 2007 година 16.288.439,7 kg и во 2008 година 16.126.379,1 kg. Откупот на дополнителен тутун е симболично во трите години на истражување.

Клучни зборови: тутун, прилеп, јака, џебел, басмак

INTRODUCTION

Production and purchase of tobacco in the Republic of Macedonia is regulated by the Law on tobacco and tobacco products and special rules related to this Law.

The purchase is made according to the Rules and Criteria for qualitative and quantitative estimation of leaf tobacco. Based on this Rules, aromatic type of tobacco is purchased in 6 classes and the additional type in 5 classes. The purchase of additional tobacco in the threee years of investigation was only symbolic.

MATERIAL AND METHODS

For realization of our goals, we used statistical data issued by the State Statistical Office of R. Macedonia, the Analysies of the Ministry of Agriculture, Forestry and Water Economy of R. Macedonia and data from the Act on tobacco and tobacco products issued in 2006.

In data procession and making conclusions usual methods for this type of investigation were used. The most frequently applied was the comparative-analytical method.

RESULTS AND DISCUSSION

Analysis on purchased tobacco quantities by types and varieties was made for the period 2006, 2007 and 2008, using the data of the Ministry of Agriculture, Forestry and Water Economy. Primarily, the purchased amounts of leaf tobacco by grades were presented, followed by the review of total quantity of purchased aromatic tobaccos and by the values of purchased leaf tobacco for the given crops.

The analysis of data presented in Table 1, reveals that a total of 18.429.294.00 kg of aromatic tobacco types Yaka, Basmak, Prilep and Djebel were purchased in 2006 crop, of which the highest amount of Prilep -11.731.646,20 kg (63.66%) and Yaka - 5.046.182,10 kg (27.38%) and the lowest of Basmak - 1.651.465,70 kg (8.96%). No purchase of Djebel tobacco was rerecorded in this period.

With regard to additional tobaccos, a total amount of 1.198.806,20 kg were purchased. The highest percentage of it belongs to Prilep tobacco - 1.174.676,10 kg (92.99%), and only negligible amounts of the other tobacco types were purchased.

From the total amount of 53.062,10 kg moldy tobacco purchased in 2006, 46.834,40 kg (88.26%) belongs to the type Prilep .

So, in 2006 the total quantity of purchased leaf tobacco was 19.681.162,30 kg, with the highest percentage of it belonging to the type Prilep (65.82%).

Data on the average purchase price by types and the average price achieved for aromatic tobaccos are also presented in Table 1.

Table 1 Purchased aromatic tobaccos by grades, crop 2006

Class	type Yaka		type Basmak		type Prilep		type Djebel		Total	
	kg	%	kg	%	kg	%	kg	%	kg	%
I	540.614,20	10,71	122.256,00	7,40	727.009,10	6,20	-	-	1.389.879,30	7,55
II	1.751.761,90	34,72	639.638,80	38,73	4.166.199,80	35,52	-	-	6.557.598,60	35,58
III^{A}	1.72.0.902,30	34,10	553.866,70	33,54	4.409.577,40	37,59	-	-	6.684.346,40	36,27
III^{B}	732.931,70	14,53	241.318,60	14,61	1.588.245,30	13,54	-	-	2.562.495,60	13,91
IV	277.225,30	5,49	85.175,80	5,16	705.485,10	6,01	-	-	1.067.886,20	5,79
V	22.746,70	0,45	9.211,80	0,56	135.129,40	1,15	-	-	167.087,90	0,90
Aromatic tobaccos, Total	**5.046.182,10**	**100**	**1.651.465,70**	**100**	**11.731.646,20**	**100**	**-**	**-**	**18.429.294,00**	**100**
%	27,38		8,96		63,66		-	-	100	
Additional tobaccos										
I	2.369,50	63,64	18.898,50	92,61	971.914,10	82,74	-	-	993.182,10	82,85
II	1.264,00	33,94	1.485,60	7,28	180.433,60	15,36	-	-	183.193,20	15,28
III	90,50	2,44	22,00	0,11	19.756,90	1,68	-	-	19.869,40	1,66
IV	0,00	-	0,00	-	1.462,40	0,12	-	-	1.462,40	0,12
V	0,00	-	0,00	-	1.109,10	0,09	-	-	1.109,10	0,9
Additional tobaccos, Total	**3.724,00**	**100**	**20.406,10**	**100**	**1.174.676,10**	**100**	**-**	**-**	**1.198.806,20**	**100**
%	0,3		1,7		92,99		-	-	100,00	
Moldy	**3.633,50**		**2.594,20**		**46.834,40**		-	-	**53.062,10**	**100**
%	6,85		4,89		88,26		-	-	100,00	
Total kg by types	**5.053.539,62**		**1.674.466,00**		**12.953.156,70**		**-**	**-**	**19.681.162,30**	
%	25,68		8,5		65,82					100
Average purchase price,denars/kg by types	119,98		156,33		112,49		119,00			
Average purchase price for aromatic tobacco				118,14						

Data on the total amount of purchased aromatic, additional and moldy tobacco are presented in Table 2.

Table 2 Total amount of purchased aromatic tobacco (kg), crop 2006

	Type				Total
	Yaka	Basmak	Prilep	Djebel	
Aromatic	5.046.182,10	1.651.465,70	11.731.646,20	-	18.429.294,00
Additional.	3.724,00	20.406,10	1.174.676,10	-	1.198.806,20
Moldy	3.663,50	2.594,20	46.834,40	-	53.062,10
Overall in kg	**5.053.539,60**	**1.674.466,00**	**12.953.156,70**	**-**	**19.681.162, 30**

Source: Data from the Ministry of Agriculture, Forestry and Water Economy - R. Macedonia

Based on the total amount of purchased aromatic tobaccos and the average purchase price by types, data on the total value in denars are presented in Table 3.

Table 3 The value of purchased leaf tobacco by types, crop 2006

Type	Purchased tobacco leaf, kg	Average purchase price, den/kg	Value in denars
Yaka	5.053.539,60	119,98	606.323.729,20
Basmak	1.674.466,00	156,33	261.769.269,78
Prilep	12.953.156,70	112,49	1.457.100.630,93
Djebel	-	-	-
Total	19.681.162,30	118,14	2.325.132.478,68

Note: Estimation was made by the average price and the price achieved for aromatic tobacco

In 2007 crop, total quantity of purchased aromatic tobacco by grades was 16.268.450,00 kg. The highest amount of it accounts for the type Prilep - 10.075.872,90 kg, i.e. 61.94%, followed by Yaka - 25.73% and Djebel with only 0.55%.

The total quantity of purchased additional tobacco was 17.991,90 kg, of which the highest part belongs again to the type Prilep - 16.287,70 (90.53%). The share of all other tobacco types is insignificant.

Table 4 The quantity of purchased aromatic tobacco (kg) by grades, crop 2007

Grade	Type Yaka		Type Djebel		Type Prilep		Type Basmak		Total	
	kg	%	kg	%	kg	%	kg	%	kg	%
I	473.137,80	11,30	7.232,50	8,39	535.741,40	5,32	196.878,00	10,25	1.212.989,70	7,46
II	2.228.379,10	53,24	50.448,00	58,53	5.997.016,40	59,52	1.020.934,10	53,16	9.296.777,60	57,15
III^{A}	1.305.391,00	31,19	25.935,50	30,09	3.238.869,20	32,14	571.673,80	29,77	5.141.868,50	31,61
III^{B}	165.320,90	3,95	2.388,00	2,77	285.939,50	2,84	116.853,50	6,08	570.501,90	3,51
IV	12.512,70	0,30	184,50	0,28	15.674,50	0,16	13.418,30	0,70	41.790,00	0,26
V	1.129,50	0,03	0,00		2.632,90		759,90	0,04	4.522,30	0,03
Total Aromatic tobacco	**4.185.871,00**	**100,00**	**86.188,50**	**100.00**	**10.075.872,90**	**100,00**	**1.920.517,60**	**100,00**	**16.268.450,00**	**100,00**
%	25,73		0,5		61,94		11,81		100,00	
Additional tobacco										
I	738,50	90,90			15.528,00	95,39	840,20	93,23	17.106,70	95,08
II	74,00	9,10			664,80	4,09	60,50	6,77	799,30	4,44
III	0,00				14,40	0,09	0,00		14,40	0,08
IV	0,00				4,90	0,03	0,00		4,90	0,28
V	0,00				66,60	0,41	0,00		66,60	0,37
Total Additional tobacco	**812,50**				**16.278,70**	**100,00**	**900,70**	**100,00**	**17.991,90**	**100,00**
%	4,5	100,00			90,48		5,0		100,00	
Moldy tobacco	**277,00**				**1.204,60**		**516,20**		**1.997,80**	
%	13,86				60,31		25,83		100	
Total kg by types	**4.186.960,50**	**100,00**	**86.188,50**	**100,00**	**10.093.356,20**	**100,00**	**1.921.934,50**	**100,00**	**16.288.439,70**	
%	25,71		0,53		61,97		11,80			100,00
Average purchase price by types, den/kg	144,49		144,29		131,85		177,60			
Average price of aromatic tob.					140,57					

From the class of moldy tobacco 1.997,80 kg were purchased, most of it belonging to type Prilep - 1.204,60 kg, i.e. 60.31%.

The overall quantity of purchased aromatic tobacco is 16.288.439,70 kg and 61.97% of it belongs to type Prilep, followed by lower amounts of Yaka and Basmak.

Data on the average purchase price of the investigated tobacco types and the price achieved for aromatic tobaccos are presented in Tables 5- 6.

Table 5 Total quantity of purchased aromatic tobacco (kg), crop 2007

Tobacco leaf	Type				Total
	Yaka	Djebel	Prilep	Basmak	
Aromatic.	4.185.871,00	86.188,50	10.075.872,90	1.920.517,60	16.268.450,00
Additional.	812,50	0,00	16.278,70	900,70	17.991,90
Moldy	277,00	0,00	1.204,60	516,20	1.997,80
Overall, in kg	4.186.960,50	86.188,50	10.093.356,20	1.921.934,50	16.288.439,70

Source: Estimation was made according to the data of the Ministry of Agriculture, Forestry and Water Economy - R. Macedonia

Note: Estimation was made by the average price and the price achieved for aromatic tobacco

Table 6 The value of purchased leaf tobacco by types, crop 2007

Type	Purchased tobacco leaf, kg	Average purchase price, den/kg	Value in denars
Yaka	4.186.960,50	144,49	604.973.994.,89
Basmak	86.188,50	144,29	12.436.210,81
Prilep	10.093.356,20	131,85	1.330.808.988,60
Djebel	1.921.934,50	177,60	341.450.972,10
Total	**16.288.439,70**	**140,57**	**2.289.666.010,80**

Note: Estimation was made by the average price and the price achieved for aromatic tobacco

The total quantity of aromatic tobacco purchased in 2008 was 16.122.738 kg. In this crop, too, the share of the type Prilep is the highest - 9.061.098,30 kg (56.20%), and it is followed by the types Yaka and Basmak.

From the class of additional tobaccos a total of 2.805 kg were purchased, most of it belonging to the type Prilep - 1.671,70 (60%). The least quantity was purchased from the class of moldy tobacco - only 836.00 kg, 48.92% of which belongs to the type Prilep.

So, the overall quantity of aromatic tobacco purchased in 2008 was 16.126.379,10 kg, most of it belonging to the type Prilep.

Table 7 The quantity of purchased aromatic tobacco by grades, crop 2008

Grade	Type Yaka		Type Djebel		Type Prilep		Type Basmak		Total	
	kg	%	kg	%	kg	%	kg	%	kg	%
I	1.637.982,30	36,68	9.068,50	19,46	2.931.636,60	32,35	380.583,90	30,76	4.959.271	30,76
II	1.957.819,00	43,84	27.876,50	59,81	4.710.778,70	51,99	1.504.066,70	50,86	8.200.541	50,86
III[A]	799.951,50	17,92	9.165,50	19,67	1.349.169,40	14,89	585.003,60	17,02	2.743.282	17,02
III[B]	64.351,30	1,44	496,00	1,06	63.086,40	0,70	73.509,90	1,25	201.444	1,25
IV	4.581,70	0,10	0,00		5.561,50	0,06	5.913,50	0,10	16.057	0,10
V	904,70	0,02	0,00		865,70	0,01	362,70	0,01	2.143	0,01
Total aromatic tobacco	**4.465.590,50**	**100,00**	**46.606,50**	**100,00**	**9.061.098,30**	**100,00**	**2.549.442,30**	**100**	**16.122.738**	**100,00**
%	27,70		0,29		56,20		15,81		100,00	
Additional tobacco										
I	914,70	86,40	-	-	1.605,00	96,05	4,00	89,98	2524	89,98
II	35,00	3,31	-	-	8,00	0,48	15,40	8,07	58	2,07
III	0,00	0,00	-	-	0,00	-	0,00	-	-	-
IV	41,50	3,97	-	-	21,00	1,26	26,20	3,21	90	3,21
V	67,70	6,43	-	-	37,70	2,27	28,70	4,74	1,34	4,78
Total additional tobacco	**1.058,90**	**100,00**	**-**	**-**	**1.671,70**	**100,00**	**74,30**	**100,00**	**2.805**	**100,00**
%	37,75				59,61		2,65			100,00
Moldy tobacco	**225,40**				**409,20**		**202,00**		**836,00**	
%	26,91				48,92		24,16			100,00
Total kg by types	**4.466.874,80**		**46.606,50**		**9.063.179,20**		**2.549.718,60**		**16.126.379,10**	
%	27,70		0,29		56,20		15,81		100,00	
Average purchase price by types, den/kg	169,02		165,70		159,38		193,23			
Average price of aromatic tob.				167,42						

In Tables 8 and 9 data are presented on the total amount of aromatic, additional and moldy tobacco, as well as the value indexes of purchased leaf tobacco from the crop 2008, estimated on the basis of average purchase prices by types and the average price achieved for aromatic tobaccos.

