ejpmr, 2018,5(03), 57-60

SJIF Impact Factor 4.897

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

PRODUCTION OF ESSENTIAL OIL AND CONCRET IN VARIOUS TYPES OF TOBACCO (*NICOTIANA TABACUM* L.)

Lenka Cvetanovska*, Ana Cvetanovska and Marija Krstikj

[1]Faculty of Natural Science and Mathematics, University of "Ss. Cyril and Methodius Skopje, R. Macedonia.
[2]Faculty of Veterinary Medicine, University of "Ss. Cyril and Methodius" Skopje, R. Macedonia.

***Corresponding Author: Dr. Lenka Cvetanovska**

Faculty of Natural Science and Mathematics, University of "Ss. Cyril and Methodius Skopje, R. Macedonia.

Article Received on 01/01/2018 **Article Revised on 22/01/2018** **Article Accepted on 10/02/2018**

ABSTRACT

The essential oils in tobacco are used as a key ingredient for keeping the taste and aroma. The pleasant smell in tobacco leafs comes from the essential oils and polyphenols. The positive correlation between the production of essential oil and its distribution in different leaf area in different varieties, clearly speaks for the linear dependence of the development phase and increased production of the essential oil going from the lower to the upper leaf area. Lowest values are obtained from the lower leaf area in all examined types, but they are insignificantly different. There are insignificant variations in terms of the intensity of the synthesis of essential oil in different harvests in all types. This proportionality is in correlation with the material's oldness, adequate weather conditions and the way of collecting plant material. Concret and absolute are used in perfumery industry. Also they are used in the pharmaceutical industry as an aromatic residue with waxy texture (after the extraction of the essential oil). The analyses for percentage of concret in the examined tobacco types are made from this aspect, regarding to their leaf areas during the two cycles.

KEYWORDS: The essential oils in tobacco concret during the two cycles.

INTRODUCTION

The ethereal oils are also known as volatile or essential oils.[1] They are rich with aromatic components and have fluid consistency. The essential oils are obtained from different parts of the plant, like roots, stems, leafs, flowers, buds and fruits. The name ethereal oils originates from the fact that these compounds represent complex aromatic mixture of volatile components, present in plants, which are the ones that to blame for the specific aroma.[2] The essential oils are complex mixtures of organic compounds including mono- and sesquiterpenes, like hydrocarbon alcohols, aldehydes, ketones, lactones, esters and other aromatic, aliphatic and cyclic compounds. The composition of essential oil is conditioned by the type of plant, ontogenesis and whole range of environmental factors. Many of these volatile substances have different ecological functions: they can act as signalizers, defensive substances against herbivores or as volatile substances that act as polynators.[3] They occur as drops in special granular organs on the surface or in the inner part of the plant. They are hydrolyzed with specific enzymes in presence of water, releasing fragrant ethereal aglycones. Tobacco usually contains 0,1-2% essential oils.

The essential oils, aromated and volatile products of the plant secondary metabolism are widely used in the alternative medicine, as well as in the cosmetic industry.[4] The unusual biological properties of the essential oils include anticancer, antiviral, antiphlogistic and antioxidant effect. The crucial effects of essential oils to CNS, especially to those strongly aromated, are based on their stimulative and sedative role, which is positively reflected in behavior control and neurophysiological activities. The essential oils are not only useful for people, but for animals as well-like food additives and treatment for various diseases. Considering the results from many studies related to tobaccos's richness with secondary metabolites, our goal was to examine the percentage of essential oil and concret in the leaf mass of several types of tobacco, which would give greater contribution to its medicinal and pharmaceutical applicability.

MATERIAL AND METHODS

The extraction of essential oil from tobacco raw material is performed in laboratory conditions by the method of hydrostepilation in Clevenger apparatus. The ratio between plant material and 2% sulfuric acid solution in distilled water is 1:10 (w/v). The extraction time is 4 hours at a rate of 2-3 ml/min. The quantity of separated essential oil is determined by subtracting the volume of collected oil in the graduated part of the hydrostepilation apparatus from the total volume of xylene and oil, reduced to raw substance.

For the determination of concret in tobacco raw material, a solid-liquid extraction was used in laboratory conditions following Soxhlet procedure. The ratio of plant material and petroleum ether is 1:10 (w/v), with extraction time of 7 hours (4-6 cycles/h). Removal of the solvent from the extract is carried in vacuum. Then the quantity of the derived concret is determined gravimetrically. The yield of concret is expressed in percentage in regard to the dry matter.

RESULTS AND DISCUSSION

The pleasant smell in tobacco leafs comes from the essential oils and polyphenols. Due to the richness of flavonoid compounds and high applicability of tobacco's essential oil in pharmaceutical purposes, studies are carried out which results confirm these properties of tobacco plant during two harvests and different leaf areas within varieties.

The positive correlation between production of essential oil and its distribution in different leaf areas within varieties, clearly speaks for the linear dependence of the development phase and increased production of essential oil going from the lower to the upper leaf areas.

Lowest values are obtained from the lower leaf areas in all examined types, but they are insignificantly different. There are insignificant variations in terms of the intensity of the synthesis of essential oil in different harvests in all types. In the type Prilep (2011) these values are in the range of 0,31-0,93 mg/100mL in the lower ie upper zone, ie three times larger increase regarding to the lower leaf area (Fig. 1, Fig. 1a). This proportionality is in correlation with the material's oldness, adequate weather conditions and the way of collecting plant material.

