

## 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<sup>3</sup>). The average density of Virginia tobacco was 240 g/cm<sup>3</sup> and that of Burley 170 g/cm<sup>3</sup>. 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 сечениот тутун. Од истражувањата се констатира дека ориенталските тутуни имаат најголем дензитет од 270 g/cm<sup>3</sup>. Дензитетот на суровината од типот вирџинија просечно изнесува 260 g/cm<sup>3</sup>, од тутунското фолио 240 g/cm<sup>3</sup>, а од типот берлеј 170 g/cm<sup>3</sup>. 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 способност, 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 filling 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 filling 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 <sup>3</sup>	275	260	175
g/cm <sup>3</sup> according to tobacco participation in the mixture	82,5	130,0	35,0
mg/cigarette		760	
N° 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<sup>3</sup>) 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 <sup>3</sup>	275	260	175
g/cm <sup>3</sup> according to tobacco participation in the mixture	68,8	117,0	52,5
mg/cigarette		733	
N° 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 <sup>3</sup>	275	260	175	160
g/cm <sup>3</sup> according to tobacco participation in the mixture	55,0	104,0	43,8	24,0
mg/cigarette		698		
N° 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 <sup>3</sup>	275	260	175	240
g/cm <sup>3</sup> according to tobacco participation in the mixture	55,0	140,0	43,8	36,0
mg/cigarette		735		
N° 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<sup>3</sup>, compared to those of reconstituted tobacco - 240 g/cm<sup>3</sup> and Burley - 170 g/cm<sup>3</sup>.

- The lowest density was recorded in expanded tobacco ribs - 160 g/cm<sup>3</sup>. 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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