Table 8 Total quantity of purchased aromatic tobaccos (kg), crop 2008

Type	Yaka	Djebel	Prilep	Basmak	Total
Aromatic.	4.465.590,50	46.606,50	9.061.098,30	2.549.442,30	16.122.738,00
Additional.	1.058,90	0,00	1.671,70	74,30	2.805,00
Moldy	225,40	0,00	409,20	202,00	836,00
Overall, in kg	**4.466.874,80**	**46.606,50**	**9.063.179,20**	**2.549.718,60**	**16.126.379,10**

Source: Estimation was made according to the data of the Ministry of Agriculture, Forestry and Water Economy - R. Macedonia

Table 9 The value of purchased leaf tobacco, crop 2008

Type	Purchased tobacco leaf, kg	Average purchase price, den/kg	Value in denars
Yaka	4.466.874,80	169,02	754.991.213,00
Basmak	46.606,50	165,70	7.722.780,00
Prilep	9.063.179,20	159,38	1.444.489.469,00
Djebel	2.549.718,60	193,23	492.682.202,00
Total	**16.126.380.00**	**167,42**	**2.699.885.664,00**

Note: Estimation was made by the average price and the price achieved for aromatic tobacco

CONCLUSIONS

Based on the data presented in this paper, the following conclusions can be drawn:

1. Total quantity of aromatic tobacco purchased in 2006, 2007 and 2008 crops amounts between 16.000.000 and 20.000.000 kg. It has an irregular movement, but no visible deviations were observed.
2. In all years of investigation, the highest share of purchased aromatic tobacco belongs to the type Prilep - over 60%, while the share of other types and varieties was relatively small.
3. In present conditions there is a market which can absorb high quantities of tobaccos grown in Macedonia and it will contribute to a higher inflow of foreign currency, which is of essential importance for our country.
4. Tobacco production in the last few years develops with various speed and intensity, which is affected by purchase price of raw tobacco, subsidies and possibilities for increased production.
5. Tobacco production will continue to be an important factor in agro0industrial complex.
6. On no account should we miss the opportunity for higher tobacco production and increased purchase, because there is no alternative for the most pauperized part of population, which exists only on production of this important industrial crop.
7. At this moment only a few companies in R. Macedonia are engaged in tobacco purchase and procession. Therefore, the production of other more profitable crops should be considered, which will be of a great benefit for the future of the country.

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THE EFFECT OF RAW ON THE FILLING CAPACITY OF SHREDDED TOBACCO

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ABSTRACT

Investigations on the effect of filing capacity of shredded tobacco are presented in this paper. It was stated from the results that the highest density was estimated in oriental tobaccos (270 g/cm^3). The average density of Virginia tobacco was 240 g/cm^3 and that of Burley 170 g/cm^3. With reference to the type, the lowest density was recorded in Burley tobacco ribs. Tobacco mixtures in major tobacco companies and in our country are based mainly on combinations of oriental, Burley and Virginia tobaccos, reconstituted tobacco and expanded tobacco ribs.

Key words: filing capacity, shredded tobacco, virginia, burley, oriental tobaccos

ВЛИЈАНИЕ НА СУРОВИНАТА ВРЗ ПОЛНЕЧКАТА СПОСОБНОСТ НА СЕЧЕНИОТ ТУТУН

Во овој труд се презентирани податоците од истражувањата за влијанието на полнечката способност на сеченият тутун. Од истражувањата се констатира дека ориенталските тутуни имаат најголем дензитет од 270 g/cm^3. Дензитетот на суровината од типот вирџиниј просечно изнесува 260 g/cm^3, од тутунското фолио 240 g/cm^3, а од типот берлеј 170 g/cm^3. Од аспект на типот, со најмал дензитет се одликуваат тутунските ребра од типот берлеј. Комбинациите на тутунските мешавини во големите тутунски компании па и кај нас, главно се базираат на комбинација помеѓу ориенталските, берлејските и вирџиниските суровини, тутунското фолио и експандираните тутунски ребра.

Клучни зборови: полнечка спсобност, сечен тутун, вирџинија, берлеј, ориенталски

INTRODUCTION

Filling capacity of shredded tobacco is one of the major physical properties of tobacco mixture. So far, little investigation has been made on this property and much more attention has been paid to chemical composition of tobacco and smoke.

The profit of tobacco companies primarily depends on tobacco amount necessary to fill a cigarette. For this reason, special attention in the present is paid to the selection of raw material and technical-technological procedures in the process of production. The choice of raw material has a high influence on the filling capacity of shredded tobacco. Various tobacco types also have various filling capacities. Thus, the filling capacity of Burley tobacco is higher compared to that of the Virginia, oriental and dark tobaccos.

It should be emphasized that tobaccos grown in regions with abundant rainfalls have higher filling capacities. It is the case with Burley tobacco raw from Malawi, Thailand and Zimbabwe, which shows higher filling capacity of shredded tobacco compared with Burley tobacco raw from Spain, Italy, Greece and the republics of former Yugoslavia.

It is characteristic that the type Burley with Malawi and Thailand origin is not thermally treated, but is harmanized together with other tobaccos which constitute the recommended formulation. It is highly important not to invest in Burley line for manufacture of Burley raw. Virginia tobaccos have lower filing capacity compared with the Burley ones and oriental tobaccos are somewhere in the middle between Virginia and dark tobaccos.

LITERATURE REVIEW

Only few tobacco experts investigated the filing capacity of shredded tobacco. Although a greater number of them have mentioned it as a very important physical character, they make no analysis on its high impact and contribution to tobacco industry.

Choutau J. (1976) determined the factors of production which affect the filling capacity of tobacco.

Uzunoski M. (1972), in his investigations of technological properties, reported higher filling capacity of Otlia tobacco in relation to the types Prilep and Yaka.

Nuneski I. (1985) recorded that filling capacity of Yaka tobacco is higher than that of the type Prilep.

Nuneski I. (1975) reported that filling capacity of Prilep tobacco originating from Krusevo region is equal to that of the type Prilep grown in the region of Bitola (T. Lazareski, 1976).

Nuneski I., Kitanoski V., Mitreski M., Prodanoska O. (1975) revealed data on the effect of pneumatic installation and its length on the impairment of shredded tobacco in cigarette manufacturing.

Nuneski R. (1985) investigated the effect of tobacco ribs, especially of their physical properties, on filling capacity.

Nuneski R. (2007) reported lower filling capacity of the Izmir basma tobacco compared with oriental tobacco varieties of Macedonian origin.

MATERIAL AND METHODS

Tobacco samples obtained from the Dimon company and reconstituted tobacco from LTR Le Mans were used as material for investigation. The level of expanding of tobacco ribs was determined in Cigarette Factory-Prilep. Filling capacity of shredded tobacco was determined with a Borgwaldt densimeter. The value of filling capacity was obtained from the reciprocal value of tobacco density. Cigarette weight was investigated through the volume of cigarette tube and density, and number of cigarettes in 1 kg of tobacco was estimated by tobacco weight in the cigarette.

RESULTS AND DISCUSSION

Data on the influence of the raw on filling capacity of shredded tobacco are presented in Tables 1, 2, 3 and 4.

Table 1 The influence of raw mixture on the filling capacity

Technological components	Tobacco type		
	Oriental	Virginia	Burley
Share in %	30	50	20
g/cm^3	275	260	175
g/cm^3 according to tobacco participation in the mixture	82,5	130,0	35,0
mg/cigarette		760	
N^o of cig. /kg of tob		1.314	

Table 1 shows that in the standard formulation which has been used so far, shredded filling capacity of tobacco is lower. The table also reveals that the raw of oriental tobaccos has a higher density compared to that of Virginia and Burley. The lowest density(175 g/cm^3) and higher filling capacity was recorded in Burley tobacco, especially in that produced in Malawi, Thailand and Zimbabwe.

Table 2 The influence of raw quantity on the filling

Technological components	Tobacco type		
	Oriental	Virginia	Burley
Share in %	25	45	30
g/cm^3	275	260	175
g/cm^3 according to tobacco participation in the mixture	68,8	117,0	52,5
mg/cigarette		733	
N^o of cig. /kg of tob.		1363	

Table 2 presents data obtained by the change of tobacco share in the mixture. It can be recorded that the share of oriental and Virginia tobaccos decreases, while that of Burley increases. Results also show of that cigarette number per kg of tobacco increases, while the weight of cigarettes decreases from 760 mg/cig in Table 1 to 733 mg/cig in Table 2, which is 27 cigarettes more.

Table 3 The influence of raw mixture on the filling capacity

Technological components	Tobacco type			
	Oriental	Virginia	Burley	Expanded ribs
Share in %	20	40	25	15
g/cm^3	275	260	175	160
g/cm^3 according to tobacco participation in the mixture	55,0	104,0	43,8	24,0
mg/cigarette		698		
N^o of cig. /kg of tob.		1432		

Expanded tobacco ribs have higher impact on the increase of filling capacity of shredded tobacco. Especially important for expanding of tobacco ribs is their length and thickness. With 15% participation of expanded ribs in tobacco mixture and with decreased share of oriental and Virginia tobaccos, consumption of tobacco is 698 mg/cigarette, i.e. 1432 cigarettes are obtained from 1 kg shredded tobacco.

Table 4 The influence of raw mixture on the filling capacity

Technological components	Tobacco type			
	Oriental	Virginia	Burley	Reconstituted tobacco
Share in %	20	40	25	15
g/cm^3	275	260	175	240
g/cm^3 according to tobacco participation in the mixture	55,0	140,0	43,8	36,0
mg/cigarette		735		
N^{o} of cig. /kg of tob.		1360		

The effects of reconstituted tobacco on the density of shredded tobacco in the mixture are almost identical with the data presented in Table 2. Reconstituted tobacco is characterized by higher density compared to Burley and to expanded ribs. In tobacco mixture it is also used as a regulator in decreasing of tar, nicotine and CO contents. With presence of reconstituted tobacco, the cigarette weight is 735 mg/cig., i.e. 1360 cigarettes are obtained from 1 kg tobacco.

From the data in Table 1, 2, 3 and 4 it can be concluded that the present technology for cigarette manufacture is based on combination of tobaccos, expanded ribs and reconstituted tobacco which have lower density and participate with higher percentage in the mixture. This is especially true for the raw with higher filling capacity.

Despite the necessary investments for processing of tobacco ribs, big tobacco companies can supply them in prices far less expensive than any other raw. Good quality tobacco ribs are available in the world market for 0.40 - 0.70 US $, which is really good price. In some tobacco companies the share of expanded ribs is as much as 30% . Apart from increasing the number of cigarettes, the presence of these materials in tobacco smoke leads to reduction of tars, nicotine and carbon monoxide and improves the financial results of tobacco companies.

CONCLUSIONS

The presented data on the effect of raw material upon cured tobacco density, the following statements can be drawn:

- The highest density was observed in the oriental tobacco raw.

- Concerning the density of shredded tobacco, the Virginia variety stands in the middle between reconstituted tobacco and oriental tobaccos. Thus, the average density of Virginia tobacco is 260 g/cm^3, compared to those of reconstituted tobacco - 240 g/cm^3 and Burley - 170 g/cm^3.

- The lowest density was recorded in expanded tobacco ribs - 160 g/cm^3. The density of tobacco ribs depends on the level of expansion and physical traits like rib length and width.

According to the type, the lowest density was observed in the ribs of Burley tobacco.

- Tobacco mixtures in major tobacco companies and in our country are based mainly on combinations of oriental, Burley and Virginia tobaccos, reconstituted tobacco and expanded tobacco ribs. These combinations are applied to achieve good financial results, nicotine and tars regulation and good technical design of cigarettes.

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THE EFFECT OF TYPE AND QUANTITY OF SILICATE MATERIALS DIRECTLY ADDED TO THE MIXTURE ON PHYSICAL CHARACTERISTICS OF CIGARETTES

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ABSTRACT

Investigations were made on the effect of type and amount of silicate materials directly added to tobacco cigarette mixtures on the major physical properties of cigarettes. Four types of silicate materials (type-Y zeolite, ultra stable type-Y zeolite, pentasile-type zeolite and amorphic silicon - carbon dioxide) were added directly to tobacco mixtures in amounts of 3% and 5% of the total mass of tobacco mixture. Cigarettes were made industrially, on cigarette making machine. Zeolites were synthesized and their physical-chemical characteristics were assessed at the Faculty of Physical Chemistry in Belgrade. Physical characteristics of cigarettes were made on SODIMAT and statistic analysis of the results was performed on the same device. Based on investigations it was concluded that direct addition of silicate materials in cigarette mixture has no effect on mass and diameter of the investigated cigarettes.

In contrast to that, it was determined that resistance to draw is significantly affected by the type and quantity of silicate material added in the mixture. All four types of silicate materials cause changes of the resistance to draw. The level of change is proportional to the amount of applied silicate material.

Key words: tobacco, cigaretess, test-cigarette, Y zeolite, tobacco mixtures

ЕФЕКТОТ НА ТИПОТ И КОЛИЧИНАТА НА СИЛИКАТЕН МАТЕРИЈАЛ ДИРЕКТНО ДОДАДЕН НА МЕШАВИНАТА ВРЗ ФИЗИЧКИТЕ КАРАКТЕРИСТИКИ НА ЦИГАРИТЕ

Испитуван е ефектот на типот и количината на силикатен материјал директно додаден на мешавината за цигари врз најважните физички својства на цигарите. Четири типови силикатен материјал (зеолит тип Y , ултрастабилен зеолит тип Y, зеолит тип пентасил и аморфен силициум диоксид) се додадени директно на тутунската мешавина во количества 3% и 5% на вкупната маса на тутунската мешавина. Цигарите се направени индустриски на машина за правење на цигари. Зеолитите се синтетизирани на Факултетот за Физичка хемија во Белград, каде се одредени и нивните физички својтва. Физичките карактеристики на цигарите се направени на СОДИМАТ а статистичката анализа е добиена од софтверот на самиот апарат. Од спроведените испитувања може да се заклучи дека директното додавање на силикатни материјали во тутунската мешавина нема ефект врз масата и дијаметарот на испитуваните цигари.

Спротивно на ова, отпорот на повлекување на цигарите се зголемува значително во зависност од типот и од количината на силикатен материјал. Сите четири типа на силикатен материјал предизвикуваат промени врз отпорот на повлекување. Влијанието е пропорционално на количината додаден силикатен материјал.

Клучни зборови: тутун, цигари, тестирање на цигари, Y- зеолит, тутунска мешавина

INTRODUCTION

Tobacco industry in the past 50 years was characterized by rapid growth of the production and consumption of cigarettes (5). For this reason, various technical-technological measures have been made to reduce the amount of harmful matters in cigarette smoke (4, 7). The most recent but insufficiently investigated approach of modification of tobacco smoke is addition of various catalysts directly in tobacco mixture. Although the obtained results indicate the possibility to reduce the harmful elements in tobacco smoke (10), it is necessary to determine the effect of this type of application on the essential physical properties of cigarettes, having in mind that silicate materials, in a form of powder, are directly added to tobacco mixture.

Physical characteristics of cigarettes have a significant effect on smoke quantity (1, 3). In this paper the most important physical characteristics of cigarettes (mass, diameter, resistance to draw) were investigated. Each group of cigarettes has a standard mass and any change in it will result in changes of the raw material required for one cigarette and will affect the uniformity of filling and smoking characteristics. In designing a cigarette all parameters are constant and the increase of cigarette mass will increase the amount of cigarette filling, which will result in higher yields of cigarette smoke.

Also, every cigarette brand has its constant diameter. The increase of diameter results in increased mass burning rate (SBRm) and reduced linear burning rate of cigarettes (SBRl). Thereby the rate of smoke movement is reduced and the yield of tars is increased.

Resistance to draw refers to the difference in static pressure between the two ends of sample cigarette at a fixed airflow rate. The increased resistance to draw leads to reduced flow of gases through the cigarette, which significantly affects the conditions of burning and creation of smoke. Beside this, resistance to draw is a property of cigarette which change is recognized by the smoker (8).

Silicate materials were selected for catalysts because of their availability, suitable prices and the possibility to be added in lower amounts and to be synthesized (2, 6).

Another, and probably more important reason from the aspect of smokers protection is that silicate materials remain in the ash after burning, so that they do not come into direct contact with smokers and have no effect on smoke properties.

MATERIAL AND METHODS

Four types of silicate materials were applied for the aims of this study:

1. Amorphic silicon - carbon dioxide (SiO2)
2. Type-Y zeolite
3. Ultra stable type-Y zeolite
4. Pentasile-type zeolite (ZSM-5)

All silicate materials used were synthesized and their chemical-physical characteristics were determined at the Faculty of physical Chemistry in Belgrade.

Tobacco mixture prepared in Tobacco Factory - Vranje was used as a starting material. The graphical presentation of the process for production of American-type of cigarettes is presented in Fig.1.

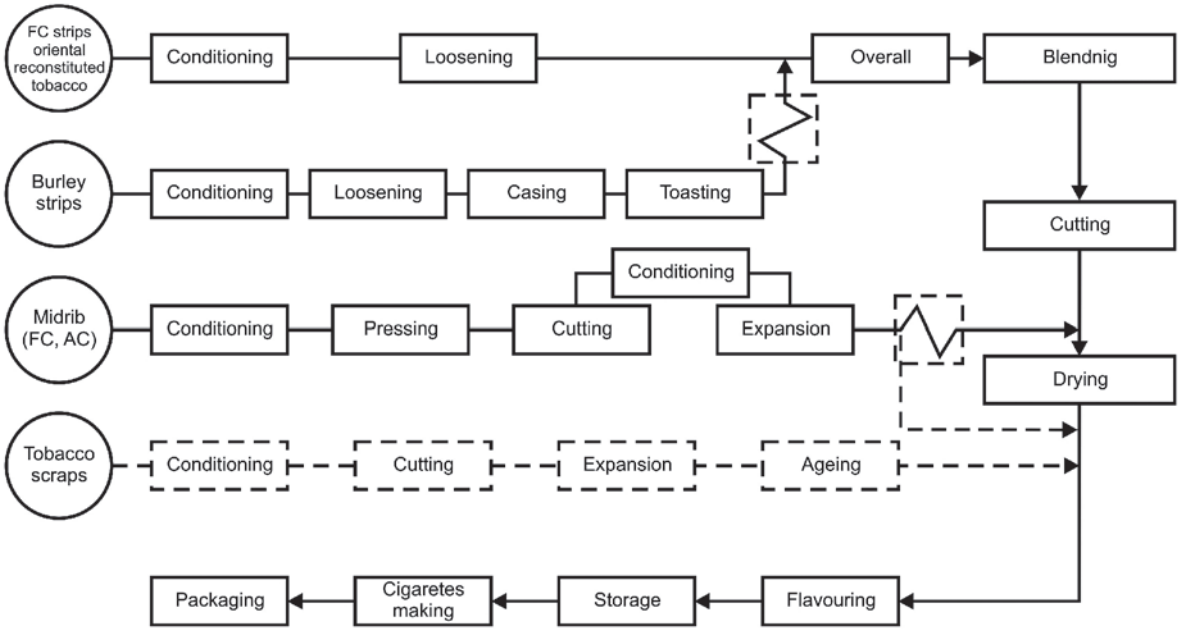

Fig.1 Schematic presentation of the process of cigarette making

After completing the process of cigarette making, 9 X 0.5 kg tobacco mixtures were sampled from the transport track at the mixture machine outlet. In four of the samples silicate materials of 3% concentration were added. The concentration of silicate materials added in all other samples was 5% (Table 1).

Table 1. Tabelar presentation of test-cigarette making

Type of silicate material	Silicate material concentration	Cigarette label
Amorphic silicon dioxide (SiO_2)	3%	S_1
Y-type zeolite	3%	L_1
Ultra stable Y-type zeolite	3%	Z_1
Pentasile-type zeolite (ZSM-5)	3%	C_1
Amorphic silicon dioxide (SiO_2)	5%	S_2
Y-type zeolite	5%	L_2
Ultra stable Y-type zeolite	5%	Z_2
Pentasile-type zeolite (ZSM-5)	5%	C_2

Silicate materials were added manually in a form of powder, with constant mixing. After 3-hours storage at room temperature in plastic bags, American blend cigarettes were made on Molins-9 cigarette making machine. In this way, a total number of nine samples were obtained, i.e. eight samples of test-cigarettes and one check cigarette (Ø).

The check cigarette was made from the same tobacco mixture as other samples, but without addition of silicate material, and its purpose was to compare all other cigarettes with it.

The same raw materials were applied in all cigarettes: filter rod made of 120 mm long acetate fibers type 2.1 Y/42000, nonporous cork and porous filter with 40 ± 2.5 CU ventilation. The filter rod was 20 mm long and the length of the cork-paper was 24mm. The total cigarette length was 84 mm.

Prior to the analysis of physical parameters, the cigarettes were conditioned for 48 hours in a Borgwaldt chamber at a temperature of 22 ± 2 ^{0}C and relative humidity of 60 ± 55, in accordance with ISO 3402 method.

Determination of cigarette mass, resistance to draw, cigarettes diameter, hardness and statistical processing of the results were made on SODIMAT (9). This device makes automatic processing of data and estimates the medium, minimum and maximum values, standard deviation and variation coefficient for the selected group of cigarettes. Resistance to draw was determined in accordance with ISO 6565.

RESULTS AND DISCUSSION

All cigarettes used in the investigation were made of the same material. Only cigarettes which mass was similar to the average (970 mg±0.5) were sampled.

Values of the three most important physical parameters investigated in this experiment (mass, resistance to draw and diameter) are presented in Tables 2 and 3. As was expected, the direct addition of silicate materials to tobacco mixture had no effect on the work of cigarette making machine.

It could be seen from the results that mass and diameter of the investigated cigarettes were ranging in tolerant limits (Table 2).

Table 2. Physical parameters of cigarettes

Test-cigarette	Cigarette mass (mg)	Cigarette diameter (mm)
Ø	970.00	7.839
S_1	971.15	7.830
Z_1	971.05	7.834
L_1	970.35	7.843
C_1	971.10	7.830
S_2	971.85	7.841
Z_2	971.75	7.837
L_2	971.60	7.835
C_2	971.65	7.847

Having in mind that cigarettes were sampled according to their mass, it was expected that their air permeability will change. This effect was determined by measuring the resistance to draw.

Table 3. The values for draw resistance of test-cigarette

Test-cigarette	Ø	S_1	Z_1	L_1	C_1	S_2	Z_2	L_2	C_2
Resistance to draw (mm WG)	93	105	105	106	107	111	109	112	114
Change (%)		12.90	12.90	13.98	15.05	19.35	17.20	20.43	22.58

The values for draw resistance are somewhat higher in all test-cigarettes compared to the check (Table 3). In test-cigarettes where 3% silicate materials were added (S_1, Z_1, L_1, C_1), the increase of resistance to draw ranged from 12.90% to 15.05%. In test-cigarettes where 5% silicate materials were added (S_2, Z_2, L_2, C_2), resistance to draw were increased from 17.20% to 22.58.05%. It can be concluded that the increase of resistance to draw is proportional to the amount of silicate material added. Results obtained during investigation confirmed the hypothesis of the experiment, because the silicate materials were applied in tobacco mixture in a form of powder. The added particles are much smaller than tobacco material. For this reason, the air movement around silicate particles is different from the movement around tobacco material. Smaller particles increase the air resistance to draw, which slows down the airflow through the cigarette. In other words, the reduced airflow through cigarette column increases the pressure and thereby the time of retention of smoke components on silicate materials particles. As a result of this, there is a high number of realized reactions, which can be proved by analysis of chemical content of the smoke. If higher amounts of silicate materials in a form of powder are added, the air combustibility through cigarette increases.

CONCLUSION

Based on investigations it can be concluded that direct addition of silicate materials in cigarette mixture has no effect on mass and diameter of the investigated cigarettes. On the contrary, it was determined that the type and quantity of added silicate materials significantly affect the resistance to draw. The addition of all four types of silicate materials caused changes of the values of resistance to draw. The level of change is proportional to the amount of applied silicate material.

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THE INFLUENCE OF THE FILTER ROD LENGTH UPON THE COMPOSITION OF CIGARETTE SMOKE

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ABSTRACT

The growing anti-smoking campaign along with the restrictive standards and demands represent a challenge to the tobacco industry in terms of reducing the observed dangerous substances in smoke while preserving the taste of cigarettes. On the other hand, World Health Organization has appealed to the scientific community to focus on discovering the influence of design elements upon the content of smoke emission. The aim of the research was to determine the influence of the filter length span on the content of dangerous substances observed in cigarette smoke. By using standardized methods, we determined the influence of filter length upon the main substances in smoke – nicotine, tar, and carbon monoxide.

Key words: cigarette filters, smoking

ВЛИЈАНИЕ НА ДОЛЖИНАТА НА ФИЛТЕРНИТЕ ОТСЕЧОЦИ ВРЗ СОСТАВОТ НА ЧАДОТ ОД ЦИГАРИТЕ

Засилената антипушачка кампања и рестриктивните норми и барања и' наложуваат на индустријата за цигари да ги намали штетните материи во чадот, без притоа да се нарушат пушачките својства на цигарите. Од друга страна, Светската здравствена организација апелира до научната заедница да го насочи своето ввимание врз разјаснување на влијанието на елементите на дизајнот врз емисијата на чад и нејзината содржина.
Целта на истражувањата е да се констатира влијанието на должината на филтер-отсечокот врз содржината на штетните материи во чадот од цигарите.Со користење на стандардни методи го констатиравме влијанието на должината на филтер-отсечокот врз основните штетни материи во чадот од цигарите - никотинот, катраните и јаглеродниот моноксид.

Клучни зборови: филтри за цигари, пушење

INTRODUCTION

The World cigarette market is in a state of constant change. This change is caused by the increased restrictive measures against smoking which are taken worldwide. The growing public interest in the state of the natural environment is the most recent factor (6). All these influences have a considerable impact on tobacco industry.

Although they are different in different parts of the World, these forces have raised some general questions regarding the products in which the filter plays a significant role (2, 3). The tobacco industry is faced with the requirements to

reach low values for the observed and controlled dangerous substances in smoke, while still meeting the demands of the consumers (1, 8, 9).

All this increased the interest on the issues concerning filters, which found its place in a separate science.

For a short period of time, despite filter's aesthetic role, they have also become major modifiers of tobacco smoke (4, 5). Therefore, today, their diversity is extremely high. The first filters "Crap" have long given way to acetate filters and those combined. Bio-filters have been in use for 10 years. However, all questions regarding the influence of cigarette design elements upon the smoke composition have remained to be corporate secrets. Thus, the World Health Organization has appealed to the scientific community to focus their attention on discovering it.

The aim of our research was to determine the influence of filter segment length on the content of dangerous substances observed in cigarette smoke.

MATERIAL AND METHODS

Widespread mono-acetate filters were used to realize the purpose of this investigation. . Also, an average value blend for the cigarettes was developed from American blend, from which laboratory cigarettes of different lengths of filter segments were made (king size, without ventilation). The studies were based on standardized methods for analysis.

RESULTS AND DISCUSSION

The results on the main phisical characteristics of materials applied for cigarette making are listed in Table 1.

Table 1. Main characteristics of applied materials

Characteristics	Statistical evaluations				
	xcp	s	v	min	max
Filter rods					
Draw resistance, mmWG	394,26	7,491	1,90	381,00	411,00
Diameter, mm	7,801	0,012	0,15	7,79	7,83
Hardness, %	81,216	0,468	0,57	80,53	81,72
Cigarette paper					
Thickness, mm	0,038	0,001	1,86	0,037	0,039
Ash content, %	17,90	0,351	1,96	17,51	18,30
Air permeability, CU	50,63	4,106	8,11	43,00	62,00
Burning, s	55,85	0,738	1,32	54,80	57,20
Wrap paper					
Thickness, mm	0,043	0,001	1,89	0,042	0,044
Air permeability, CU	NO				

The selected materials are traditionally used by the industry. Our investigation included filter cigarettes with different lengths, such as: sample № 1 –15 mm, sample № 2 - 21mm length, sample № 3 - 25mm length and sample № 4 - 27mm.

The results of the research of filter segments used in preparation of laboratory variants are listed in Table 2

Table 2 Filter segments used in preparation of laboratory variants of cigarettes

Characteristics	Statistical evaluations				
	xm	s	v	min	max
1	2	3	4	5	6
Sample 1					
Filter length, mm	15,00	0,001	0,11	14,99	15,00
Diameter, mm	7,73	0,011	0,15	7,73	7,75
Draw resistance, mmWG	68,60	2,632	1,27	67,00	70,00
Sample 2					
Filter length, mm	21,00	0,109	0,20	20,98	21,02
Diameter, mm	7,75	0,001	0,12	7,74	7,76
Draw resistance, mmWG	71,17	2,220	1,64	70,00	73,00
Sample 3					
Filter length, mm	25,00	0,106	0,24	24,90	25,03
Diameter, mm	7,74	0,020	0,18	7,73	7,75
Draw resistance, mmWG	88,00	2,701	1,45	87,00	90,00
Sample 4					
Filter length, mm	27,00	0,186	0,94	26,98	27,01
Diameter, mm	7,75	0,010	0,21	7,74	7,79
Draw resistance, mmWG	91,20	2,109	1,83	91,00	93,00

The variation among the indicators is due to the variations found in filter rods. According to the results, it is apparent that with the increase of filter section length, there is a proportional increase of draw resistance. The laboratory cigarettes weighed 0,820 g.

In order to determine the influence of the filter section length upon the smoking properties, we conducted a tasting evaluation of the laboratory options.

The main results of the tasting evaluation are as follows:

Sample № 1 – It is characterized with a pleasant and intense flavor at a medium + level, clean and dense at medium level. The taste is rough, moderate irritation, burning at an average degree, taxation below average level, medium fullness. The physiological force is at above average level- strong.

Sample № 2 – The aroma is pleasant and intense at below average degree, clean and dense. The taste along with the burning and taxation is at below average level c+, the irritation is up to the average, with medium fullness. The physiological force is at above average level.

Sample № 3 – The aroma is pleasant and clean below average, intense and clean to moderate level. The taste is characterized with burning and taxation under average c-degree, irritation and fullness are below average – moderate. Physiological force is at the average level.

Sample № 4 – This sample has a pleasant aroma and purity below average, intensive and dense below average, the irritation is below average C + level, burning and fullness below average, slight dryness. The physiological force is below average.

It is apparent that with the increase of the filter section length, the smoking properties change. The aroma reduces its intensity, the fullness of flavor decreases; unbalanced defects influence the taste of aromatic complex, and the physiological force decreases. A conclusion can be drawn that the length of filter section increases, while the taste and the intensity of flavor decrease.

The changes of the smoking properties of cigarettes, i.e. their flavor and taste, are presented in Figures 1 and 2, respectively.

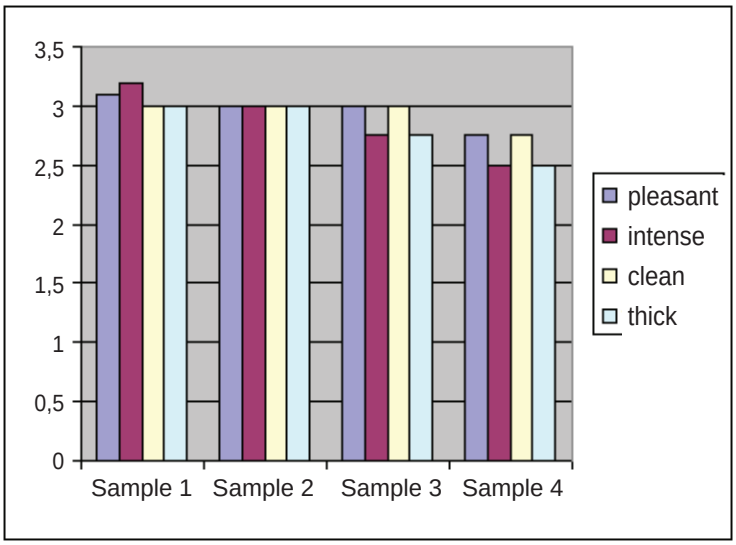

Figure 1 Flavor rating

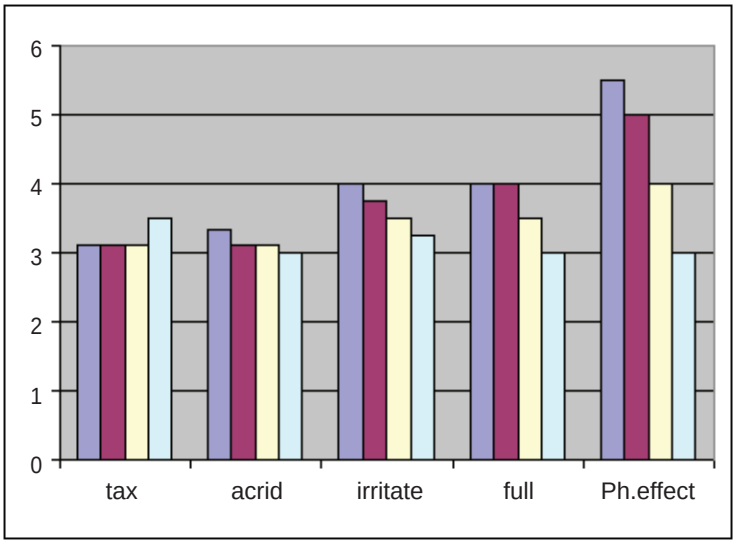

Figure 2 Taste and physiological effect rating

The results on nicotine, tar and carbon monoxide research are presented in Figures 3 and 4.

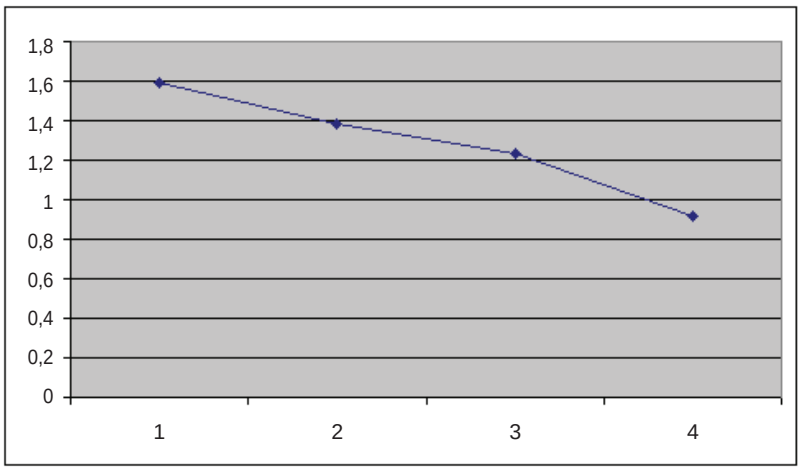

Figure 3 Nicotine, (mg/cig)

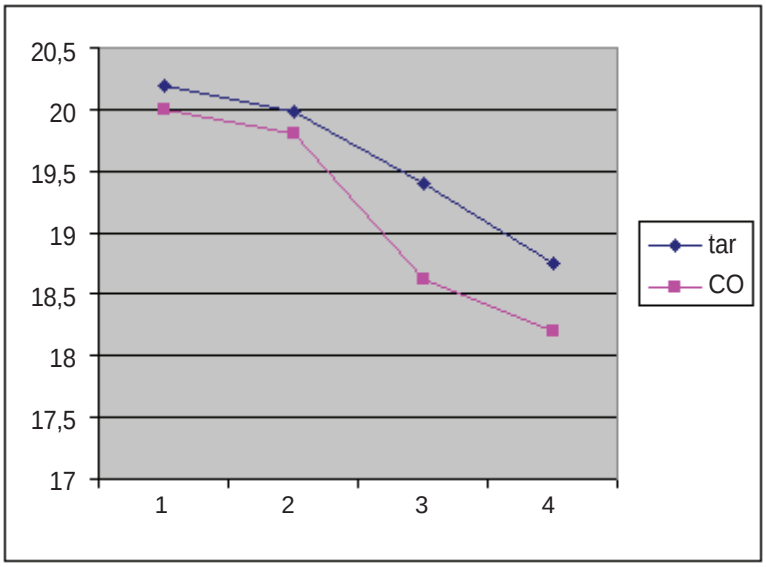

Figure 4 Tar and carbon monoxide, (mg/cig) contents

The results are obtained from laboratory tests and they cannot be taken as absolute values for the reduction of dangerous substances in smoke. However, they are sufficient indicators of the influence of filter segments. There is a strong tendency of proportional increase of filters efficiency along with their length. It is evident that the smoking properties will be changed. Considering these facts, there cannot be mechanical increase of the length of filter segments, but they must be a part of the design in the formulation of cigarettes.

CONCLUSION

Taking into consideration the results of our research, it can be concluded that the increase of filter segments enhances their ability of modification.

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ELECTRONIC CIGARETTES: REGULATORY ISSUES AND SAFETY CONCERNS

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ABSTRACT

An electronic cigarette, e-cigarette or personal vaporizer, is a battery-powered device that provides inhaled doses of nicotine or non-nicotine vaporized solution, while no smoke or combustion is actually involved in its operation. The manufacturers often describe their product as an alternative to smoked tobacco products, such as cigarettes, cigars, or pipes. Electronic cigarette can be used indoors where traditional smoking is prohibited and is not subject to the restriction of the use of tobacco products.

On the evidence of many countries, electronic cigarettes are witnessing a significant increase in global distribution and sales. This increase coincides with implementation of Article 8 of the WHO FCTC (*Protection from exposure to tobacco smoke*) that is leading to the introduction of smoke-free environments in many countries. As market penetration of these products continues to rise, policymakers and regulators in many countries have sought guidance from WHO on the scientific evidence base and optimal regulatory approaches to be taken with regard to these products. Today, Macedonia and Serbia have a strong national ban on smoking in all public indoor places, and in some cases on the outer surface, so that the use of electronic cigarettes is becoming popular. In the market, there are different models of electronic cigarettes that are mainly buying and selling online. The aim of this study was to examine the legal status of this product in Macedonia, Serbia and Bosnia and Herzegovina, reasons for the use or ban, and users' opinions of these products.

Key words: electronic cigarettes, nicotine, design, legislative, directive

ЕЛЕКТРОНСКИ ЦИГАРИ: РЕГУЛАТОРНИ ПРАШАЊА И ГРИЖА ЗА БЕЗБЕДНОСТА

Електронската цигара, е-цигара или персонален испарувач е уред напојуван со батерија кој обезбедува вдишување на никотински или безникотински пареи, при што не постои чад или согорување. Производителите најчесто го опишуваат нивниот производ како алтернатива на тутунските производи како што се цигарите, пурите или лулињата. Електронската цигара може да се користи во затворен простор каде што традиционалното пушење е забрането и таа не е предмет на Законот за забрана на користењето на тутунски производи. Според сведоштвата во многу земји, глобалната дистрибуција и продажба на електронските цигари значително се зголемува. Ова зголемување се совпаѓа со спроведувањето на членот 8 од Рамковната конвенција за контрола на тутунот на СЗО (Заштита од изложеност на тутунски чад), со кој се воведуваат непушачки зони во многу земји.

Бидејќи пробивот на пазарот на овие производи продолжува да расте, регулаторните органи во многу земји под водство на СЗО се ангажираа околу создавањето на научна база и оптималните регулаторни мерки што треба да се преземат во однос на ова прашање. Денес, Р. Македонија и Р. Србија имаат донесено строга забрана за пушење на сите јавни затворени места, а во некои случаи и во надворешната средина, така што користењето на електронските цигари станува се поинтересно.. На пазарот постојат различни модели на електронски цигари кои главно се купуваат и продаваат на интернет. Целта на овој труд е да се одреди законскиот статус на електронската цигара во Р. Македонија, Р. Србија и Р. Босна и Херцеговина, причините за да се дозволи нејзината употребата или да се забрани, како и мислења на корисниците на овие производи.

Клучни зборови: електронска цигара, никотин, дизајн, законска регулатива, директиви

INTRODUCTION

Electronic Nicotine Delivery Systems are designed to deliver nicotine to the respiratory system. The term encompasses products that contain tobacco-derived substances, but in which tobacco is not necessary for operation. They are battery powered devices that provide inhaled doses of nicotine by delivering a vaporized propylene glycol/nicotine mixture. In addition to purported nicotine delivery, this vapour also provides a flavour and physical sensation similar to that of inhaled tobacco smoke (1, 2).

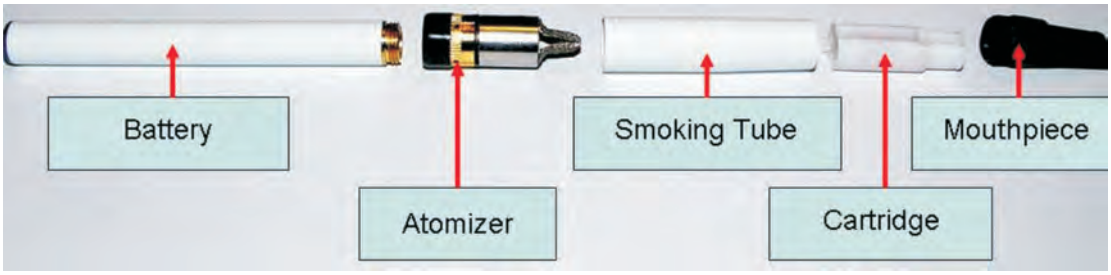
Electronic Nicotine Delivery Systems are marketed under a variety of brand names and descriptors, of which the terms "electronic cigarettes" or "e-cigarettes" are the most common. They are designed to resemble the outward appearance of real smoking products, like cigarettes, cigars, and pipes. Also, they are non-flammable products and there is no danger of burning because it has a light instead of flame. Some products have CE certification and RoHS labelling.

The electronic cigarette was invented by a Chinese medicine practitioner Hon Lik in China in 2003 and introduced to the market the next year. The company he worked for, Golden Dragon Holdings later changed its name to Ruyan (meaning "to resemble smoking") and started selling abroad (3, 4).

In 2006, the electronic cigarette was brought to Europe, and officially launched at the "RUYAN" Overseas Promotion Conference in Austria. After its introduction, this product was adapted to the European market and marketed in UK as the "*electronic cigarette*". According to Electronic Cigarette Association (ECA), the total number of e-cigarette users was estimated to be 300,000 in October 2009, based on survey results (5).

Design and operation

The several existing brands vary but, in general, electronic cigarettes contain: a mouthpiece, a heating element, a rechargeable battery, and various electronic circuits (Picture 1).



Picture 1. Electronic cigarettes component diagram

Battery and electronics

An electronic cigarette battery connected to a USB charger. Most electronic cigarettes employ a lithium-ion rechargeable battery to power the heating element. Battery life varies depending on the battery type and size, frequency of use, and operating environment.

Some electronic cigarettes employ an electronic airflow sensor to automatically activate the heating element upon inhalation, while other models require the user to press a button while inhaling. Various other electronic circuits are usually employed as well, such as a timed cut off switch to prevent overheating and a LED light to signal activation of the device and also to mimic the glow of a cigarette's end tip.

Heating element

The electronic cigarettes closely resemble and purposefully mimic the art of smoking by having users inhale vaporized liquid nicotine created by heat through an electronic ignition system

The heating element serves to vaporize the liquid in the mouthpiece so that it can be inhaled. This component is referred to in the industry as an "atomizer". Atomizers have a finite life of about one month and are one of the recurring expenses associated with electronic cigarettes.

The vapours are expelled via a cartridge that usually contains a concentration of pure nicotine. The cartridge and ignition system are housed in a device created to look exactly like a traditional cigarette, cigar or pipe.

Mouthpiece

The mouthpiece is a small disposable plastic cup-like piece affixed to the end of the tube. Inside the mouthpiece is a smaller plastic cup which holds an absorbent material that is saturated with a flavoured liquid solution that may contain nicotine. This inner cup is made such that air is able to flow around it and through a hole in the end of the outer piece; this is necessary for the device to provide the ability for suction to move the vapour into the user's mouth. The mouthpiece is referred to in the industry as a "cartridge". Nicotine is delivered through replaceable cartridges that are available in various concentrations (e.g. 16 mg, 11 mg, 6 mg and 0 mg). Thus, the device can be adjusted to various levels of nicotine as per the needs of the user. When the liquid in the cartridge has been depleted, it can either be refilled by the user or replaced with another pre-filled cartridge.

Another type of cartridges is those in which nicotinic solution is directly added in drip tips. By removing the absorbent material, one is able to simply remove the plastic mouthpiece and drip several drops of e-liquid directly onto the atomizer bridge. To further ease dripping, some manufacturers have created specialty mouthpieces made of stainless steel or plastic that are intended just for dripping and do not require removal each time you drip.

Nicotine and non-nicotine solution

Nicotine solutions sold separately for use in refillable cartridges are sometimes referred to as "e-liquid" or "e-juice", and commonly contain some amount of flavouring, with hundreds of different flavours available. They consist of nicotine dissolved in propylene glycol (PG) and/or vegetable glycerine (glycerol) or VG (). Solutions are also available in differing nicotine concentrations, to let the user decide the amount of nicotine to be taken in. Concentrations range from Zero Nicotine, low and midrange doses (6–8 mg/ml and 10–14 mg/ml respectively), to high and extra-high doses (16–18 mg/ml and 20–54 mg/ml respectively). Solutions are also available that contain no nicotine at all (6).

Some commercial e-liquids trying to resemble a regular or specific cigarette brands like Marlboro or Camel, and cigarettes with flavour (menthol, vanilla, caramel, chocolate and coffee).

A liquid formulation used in electronic cigarettes was tested by gas chromatography mass spectrometry (GC-MS) to identify the major ingredients in the mixture and their relative concentrations. The composition of some commercially available tobacco liquids are presented in Table 1 (4, 7).

Table 1. Composition of some commercially available tobacco liquids

Substance	Recipe 1	Recipe 2	Recipe 3	Recipe 4	Recipe 5
Propylene glycol	85%	80%	90%	80%	<65%
Nicotine	1.6%	2.4%	3.2%	0.1%	<3%
Glycerol	2%	5%	-	5%	<20%
Tobacco essence	-	4%	4.5%	1%	<5%
Essence	2%	-	1%	1%	<5%
Organic acid	1%	-	-	2%	<1%
Anti-oxidation agent	1%	-	-	-	-
Butyl valerate	-	1%	-	-	-
Isopentyl hexonate	-	1%	-	-	-
Lauryl laurate	-	0.6%	-	-	-
Benzyl benzoate	-	0.4%	-	-	-
Methyl octynicate	-	0–5%	-	-	-
Ethyl heptylate	-	0.2%	-	-	-
Hexyl hexanoate	-	0.3%	-	-	-
Geranyl butyrate	-	2%	-	-	-
Menthol	-	0.5%	-	-	-
Citric acid	-	0.5%	2.5%	-	-
Water	-	-	-	2.9%	<10%
Alcohol	-	-	-	8%	-
2,3,5-Trimethylpyrazine	-	-	-	-	<1%
2,3,5,6- Tetramethylpyrazine	-	-	-	-	<1%
2,3-Dimethylpyrazine	-	-	-	-	<1%
Acetylpyrazine	-	-	-	-	<1%
Terpineol	-	-	-	-	<1%
Ethyl maltol	-	-	-	-	<1%
Guaiacol	-	-	-	-	<1%
Acetylpyridine	-	-	-	-	<1%
Octalactone	-	-	-	-	<1%

Legislative requirements

Many world public health authorities caution that the risks and benefits of Electronic Nicotine Delivery Systems (ENDS) have not been adequately studied, that they may not deliver nicotine as claimed and may deliver more toxicants than claimed.

There is also concern that they may undermine smoking prevention, cessation and clean air laws (8, 9). Some countries have banned ENDS until they are adequately studied (e.g. Brazil, Canada, Uruguay, Singapore, Turkey) (9).

Because of the relative novelty of the technology and the possible relationship to tobacco laws and medical drug policies, electronic cigarette legislation and public health investigations are currently pending in many European countries.

In Denmark, the Danish Medicines Agency classifies electronic cigarettes containing nicotine as medicinal products. Thus, authorization is required from the retailer before the product may be marketed and sold (10).

In Finland, the sale of electronic cigarette is banned and it is considered as a medical device instead of a nicotine therapy product.

In Netherlands, use and sale of electronic cigarettes is allowed, but advertising is forbidden pending European Union legislation (11).

In Norway the Directorate of Health prohibits import and sale of electronic cigarettes, based on this being considered a medical product due to its nicotine content. However, obtaining electronic cigarettes for personal use is permitted from any country within the European Economic Area.

In the United Kingdom, use and sale of electronic cigarettes is currently unrestricted, although the MHRA has proposed bringing all nicotine products except tobacco within the medicines licensing regime (12).

In Italy, use and sales of electronic cigarettes is permitted but all products containing Nicotine must be labelled with hazardous symbols as per Directive 2001/95/CE and 1999/45/CE.

In Greece, the recent law on protection from tobacco and alcohol bans the marketing of e-cigarettes unless a Ministerial decision authorises them under certain conditions.

Regulators of medical and tobacco products should collaborate in assessing the regulatory framework within their own countries to determine the most effective means of regulating the electronic cigarettes to protect public health.

Under the Tobacco Products Directive (2001/37/EC) 'tobacco products' means "products for the purposes of smoking, sniffing, sucking or chewing, inasmuch as they are, even partly, made of tobacco, whether genetically modified or not" (13).

Electronic cigarettes may fall under the Tobacco Products Directive only if they contain tobacco (even a marginal amount is enough). However, these kinds of products have the potential of undermining the smoking cessation policies, since they keep the smoking addiction.

Conclusion: Electronic cigarette not containing tobacco is not a tobacco product under the Tobacco Products Directive (2001/37 EC).

Article 1(2) of Pharmaceutical Products Directive (2001/83/EC) gives the following definition of a medicinal product (14):

a) Any substance or combination of substances presented as having properties for treating or preventing disease in human beings; or

b) Any substance or combination of substances which may be used in or administered to human beings either with a view to restoring, correcting or modifying physiological functions by exerting a pharmacological, immunological or metabolic action, or to making a medical diagnosis.

The electronic cigarette is normally a device whose only purpose is to administer nicotine into the human body through inhalation. The manufacturers often describe their product as an alternative cigarette and marketing may also refer to use as cessation aid.

Nicotine is a substance that has a strong effect on central nervous system and it causes strong physical addiction and withdrawal symptoms.

It is for each national authority to decide, account being taken of all the characteristics of the product, whether it falls within the definition of a medicinal product by its function or presentation.

Conclusion: Whether the electronic cigarette falls under Directive 2001/83/EC on human medicinal products depends on whether it can be characterised as human medicine by presentation (as a remedy to get rid of nicotine addiction) or by function (as it qualifies as "restoring, correcting or modifying physiological functions").

Article 1 (2) a of Medical Devices Directive (93/42/EEC) requires that, in order for a product to be qualified as a medical device, it is to have a medical purpose.

Manufacturer of electronic cigarettes should declare whether their products will be used for medical purposes or not.

Conclusion: Whether the electronic cigarette could be regarded as falling under Directive 93/42/EEC on medical devices depends on the claimed intended use and whether this intended use has a medical purpose or not.

Electronic cigarettes are consumer products and their safety risk assessment (and management) can in theory fall under the General Product Safety Directive 2001/95/EC to the extent they are not covered by other Community legislation setting forth more specific provisions with the same objective (15).

Conclusion: The Directive 2001/95 on general product safety applies in so far as there are no specific provisions with the same objective in other Community law. This Directive enables the withdrawal of the product from the market if the regulator can show that it is dangerous to the health and safety of consumers.

Summary of all requirements of mentioned EC legislatives for electronic cigarettes is presented in Table 2.

Table 2. Requirements of EC legislatives for electronic cigarettes

Directive	Prior authorisation	Safety tests	Advertising restrictions	Other requirements
Tobacco Products (Directive 2001/37)	No	No	Yes	Warning labelling, Ingredients reporting
Pharmaceutical Products (Directive 2001/83)	Yes	Yes	Yes	Effectiveness tests
Medical Devices (Directive 1993/42)	No		No	Conformity assessement, CE marking
General Product Safety (Directive 2001/95)	No	Yes	No	

The health effects of using electronic cigarettes

Electronic cigarettes are probably less harmful than cigarette smoking, but they can't be recommending as a permanent replacement or alternative to smoking.

However, to our knowledge, there is no published research data on the safety of electronic cigarettes and the health effects of using electronic cigarettes are currently unknown (16, 17).

It has published two reviewed studies of electronic cigarettes nicotine delivery in humans and provides preliminary data on nicotine absorption and craving relief by several products (18, 19). Two limitations of the studies are worthy of special note. First, there are hundreds of brands and models of electronic cigarettes, with diverse claims implying unique modes of operation, contents and widely varying nicotine, suggesting potential differences from those tested to date. Second, these short term laboratory studies offer little basis for assessing the safety of electronic cigarettes as they would actually be used, which could involve hundreds of puffs per day for many years with puffing parameters varying widely.

To date, there is no research to support the manufacturers' claims that electronic cigarettes help smokers quit, the World Health Organization proclaimed that it does not consider the electronic cigarette to be a legitimate smoking cessation aid (16).

If they claimed that they help smokers quit, manufacturers would be subject to the legislation and regulation that applies to Nicotine replacement therapy NRT products. In order to avoid this, some electronic cigarettes are now marketed for enjoyment, or as devices that enable smokers to "smoke" everywhere, including smoke free places. Nonetheless, some distributors present their products as an alternative to tobacco smoking, more or less implicitly suggesting that e-cigarettes can be used to aid smoking cessation.

Analyses conducted by the United States Food and Drug Administration (FDA) showed that electronic cigarettes contained detectable levels of known carcinogens and other toxic chemicals. The FDA also found that cartridges labelled as containing no nicotine did in fact contain low levels of nicotine (20).

The judicial ruling preventing the FDA from banning electronic cigarettes imports will complicate its efforts to regulate the products; however, the FDA has several regulatory avenues, in addition to its new authority to regulate tobacco products (21).

DISCUSSION

The presence of e-cigarettes on the Internet, including in Web searches, virtual user communities, and online stores where people sell e-cigarettes on commission, is increasing rapidly.

The legal status of the electronic cigarette is unclear in many countries, and its regulation is complex; it is neither classed as a tobacco product, nor food, nor is it registered as a medicine.

From a public health perspective, however, the question is whether - at a population level - the potential benefits of the electronic cigarette outweigh its drawbacks. There is a difficult balance between the need to protect consumers and the possibility now being offered to smokers to use a new, acceptable and potentially effective device to stop smoking. However, the electronic cigarette is not defined as a tobacco product by any law on tobacco and tobacco products.

Now it is still early to make judgments about the presence of electronic cigarettes in the Balkan region, because the electronic cigarettes are mainly bought and sold online and by retailers.

Electronic cigarettes are mainly marketed to current smokers either for enjoyment or for use in smoke-free places and to people who use them to help quit smoking. There are no official data relating to the consumers opinion for this product.

For these reasons, for now it is not possible to do an official study on the use of electronic cigarettes.

From the sites relating to the electronic cigarette can be concluded that most people who buy this product are current and former smokers. They are devoting more positive than negative effects from this product like effects on the respiratory system (breathing better, coughing less), which were probably associated with stopping smoking. The fact that electronic cigarette can be used indoors where traditional smoking is prohibited and do not produce any unpleasant odours or environmental tobacco smoke was also appreciated.

One may hypothesize that the positive effects of electronic cigarettes may include smoking cessation, smoking reduction or relapse prevention. The electronic cigarettes could also be used as an aid during a preparation period before cessation, similar to the pre-cessation treatment or "cut down to quit" approach that is an approved indication for Nicotine replacement therapy (NRT).

A large proportion of buyers are people who use them to help quit smoking. But, they may also enable smokers to continue to 'smoke' in smoke-free environments, thus delaying or preventing cessation in people who might otherwise quit. Finally, because of its rapid nicotine delivery, they also have the potential to be addictive.

Many users were concerned about the safety and toxicity of electronic cigarettes, and questioned why no study has yet investigated these aspects.

The health effects of using electronic cigarettes are currently unknown. Several studies regarding the long-term health effects of inhaling nicotine vapour are currently in progress.

Electronic cigarettes may be dangerous because of the frequent and long term lung inhalation of nicotine, propylene glycol and other toxic components. Some manufacturers claim that the content of nicotine is many times lower than that of a classic cigarette.

On the other hand, one cartridge may include different intensities of nicotine content, for example 0 mg, 6 mg, 11 mg or 16 mg of nicotine according to user's choice. One cartridge is said to correspond to 15-20 cigarettes.

This means that the electronic cigarette - with the most intense cartridge - gives about the same yield of nicotine as one cigarette (1 mg). Therefore, the statement that the product contains "many times lower," nicotine from cigarettes mislead consumers.

Furthermore, some of electronic cigarettes are not manufactured according to the high standards imposed on pharmaceutical companies and inhaled vapour may contain impurities that may be dangerous to consumers. In particular, the origin of the nicotine itself is uncertain, as pesticide-grade nicotine rather than pharmacological grade nicotine may be used in electronic cigarettes.

Finally, the fruit and chocolate flavours may appeal to young people, and this raises the concern that electronic cigarettes may facilitate initiation of nicotine dependence in young never-smokers.

Laws banning smoking, which are in effect starting this year in Macedonia and Serbia prohibits the use of tobacco products.

In Bosnia and Herzegovina, for ten years, there is the Law on restricted use of tobacco products, which also does not allow smoking in public places and advertising of tobacco products, but it is not implemented in practice.

More than 170 countries adopted in November 2010 at the conference of the World Health Organization (WHO) in Uruguay measures to strengthen the fight against tobacco, including those related to adding flavors in cigarettes.

The Parties to the Framework Convention on Tobacco Control, which also include Macedonia, Serbia and Bosnia and Herzegovina, have reached an agreement on the introduction of assistance programs for smoking cessation in national health systems and support campaigns to raise awareness of the population, according to a WHO statement.

Participants are not taken any decision regarding the control of "electronic cigarettes" and similar products containing tobacco. On this subject will be discussed at the next meeting 2012th in South Korea.

CONCLUSIONS

The electronic cigarettes are new, untested and unregulated high-tech nicotine-smoking devices, which have recently been made available to all consumers. Electronic cigarettes are used mainly on places where traditional smoking is prohibited. These products are buying by people who use them to help quit smoking and may be useful for this purpose. Almost all users were concerned about the potential toxicity of these devices. Very few studies have investigated efficacy and toxicity of electronic cigarettes and research is now urgently required.

When determining if a product is safe, the Regulations require further consideration of:

1. The characteristics of the product: the electronic cigarettes are required to be composed well, easy to use and contain instructions for assembly and usage. Notably, the refill cartridges need to be in child resistant safety packaging.

2. The effect of the product: there is presently no scientific evidence to confirm the product's safety and efficacy. It is not known what effects the nicotine has with the other chemicals contained in the cartridge refills which cause the vapour to excrete from the product. This could be potentially dangerous to users.

3. The presentation of the product: the product needs to be adequately labelled in terms of the manufacturers (and importers) details, its contents etc. Products containing high levels of nicotine solution are legally required to display the 'Highly Toxic' warning.

4. What will need to be regulated by law is a ban on selling electronic cigarettes to persons less than 18 years, given that this product contains nicotine, which creates a dependency on e-smoking.

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TOBACCO INFLUENCE ON REDUCTION OF POVERTY AMONG HOUSEHOLD FARMING

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ABSTRACT

In this paper the authors will present a few definitions about poverty, followed by a comparative analysis of resources available for living and personal consumption in the Republic of Macedonia and in the Republic of Serbia. The results had shown that Macedonian citizens spent 14.9% more money than they had available. The situation in Republic of Serbia was quite reversed, because they had 12.1% more than actual spending. In both countries, over 41% of overall consumption went to food and non-alcoholic beverages.

Republic of Macedonia has 3.4 times smaller surface area (when observing the whole territory) than the Republic of Serbia, the production of tobacco used by 2.3 times more arable land.. The Virginian tobacco is the reason why average tobacco production in the Republic of Serbia was 200 kg/ha higher than in the Republic of Macedonia.

In both countries gross margin is grater than all other cultures, even in breeding dairy cows. This implies that in the future tobacco area should be enlarged, which in turn would be useful in poverty reduction or to increase the family budget from agricultural activities.

Key words: tobacco, gross margin, poverty.

ВЛИЈАНИЕ НА ТУТУНОТ ВРЗ НАМАЛУВАЊЕТО НА СИРОМАШТВОТО КАЈ СЕМЕЈНИТЕ СТОПАНСТВА

Во трудов, најнапред се даваат неколку дефиниции на поимот сиромаштво, а потоа се прави компаративна анализа на расположливите средства за живот и личната потрошувачка во Република Македонија и во Република Србија. При тоа е констатирано дека македонските граѓани трошат 14.9% повеќе отколку што имаат на располагање. Состојбата во РепубликаСрбија е обратна, тие имаат 12.1% повеќе отколку што вистински трошат. И во двете земји над 41% од вкупната потрошувачка се троши за храна и безалкохолни пијалоци.

Република Македонија иако е помала (според вкупната територија) за 3.4 пати од Република Србија, таа за производство на тутун користи за 2.3 пати повеќе обработлива површина. Просечните приноси во Република Србија се повисоки за по 200 kg/ha во однос на

приносите во Република Македнија, поради фактот дека таму се произведуваат и вирџиниски тутуни.

И во двете земји бруто маржата е поголема во споредба со сите други култури, па дури при одгледувањето на млечни крави. Врз основа на тоа се констатира дека во иднина може да се зголемува површината со тутун, кое што, пак ќе придонесе за намалувањето на сиромаштијата, односно за зголемување на семејниот буџет од земјоделска дејност.

Клучни зборови: тутун, бруто маржа, сиромаштво.

INTRODUCTION

Poverty is most frequently defined as a lack of material goods needed for the normal satisfaction of fundamental needs. According to Organization of United Nations, poverty is defined as lack of comfort and dignity at a certain stage of life in humans. Along with insufficient income for normal life, i.e. for satisfaction of basic human needs, poverty means lack of employment opportunities, inadequate housing conditions, lack of social and health care as well as lack of funds for education and utility services. Furthermore, poverty should consider situations when people do not have a chance to use their right to live in a healthy environment and do not have access to natural resources. First of all, this includes clean drinking water and clean air to breathe. According to Social Security Glossary, CARDS, Skopje, 2006, poverty is defined as the level of income below which life of the family or individual is compromised. Absolutely poor are unable to meet basic human needs such as food, clothing, housing, etc.

Along with changes in social norms, the measurement of the level of poverty has been changed. Therefore, poverty was sub-divided into destitution or absolute poverty, relative poverty, pauperism (impoverishment of workers) and the new poverty.

Living standard is constantly changing, unfortunately in decline. Social and other issues concerning human development in Macedonia for the last two decades, derive not only from the transition of the economic and political system (although these are factors causing strong negative influence), but also from inherited level of economic development from a preceding period. Society is characterized by a process of social restructuring, i.e. the formation of new social groups. On one side are those who enrich themselves very fast, and on the other side are those poor. On the right side is the small number – the rich and the left are numerous – the poor. Every nation has an assignment to create conditions for reducing absolute poverty. In this category are adults whose daily food consumption has nutritive values below 9,579.4 kJ (2,288 kcal). This nutritive minimum is prescribed by FAO (Food and Agriculture Organization). Member States of EU, measure the relative poverty. Relative poverty in the Republic of Macedonia is defined as 70%, and in the Republic of Serbia as 60%, of median equivalent expenditures. However, considering age differences in population, in practice, equivalence scale of OECD (recommended by Eurostat) is applied. Accordingly, the head of household bears the weight 1, each grown up household member (14+) bears the weight 0.7, and children (below 14 years of age) bear the weight 0.5. E.g. three-member household with one child (below 14 years of age) would bear the weight 2.2. Based on the quantities and prices of products (which meets the nutritional minimum is) poverty line value is expressed.

Jakimovski (2003) states that poverty in rural areas in Republic of Macedonia increased from 23.33% in 1997 to 17.19% of population in 2000.

In accordance with figures of State Statistical Office (News release, No: 4.1.11.48, Year XLIX), in Republic of Macedonia in 2009, 31.1% of people had lived under the absolute level of poverty. When analyzed by profiles, most vulnerable group of households was one where the head of the household had no education, or had finished only elementary school. Namely, 54.2% of impoverished had lived in such households. Then, 42.8% of those in need had lived in households with 6 or more members. The rate of relative poverty among the unemployed was 40.5%, i.e. 42.7% of all impoverished were

unemployed. In rural areas the relative level of poverty was 48%, which is 25.7 index points higher than in 2003. In the Republic of Macedonia 42.2% of the population lived in rural areas, and in the Republic of Serbia about 45%. The struggle to reduce poverty Popovic Vesna (2008) sees, amongst others, in the active role of the state budget, especially the Ministry of Agriculture, Water Management and Forestry of Republic of Serbia, whose engagement can be seen in programming and funding measures to support sustainable agriculture and rural development. In Serbia, (according to the Statistical Office of the Republic of Serbia, Belgrade, 2011), below this level were 6.9% of the total population. As a result of strategy for reducing poverty in the Republic of Serbia, the poverty rate in 2002 amounted to 14.2% in rural areas and in urban areas 7.8%. In Bulgaria, in 2009 (according to data from the National Statistical Institute), 21.8% of the population had lived under the absolute poverty line and in Croatia 18.0% (State Statistical Office of Republic of Croatia). The Statistical Office of Montenegro stated that in 2009 general poverty rate was 6.8%, while in rural areas 14.8% of population were those in need. The absolute poverty line was 169.13 EUR/equivalent adult.

Jelic, et all (2011) concluded that poverty is more expressed in family agriculture households in rural areas and concentrated in traditional undeveloped area in southern and southeastern part of the Republic of Serbia.

According to the survey of income and living conditions (SILC), percentage of the population who lived in poverty risk in EU countries, was between 10% and 26% in 2008. The lowest poverty rate was in the Netherlands and the Czech Republic and the largest in Latvia. In Bulgaria, there were 21% of those at risk. (Chart 1).

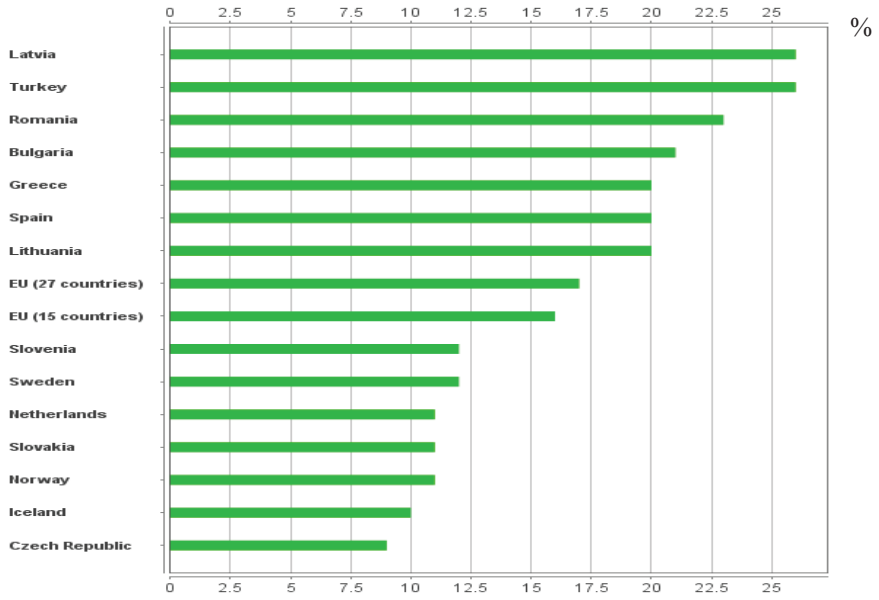


Chart 1 - % of poverty in some European countries and Turkey

Drummond E. H. and Goodwin W. H. (2004) in their book Agricultural Economics 2/e, pg. 422, say: most of the statistics showing the difference between impoverished and developing countries are not as obvious as the percentage of employees in agriculture is. By that criterion, the Republic of Macedonia had 30.18% (in 2007) and the Republic of Serbia 35.17% (in 2002) of poor people. A well known Nobel Prize winner in Economics in 1979, Theodore W. Schultz (1978) began his acceptance speech observing: "Most of the people in the world are poor, so if we knew the economics of being poor, we would know much of the economics that really matters. Most of the world's poor people earn their living from agriculture, so if we knew the economics of agriculture, we would know much of the economics of being poor " [1].

The goal of this research, based on statistical data, is to compare availability and spending of resources throughout households in the Republic of Macedonia and Republic of Serbia. Then, based on personal research (questionnaire) of income in agricultural households, as well as revenues and expenses in the tobacco industry, we will analyze the influence of revenue from tobacco on poverty across rural areas.

DATA AND METHODS

The amount of available resources as well as personal consumption is determined based on statistical data for annual available and used funds in households. Based on average number of persons in the household, the amount of assets is reduced to monthly per capita.

Revenues per crops and livestock species are determined based on a direct inquiry of the head of the household. Therefore authors interviewed 50 households in the Pelagonia region in the Republic of Macedonia and 15 households (five in Nis, five in Jablanica and five in Pcinja region) in southern and eastern Serbia, which in the last three years (2008-2010) had produced aromatic tobacco, amongst others. Having determined the percentage share of revenue from tobacco in total household income, we selected nine households from the Republic of Macedonia and four from the Republic of Serbia, where tobacco had over 50% of the total annual revenue.

The gross margin was established based on the analytical calculation of validity of production and variable expenses of 13 selected economies. Due to valid comparison of financial indicators, money values of domicile currencies are transformed to EUR. The relationship between domicile currency and currency in EU, in 2009 was: 61.27 MKD/EUR and 93.93 RSD/EUR.

The transformation of the household's in full working capacity was conducted with coefficients [8]: 1.0 for men aged 18-65, 0.8 for women aged 18-65 and boys aged 14-18; 0.6 for men and women over 65 years of age and girls aged 14-18; 0.1 for children aged 7-14.

RESULTS AND DISCUSSION
1. AVAILABLE RESOURCES OF HOUSEHOLDS

Available resources include all money income, with consumer credits and investment loan values included. While observing agricultural households, the monetary value of natural consuming (self-production) is included. Employees in these households often receive products (instead of money) from their employers as part of their monthly pay. These revenues are calculated into the total available funds.

Structural analysis of the total amount of available funds (in 2009) had shown that people in Macedonia had more money income than those in Serbia (95.04% against 94.6%), in comparison to the total funds available. Nevertheless, the fact is that people in Serbia had over 52% higher total funds than those in Macedonia (Table 1). Bulgarian citizens had 164.8 EUR at disposal, and Croats 362.3 EUR, or 3.3 times more than Macedonians. The income from regular working relationship had had the highest share of the total funds available (57.12% in Macedonia, i.e. 45.81% in Serbia). Compared to Macedonia, every member in Serbian households had 22% more income from the monthly pay. Moreover, pensions were higher (more than 169%) in the Republic of Serbia than in the Republic of Macedonia. Republic of Serbia assigned more funds for social insurance, also more than the Republic of Macedonia. Macedonian citizens, unlike the Serbian, earned slightly more money from engagement elsewhere after working hours. On the other side, Serbian citizens had had four times more funds obtained as monetary gifts and winnings from games of chance. They also had more money in savings deposits in banks and more cash "under the mattress" (hidden somewhere).

Table 1 – Average monthly available funds per member of households in 2009

Indicators	Republic of Macedonia		Republic of Serbia	
	EUR	%	EUR	%
1. Regular salaries and wages	63.4	57.12	77.4	45.81
2. Other income comprises	9.6	8.65	5.3	3.16
3. Pensions (old-age, family, disablement and other)	19.5	17.57	52.5	30.96
4. Other social insurance related receipts include	1.7	1.53	3.0	1.77
5. External receipts include	3.0	2.70	2.5	1.48
6. Income from agriculture, hunting and fishing includes	5.1	4.59	5.5	3.25
7. Real estate related income	0.4	0.36	0.9	0.51
8. Donations and awards	0.5	0.45	2.2	1.28
9. Customer and investment credits	2.0	1.80	2.3	1.34
10. Other receipts	0.3	0.27	8.4	4.97
Total income of household in money	**105.5**	**95.04**	**160.0**	**94.67**
Household receipts in kind	**5.5**	**4.96**	**9.0**	**5.3**
Available budget - total	**111.0**	**100.00**	**169.0**	**100.00**

Sources: Statistical Office of the Republic of Macedonia – Skopje;
Statistical Office of the Republic of Serbia – Belgrade.

Average nett salary (in 2009) per worker, in Republic of Macedonia amounted to 325.7 EUR, and in the Republic of Serbia 3.7% more. There was a higher difference between employees in agriculture. Namely, Serbian farmers earned 23.5% more than those in Macedonia (271.4 EUR against 219.7 EUR). This finding indicated that employees in the Republic of Serbia had the possibility to spend more than Macedonians. Croatian citizens, compared with Macedonian, had 2.2 times higher netto salary, and compared with Bulgarian citizens, almost 6.5 times higher. Same relations could be found when observing netto salaries in agriculture.

2. HOUSEHOLD CONSUMPTION

Poverty can also be analyzed on the basis of household consumption, because it represents an appropriate measure of social well-being of the population, due to its stability, comprehensiveness and consistency over a rather long period, unlike incomes of households who are submissive to short-term fluctuations. The means for personal consumption are quantified in groups, in accordance with the COICOP classification (Classification of Individual Consumption by Purpose).

It may seem that there is parallelism between available resources and personal consumption. Citizens of the Republic of Macedonia had spent 127.5 EUR per month, or 15.5% less than Serbian citizens (Table 2). Bulgarian citizens, on the other hand, had spent 5% less than Macedonians. Citizens of Republic of Croatia had spent the most of all – 285.4 EUR per capita.

In all of countries above mentioned, expenses for food and non-alcoholic drinks dominated. When observing an absolute number, Croatia had the highest expenses (92.8 EUR per capita), and Bulgaria the lowest (51.8 EUR per capita). Nevertheless, when we observe a relative number, Republic of Macedonia had the highest (43.52%), and Republic of Croatia the lowest expenses (32.51%). Second largest, as absolutely and relatively, are housing expenses. The Macedonians had the lowest (16.7 EUR per capita) and Croats the highest expenses (41.6 EUR per capita). Within the structure of expenses, third place in Serbia, Bulgaria and Croatia went to transportation costs, while in Macedonia, importance of clothing and footwear had overtaken this position. Croatian citizens had paid 2.3 times more than Serbian, 3.7 times more than Bulgarian, and by 4.3 times more than Macedonian citizens for transportation costs.

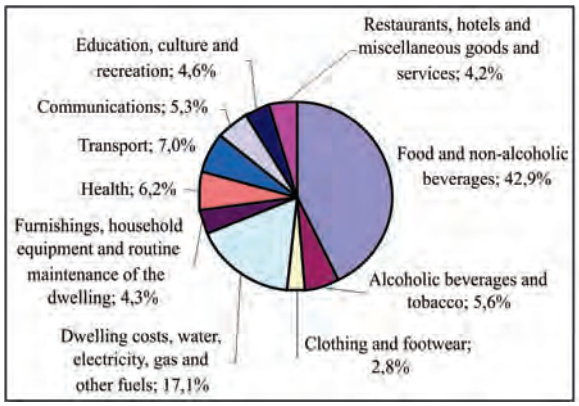
Table 2 – Average monthly personal consumption per member of household in 2009

Indicators	Republic of Macedonia		Republic of Serbia	
	EUR	%	EUR	%
1. Food and non-alcoholic beverages	55.5	43.52	62.3	41.31
2. Alcoholic beverages and tobacco	5.6	4.39	6.7	4.44
3. Clothing and footwear	9.3	7.29	7.7	5.11
4. Dwelling costs, water, electricity, gas and other fuels	16.7	13.10	24.2	16.05
5. Furnishings, household equipment and routine maintenance of the dwelling	6.5	5.10	6.6	4.38
6. Health	4.0	3.14	5.6	3.71
7. Transport	7.3	5.73	13.6	9.02
8. Communications	5.4	4.24	5.5	3.63
9. Recreation and culture	4.0	3.14	7.5	4.97
10. Education	1.1	0.86	1.5	1.01
11. Restaurants and hotels	6.2	4.86	3.0	1.99
12. Miscellaneous goods and services	5.9	4.63	6.6	4.38
Total	**127.5**	**100,00**	**150.8**	**100.00**

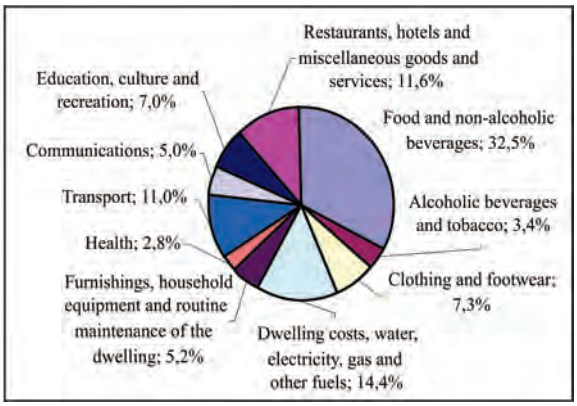
Sources: Statistical Office of the Republic of Macedonia – Skopje;
Statistical Office of the Republic of Serbia – Belgrade.

Along with personal consumption, households use their funds for other purposes, like: membership fees, taxes, customs duties, servicing of borrowing and lending operations, savings, housing costs, house or other property, gifts, contributions for humanitarian purposes, etc. The funds for these purposes, in Republic of Macedonia occupy 6.2%, and in the Republic of Bulgaria 14.3% of all used assets. There wasn´t any relevant data in this category for Republic of Serbia and Republic of Croatia.

However, Macedonian citizens in 2009 spent 16.5 EUR per capita per month more than they had had available. That means that in the future they should try to earn more money outside their working place than in 2009 (9.6 EUR per capita), or they should search for other sources of income, preferably in cash. Citizens of Republic of Serbia had 18.2 EUR per capita more in their funds than they needed. Croatian citizens had 26.9%, and Bulgarians 36.5% more money than required.



a) Republic of Bulgaria



b) Republic of Croatia

Sources: Statistical Office of the Republic of Bulgaria - Sofia;
Statistical Office of the Republic of Croatia - Zagreb.

Chart 2 – The structure of personal consumption

When analyzed by social groups, in Macedonia in 2009, agricultural households had shown themselves more modest than the others, in terms of minimum required funds for a normal life. For example, data from the State Statistical Office (News release, No: 4.1.11.48, Year XLIX) had shown that 33.2% of all agricultural households reviewed, thought they needed 375.4-789.6 EUR, while 40.4% of all other households (non-agricultural and mixed households) thought they would need more than 789.6 EUR.

3. TOBACCO AREAS AND TOBACCO PRODUCTION

Republic of Serbia has 3.4 time larger surface area (including whole territory) than Republic of Macedonia. There are 7,320,807 people living in Serbia, or 3.6 times more than in Macedonia. It also has 3.9% higher population density (82.85 people/km^{2,} against 79.76 people/km^{2} in Macedonia). Republic of Serbia furthermore has a larger area capacity (4.3 times larger agricultural land and 6.9 times more arable land and gardens). Industrial cultures in Republic of Macedonia occupy 26,500 ha, or over 15 times less than in the Republic of Serbia.

Tobacco production in the Republic of Macedonia took over 17,123 ha – 20,538 ha, or approximately 70% of the area under industrial crops. Republic of Macedonia, compared with the Republic of Serbia has 2.3 times more area with tobacco.

Table 3 – Dynamics of usage of cultivated areas in Republic of Macedonia and Republic of Serbia

Year	Agricultural area ('000 ha)		Arable land and gardens ('000 ha)		Industrial crops ('000 ha)		Tobacco (ha)	
	RM[1)]	RS[2)]	RM[1)]	RS[2)]	RM[1)]	RS[2)]	RM[1)]	RS[2)]
2001	1244	5112	612	3355	33	323	20074	11707
2002	1316	5107	577	3351	31	328	20538	11080
2003	1303	5115	569	3345	28	420	18008	8565
2004	1265	5113	461	3344	27	389	17716	7855
2005	1229	5074	448	3330	27	414	18488	7219
2006	1225	5066	439	3318	23	436	17438	6821
2007	1077	5053	431	3299	22	413	17132	8043
2008	1064	5055	424	3302	23	416	17064	7129
2009	1014	5058	420	3301	24	403	17800	6103
2010	1121	5051	415	3295	27	439	20300	5828
Average	1185.8	5080.4	479.6	3324	26.5	398.1	18455.8	8035

RM[1)] Republic of Macedonia; RS[2)] Republic of Serbia
Sources: Statistical Office of the Republic of Macedonia – Skopie;
Statistical Office of the Republic of Serbia – Belgrade.

This ratio of surface with tobacco crops in real practice is not reflected proportionally. Namely, quantity of tobacco in the Republic of Macedonia is only 1.9 times more than in Republic of Serbia. This may be due to 13.7% lower average yields in Republic of Macedonia in relation with ones in Republic of Serbia (Table 4). Average yields were lower, due to the fact that the Republic of Serbia (especially in Vojvodina) besides aromatic tobacco grew Virginian tobacco, and in the Republic of Macedonia there was only aromatic tobacco, which caused incomes to be rather low.

Table 4 – Dynamics of tobacco production and incomes from tobacco in Republic of Macedonia and Republic of Serbia

Year	Production (t)		Yield (t/ha)	
	RM[1)]	RS[2)]	RM[1)]	RS[2)]
2001	23217	16586	1,1	1,4
2002	22911	17993	1,1	1,6
2003	23986	11500	1,3	1,3
2004	21630	12474	1,2	1,6
2005	27691	11336	1,5	1,6
2006	25036	10808	1,4	1,6
2007	22056	11136	1,3	1,4
2008	17087	10839	1,0	1,5
2009	24122	9847	1,4	1,6
2010	30280	10440	1,5	1,8
Average	23801.6	12295.9	1.3	1.5

RM[1)] Republic of Macedonia; RS[2)] Republic of Serbia
Sources: Statistical Office of the Republic of Macedonia – Skopie;

The analysis of data by region had showed that there was relatively large differentiation. The presence of tobacco in the range of production was dependent on natural conditions, but also by tradition, average yields of the variety and type, and the degree of intensity or the level of investment of effort and resources. The largest area with tobacco in the Republic of Macedonia (51.6% of overall territory) is in Pelagonia region. The yields range between 1.0 and 1.7 t/ha (Table 5).

Table 5 – Surface and yields per region in 2009

Republic of Macedonia			Republic of Serbia		
Region	Area (ha)	Yield (t/ha)	Region	Area (ha)	Yield (t/ha)
Skopje	268	1.3	Belgrade	40	1.5
Northeast	51	1.3	Vojvodina	3613	1.6
East	580	1.4	Sumadija and West Serbia	1114	1.5
Southeast	6349	1.4	South and East Serbia	1336	1.7
Vardar	1255	1.7	/	/	/
Pelagonia	9190	1.1	/	/	/
Polog	2	1.0	/	/	/
Southwest	105	1.2	/	/	/
Total / Average	17800	1.4	Total / Average	6103	1.6

Sources: Statistical Office of the Republic of Macedonia – Skopie;
Statistical Office of the Republic of Serbia – Belgrade.

In the Republic of Serbia 59.2% of total tobacco area is located in region of Vojvodina. There the Virginian type of tobacco is grown and yields range between minimum and maximum. We can argue that in South and East Serbia only aromatic tobacco is produced. This region occupies 21.9% of the total area in the country. In Nis, Jablanica and Pcinja region (where we performed our research) tobacco was grown to a total of 1,264 ha, which is 94.6% of the total area in the region. Interestingly, there have been maximum yields (1,600-1,930 kg/ha) in this regions, probably due to higher investments in production process.

4. FAMILY BUDGET IN RURAL HOUSEHOLDS

Families from rural areas were generating incomes mainly from their agricultural activity. There are those who have incomes from other sources, such as pension, social incomes etc. According to the register of agriculture conducted in 2007 in the Republic of Macedonia, the number of persons whose main activity is agriculture was 167,992, and in the Republic of Serbia, also according to register of agriculture in 2002, that number was 454,732, or 2.7 times more.

Depending on the type of the economy, the range varied between households. Some dealt exclusively with vegetable production, and others had livestock production along with plants, making them mixed economies.

Economies that we investigated were mixed type. The volume of used arable land (total and components) reflects the general situation in the country. The number of working members of the family economies is slightly above the overall average number of household members in both countries. This is due to the fact that usually there are more rural households than the urban ones.

Table 6 – Gross margin in rural households (average)

Indicators	Republic of Macedonia				Republic of Serbia			
Average number of working members in household				3.6	Average number of working members in household			3.3
Arable land (ha) - average				2.6	Arable land (ha) - average			2.4
	Area (ha / No head)	Total income (EUR/ha/ head)	Total costs (EUR/ha/ head)	Gross margin (EUR/ha/ head)	Area (ha / No head)	Total income (EUR/ha/ head)	Total costs (EUR/ha/ head)	Gross margin (EUR/ha/ head)
Wheat	/	/	/	/	1.4	884,2	455,0	329,2
Barley	1.0	1247.8	518.4	729.4	/	/	/	/
Corn	/	/	/	/	1.2	1000,9	712,0	288,9
Alfalfa	0.5	1983.0	838.7	1144.3	0.5	1240,4	507,8	732,6
Pepper	0.7	10918.8	8186.7	2732.1	/	/	/	/
Tobacco	0.4	8165.0	3404.5	4760.5	0.2	4270,4	3426,6	843,8
Cows	2	1907.1	1410.6	496.5	5	2229,2	1896,0	333,2

Gross margin, the difference between total revenue and total variable costs is different per crops (products) and livestock species. There is visible difference between gross margin by country (Table 6). The share of gross margin per crops and countries is also different. For example, with Macedonian farmers alfalfa reached 57.7% and with Serbs 59.1% of gross margin, cow breeding 26.0% against 14.9%. Macedonian tobacco producers brought about the highest gross margin (4,760.5 EUR/ha or 58.3% of the value of production) compared to other crops. Serbian farmers in tobacco production also realize the highest absolute value of the gross margin per unit of capacity (843.8 EUR/ha). When observing relative indicator, alfalfa accomplished better results than tobacco.

Survey results show that tobacco has and will have significant role in poverty reduction among rural households, both in Republic of Macedonia and the Republic of Serbia.

5. CONCLUSION

The survey showed that poverty is generally increasing, besides many efforts made by the authorities in the countries hoping to achieve conditions for its reduction. Poverty is asymmetrically distributed. It is more emphasized in rural areas, compared with urban ones, and lowest in capital cities. The situation is even more concerning knowing that in rural areas almost all households are agricultural.

Agricultural rural households cultivate restricted area. The average size of arable land in researched economies was: in the Republic of Macedonia 2.6 ha, and in the Republic of Serbia 2.4 ha. But, besides that, their effort gives relatively high income. The earnings, expressed through gross margin, in Macedonian households reach 320.9 EUR and in Serbian households 314.8 EUR per capita. Considering fact that tobacco gives the highest gross margin, it was, and still can be, significant part in poverty reduction in rural households.

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DZEBEL BASMA - A NEW GENERATION OF ORIENTAL TOBACCO ECOTYPE

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ABSTRACT

In compliance with tobacco trading and the requirements of cigarette companies, it is necessary to restore the good trade image and commercial properties of the smoking qualities of the ecotype Dzebel basma. The variety structure of Dzebel basma has to be renovated with new genotypes of high quality, flavour and aroma, typical for traditional basma.

In accordance to that, three varieties of oriental tobacco Dzebel basma – Dzebel basma 1, Dzebel basma 2, Basma 13.were created and acknowledged by IASAS and Patent office of Bulgaria (2008-2010).

The genotypes presented here are genuine basma tobaccos. Their biological, morphological, economic and technological characteristics combine the qualities of the old Dzebel tobacco with the new market requirements.

Key words: dzebel basma 1, dzebel basma 2, basma 13, oriental tobacco

ЕКОТИПОТ ЏЕБЕЛ БАСМА - НОВА ГЕНЕРАЦИЈА ОРИЕНТАЛСКИ ТУТУН

Во склоп на трговијата со тутун и потребите на цигарните компании, потребно е да се врати добрата трговска слика и комерцијалните карактеристики на квалитетот на тутунот за пушење од екотипот "Џебел басма". Различната структура на Џебел басма треба да биде надоградена со нови генотипови тутун со висок квалитет, на вкус и арома, типична за класичната басма.

Трите сорти на ориентalски тутун Џебел басма (Џебел басма 1, Џебел басма 2, и Џебел басма 13) се создадени и признати од IASAS и Patent Office of Bulgaria (2008-2010).

Новите генотипови претставуваат вистински басми. Во нивните биолошки, морфолошки, технолошки и економски својства се комбинирани својствата од стариот тутун џебел со новите трговски барања.

Клучни зборови: џебел басма 1, џебел басма 2, басма 13, ориентalски тутун

INTRODUCTION

The tobacco region of Dzebel covers an area differentiated in the Eastern, Middle and partly Western Rhodopes.

The Dzebel basma tobacco ecotypes produced there are traditional basma. In the past, a typical representative of Dzebel varieties has been the local ('has') basma, widely distributed in the whole region and - in small quantities – even in some 'Bashibaly' sub-regions. This is the real native Xanti's basma (Baylov D., 1939, A. Timov etc., 1974).

The Dzebel tobaccos are with the smallest possible leaves compared with the other Oriental tobaccos. The medium length of the leaf is 6-14 cm, the shape of the leaf is wide elliptical, oval, with rounded top and short neck. The dried leaves are rich in content, without any thickness shown, but with a tender structure and thin main vein, elasticity, expressive gloss and 'well backed'. The colour is yellow-orange, orange, orange-red for the high-grade fractions. The nicotine content is 0.8 – 1.5%, soluble carbohydrates are 12 – 16%. The leaves have a high cigarettes output, excellent burning capacity and very fine and pleasant aroma. By the natural fermentation during the summer, the place of preservation of the Dzebel tobaccos is easily discovered thanks to its aroma.

In smoking, the Dzebel tobaccos are distinctive by their low physiological strength, gentle taste without any faults, and by teh fine and pleasant aroma.

The purpose of the present study is to create new Dzebel basma Oriental tobacco varieties, combing the classical concepts for this ecotype with the contemporary quality and taste requirements of the market – high nicotine, balanced sugars, taste and flavour.

AGRO-BIOLOGICAL CHARACTERISTICS OF THE VARIETY
Dzebel Basma 1

Certificate №10795/30.09.2008 of Bulgarian Patent office

1. **History of the variety** – Individual breeding of local populations – village of Vodenicharsko, municipality of Dzebel

2. **Botanical affiliation** – Nicotiana tabacum, ecotype Dzebel basma.

3. **Shape of the plant** – cone-shaped. Height: 85-100 cm, depending on agrotechnics – up to 105 cm.

4. **Leaves** – counting: 28 – 33 pieces. Position: regular. Angle of aberration: 40 – 45^0. Size: 15.3/8.7 cm (length/width) at 14^{th} leaf. Shape of the leaf: elliptical, with an average mucronated top. Lamina: curly and waved, hairy and strongly gummy. Colour: green. Nervation: regular. Neck: above 3.5 cm. Ears: 5.8 – 4.1 cm. Drawers: asymmetric, over 4 cm long

5. **Raceme** – ball-shaped, compact, with size 8.6/7.7 (length/width), with 5-6 lateral nodes and 25-30 blossoms. Colour of the petals: pale rose

6. **Biological characteristics** – the length of the vegetation period (from the plant-seedlings until the mass flowering) is 53 – 56 days; from the plant-seedlings until the opening of the first blossoms – 50 days; until the ripe of the first leaves: 42 – 44 days. The leaves ripe consecutively. The leaves get overripe if the harvest is late. It dries fast. The quality gets worse when lots of nitrogen fertilizers are used.

7. **Quality** – the dried tobacco leaves have deep orange to orange-red colour with gloss, medium thickness, and thin main vein. It possesses a fine flavour, typical for the basma tobaccos, pleasant taste and very good burning capacity. When smoked, it doesn't saturate.

8. **Chemical indicators –** Nicotine content / average for the three years of testing1999-2001 / to data from the IASAS – 2,01%, soluble carbohydrates – 14,60%, nitrogen content – 2,02% and ash content -9,57%.

9. **Yield per decare** – according to out data and to the data from the IASAS tests, depending on the agro-climatic conditions strict observing of the agrotechnics, the yields are in the range from 160 to 190 kg per decare.

AGRO-BIOLOGICAL CHARACTERISTICS OF THE VARIETY
Dzebel Basma 2

Certificate №10797/30.09.2008 of Bulgarian Patent office

1. **History of the variety** – Individual breeding of local populations – village of Dolno Kazatzite, municipality of Dzebel.

2. **Botanical affiliation** – Nicotiana tabacum, ecotype Dzebel basma.

3. **Shape of the plant** – cone-shaped. Height: 75-85 cm, depending on agrotechnics – until 100 cm.

4. **Leaves** – counting: 28 – 30 pieces. Position: regular. Angle of aberration: 40 – 45^{0}. Size: 14.7/8.6 cm (length/width) at 14th leaf. Shape of the leaf: wide-elliptical, with an average mucronated top. Lamina: curly and waved, hairy and strongly gummy. Colour: green. Nervation: regular. Neck: above 3.5 cm. Ears: 3.5 – 4.0 cm. Drawers: asymmetric, long more than 3 cm

5. **Raceme** – ball-shaped, compact, with size 8.6/7.7 (length/width) with 5-6 lateral nodes and 25-30 blossoms. Colour of the petals: pale rose

6. **Biological characteristics** – the length of the vegetation period (from the plant-seedlings until the mass-flowering) is 48 – 52 days; from the plant-seedlings until the opening of the first blossoms – 46 – 48 days; until the ripe of the first leaves: 40 – 42 days. The leaves ripe consecutively. The leaves get overripe, if the harvest is late. It dries fast. The quality gets worse when lots of nitrogen fertilizers are used.

7. **Quality** – the dried tobacco leaves have orange to orange-red colour with gloss, they are rich in content, gentle, elastic, with a pleasant flavour, medium thickness, good burning capacity and thin main vein.

8. **Chemical indicators –** Nicotine content / average for the three years of testing / to data from the IASAS – 1,83%, soluble carbohydrates – 15,87%, nitrogen content – 2,02% and ash content -11,28%.

9. **Yield per decare** – according to our data and to the data from the IASAS tests, depending on the agro-climatic conditions strict observing of the agrotechnics, the yields are in the range of 160 – 190 kg per decare.

AGRO-BIOLOGICAL CHARACTERISTICS OF THE VARIETY
Basma 13

Certificate №10835/29.01.2010 of Bulgarian Patent office

1. **History of the variety** – Individual breeding of local populations.

2. **Botanical affiliation** – Nicotiana tabacum, ecotype Dzebel basma.

3. **Shape of the plant** – cone-shaped. Height: 80 -85 cm, depending on agrotechnics – until 100 cm.

4. **Leaves** – counting: 28 pieces. Position: regular. Angle of aberration: 25 – 30^{0}. Size: 14,7 /8.3 cm (length / width) at 14th leaf. Shape of the leaf: widely elliptical. Lamina: curly and waved, hairy and strongly gummy. Colour: green. Neck: above 3.6 cm. Ears: 3.8cm. Drawers: - 2,7cm.

5. **Raceme** – ball-shaped, compact, with diameter 9,8cm, with 25-30 blossoms. Average number of ripe capsules is 23, weight of one capsule 0.120g. Colour of the petals: pale rose

6. **Biological characteristics** – the length of the vegetation period (from the plant-seedlings until the mass-flowering) is 43 – 45 days; from the plant-seedlings until the opening of the first blossoms – 38-40 days; until the ripe of the first leaves: 32 – 35 days. The leaves ripe consecutively. The leaves get overripe, if the harvest is late. It dries fast. The quality gets worse when lots of nitrogen fertilizers are used.

7. **Quality** – the dried tobacco leaves had yellow to yellow-orange colour and orange colour with gloss, leaves are meaningful, soft, elastic, developed with a pleasant aroma and taste and good burning capacity.

8. **Chemical indicators –** Nicotine content / average for the three years of testing1999-2001 / to data from the IASAS – 1,8-2%, soluble carbohydrates – 12,8-15%, nitrogen content – 1,6% and ash content - 12%.

9. **Yield per decare** – according to out data and to the data from the IASAS tests, depending on the agro-climatic conditions strict observing of the agrotechnics, the yields are in the range of 160 – 190 kg per decare.

Fig.1 Dzebel basma 1

Fig.2 Dzebel basma 2

Fig.3 Basma 13

CONCLUSION

- The expert committee on IASAS / 19.01.2010 / approved variety Dzebel basma1 as a standard for the Dzebel basma tobacco ecotype.

- Chemical indicators derived from the three-years testing of varieties in the IASAS system and our data, perfectly satisfy / high nicotine and balanced sugar levels / the contemporary trade requirements for the ecotype Dzebel basma.

- Presented results show the advantages of the new varieties per yield, as well as quality compared to both controls Dzebel basma 576 and Dzebel basma 359. contemporary trade requirements for the ecotype Dzebel basma.

- Presented results show the advantages of the new varieties per yield, as well as quality compared to both controls Dzebel basma 576 and Dzebel basma 359.

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MORPHO-BIOLOGICAL, PRODUCTIONAL, TECHNOLOGICAL-PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE NEWLY CREATED SEMI-ORIENTAL VARIETY O. ZLATOVRV

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ABSTRACT

The semi-oriental variety O. Zlatovrv was approved by the State Variety Commission in 2010. Its higher yields as well as morpho-biological, technological and chemical characteristics typical for Otlia tobacco make this variety attractive for growers and manufacturers.

Key words: The semi-oriental variety, otlja, zlatovrv

МОРФО-БИОЛОШКИ, ПРОИЗВОДНИ, ТЕХНОЛОШКО-ФИЗИЧКИ И ХЕМИСКИ СВОЈСТВА НА НОВОПРИЗНАТАТА ПОЛУОРИЕНТАЛСКА СОРТА О. ЗЛАТОВРВ

Полуориенталската сорта О. Златоврв е призната од Државната сортна комисија во 2010 година. Поголемиот принос во однос на стандардот и карактеристичните морфо-биолошки, физичко-технолошки и хемиски својства за овој тип на тутун, ја прават оваа сорта поинтересна за производството и фабрикацијата.

Клучни зборови: полуориенталски сорти, отлја, златоврв

INTRODUCTION

Semi-oriental tobaccos belong to the group of additional types of tobaccos with low midrib content and good manufacturing performance. Its share in cigarette mixtures is about 25%. According to their neutral tobacco raw, they are close to the Virginia tobaccos. These tobaccos are sun-cured, which reduces the costs related to energy consumption and construction investments**.** Naumoski (1985) reported that according to its technological and tasting properties, Otlia tobacco is competitive to the Virginia type.

One of the most widely grown tobacco varieties in R. Macedonia in the past period was Otlia 9-18/2. Although new varieties of this type have been created in R. Macedonia meanwhile, they fail to attract any significant interest among producers. One of these varieties is O. Zlatovrv, created by the research team of Tobacco Institute-Prilep.

Through presentation of its morpho-biological, productional-technological and chemical properties, our aim is to encourage the potential growers, manufacturers and consumers to include this variety in their tobacco mixtures.

MATERIAL AND METHODS

Four-year comparative investigations (2000 - 2004) which included the variety O. Zlatovrv were made (Photo 1). Morphological measurements, phenological observations, harvest and curing were performed during the growing season. Later, qualitative estimation of the raw material was made. Physical and chemical characteristics of tobacco raw were investigated in the accredited laboratories of Tobacco Institute-Prilep and tasting properties were determined by the Tasting Panel of Tobacco Factory - Prilep.

Photo 1 - O. Zlatovrv

RESULTS AND DISCUSSION

O.Zlatovrv is a newly created fertile semi-oriental variety approved by the State Commission of the Ministry of Agriculture, Forestry and Water Economy and registered in the List of Macedonian newly created agricultural plants (Official Gazette of R. Macedonia, July 16, 2010).

-Morphological properties

The variety O. Zlatovrv has a conical habitus and well developed root system. The stalk height with inflorescence is 156 - 166 cm, average leaf number 36 - 37 and middle primings height 33.8 cm and width 20.6 cm, depending on soil and climate conditions. During the growing season, leaves are light green, elliptic and in maturation they turn to yellow. The stalk is strong, with medium thickness and green in color. The average length of internodia in the lower belt is 3.9 cm, in the middle 5.7 cm and in the upper belt 2.9 cm. The inflorescence is conical, with light pink flowers (Photo 2). Seed capsules are peanuts-like and they do not crack and drop the seed.

Photo 2 - Inflorescence of O. Zlatovrv

- Biological properties

The variety is adapted to coluvial and alluvial-coluvial soils, in regions with high precipitations and conditions for irrigation during the growing season, when good quality raw, typical for this type of tobacco is obtained.

- Seedling production

For production of seedlings under polyethylene, the required amount of seed is 4g/10 m^2. In this period, suitable agrotechnical measures (watering, nutrition and protection) should be applied in order to obtain healthy and well developed seedlings. Depending on temperature conditions and cultural practices applied (weeding, watering, nutrition, protection etc.), seedlings of this variety will be ready for transplanting in 50 - 58 days.

- Field production

One autumn and two spring plowings are necessary in this period. Fertilization with NPK should be applied in accordance with the results of agrochemical analysis of soil. Planting is made at 50 x 25cm spacing, i.e. 80 000 stalks/ha, with 0.12 m^2 nutrient area per stalk.

Flowering normally occurs in 76 days, 50% flowering in 87 days and 100% flowering in 107 days. Matured leaves are swollen and turn to yellow. Matured tobacco is harvested in 5-6 primings and then sun-cured. The yield per stalk varies from 35 g to 36.40 g and the average yield per hectare is 2850 kg. With application of suitable cultural practices and additional irrigations, this variety can achieve even higher yields.

The variety showed tolerance to a number of economically important diseases (PVY, PTA, TMV etc.).

- Technological properties

The color of dry leaves of O. Zlatovrv is yellowish to pale red (Photo 2). Thickness of the middle belt leaves is 73 µm, their midrib percentage is 20.98% and substantiality is about 53.11 g/m^2.

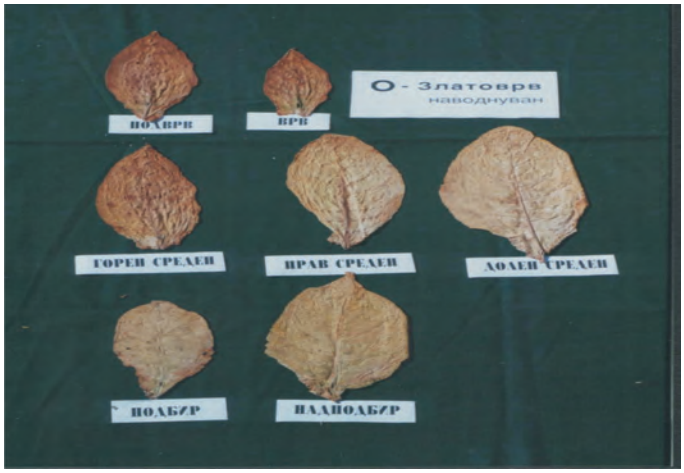

Photo 3 - Dry leaves of O. Zlatovrv by insertions

- Tasting properties

The Tasting Panel of Tobacco Factory - Prilep determined that according to its aroma, strength, taste, irritation and harmony, O. Zlatovrv is a typical semi-oriental variety.

- Chemical composition

Depending on climate during the growing season, applied agrotechnics, irrigation, harvest and curing conditions, the investigated samples of O. Zlatovrv contains the following components:

- nicotine: 0.58% in irrigated to 1.39% in unirrigated conditions,
- proteins: 6.62% (irrigated) - 7.94% (unirrigated),
- soluble sugars: 18.61 % (irrigated) - 16.64% (unirrigated),
- mineral matters: 13.16 % (irrigated) - 11.91 % (unirrigated) and
- Shmuks quality index: 2.81 to 2.23.

CONCLUSIONS

- According to its morpho-biological, productional, physical-technological and chemical characteristics, the variety O. Zlatovrv is typical representative of semi-oriental tobaccos.
- this variety can successfully find its place in production and in fabrication of tobacco mixtures.

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