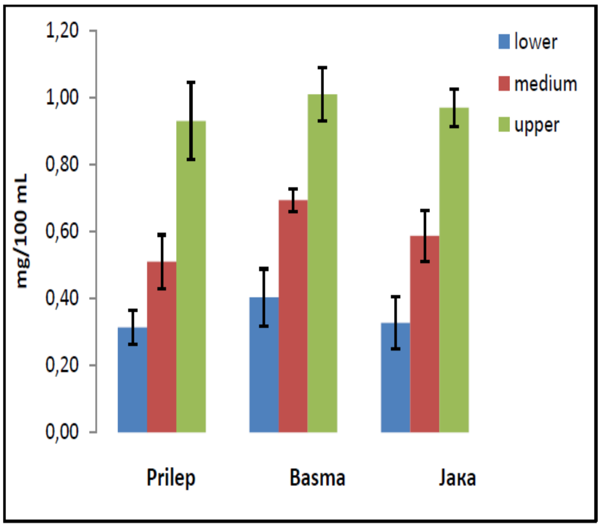

Fig. 1: Production of essential oil (mg/100 mL) within the three leaf area of the varieties of Prilep 66, Basma 82 and Jaka 125/3 (harvest 2011).

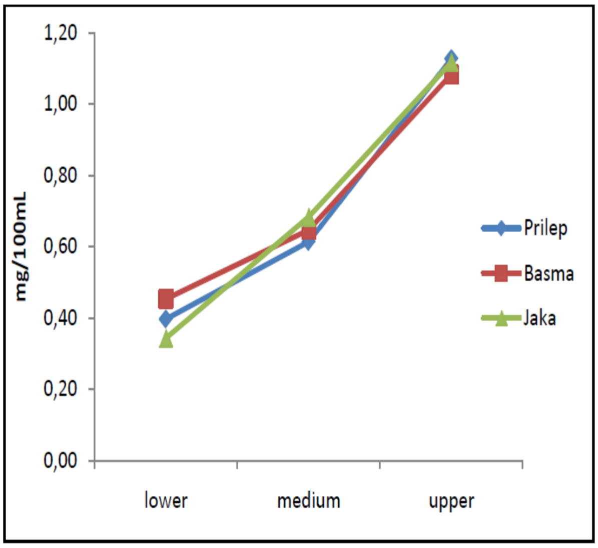

Fig. 1a. Linear increase of essential oil production within the examined leaf areas of the varieties Prilep 66, Basma 82 and Jaka 125/3 (harvest 2011).

Almost the same ratio of essential oil within leaf areas is found in 2012 ranging within the limits of 0,40-1,13 mg/100mL. Similar values (0,40-1,01 mg/100mL) are found in type Basma in 2011, while in relation to the same type in 2012 were found insignificant differences. A three-fold increase in production is found in the type Jaka during the two harvests (Pic. 1; Pic 2). From this comes the justification for the so-called maturization of tobacco which correlates with the production of essential oil, and all this favor of quality tobacco raw material with high applicability in the pharmaceutical industry.

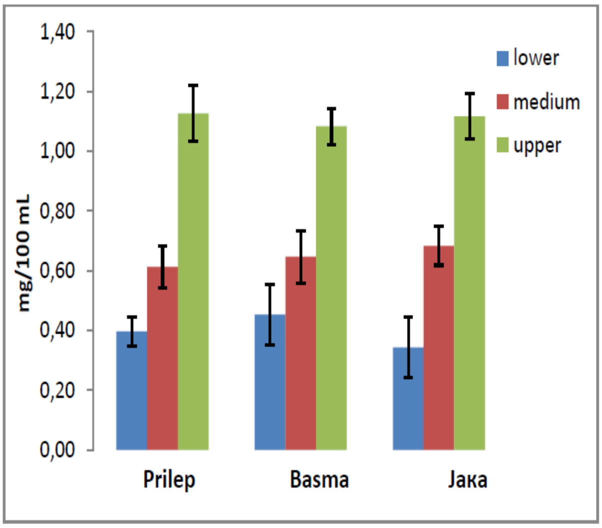

Fig 2. Production of essential oil (mg/100ml) within the three leaf areas of the varieties Prilep 66, Basma 82 and Jaka 125/3 (harvest 2012).

Followed by leaf areas, the production of essential oil in both harvests shows linear increase within the three leaf areas in tobacco plant types during both vegetative cycles. This significantly positive correlation is clearly visible by following the values obtained within the shown graphical display and table (Fig. 1 and Fig. 2; Tab. 1).

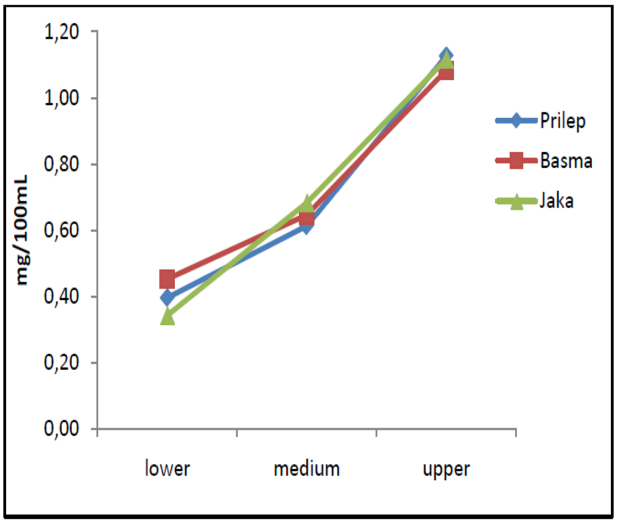

Fig. 2a: Linear increase in essential oil production within the examined leaf areas of variety Prilep 66, Basma 82 and Jaka 125/3 (harvest 2012).

Tab. 1: Insignificant differences in production of essential oil within the three leaf areas between harvests 2011 and 2012.

		Leaf area		
Variety	**Harvest**	**lower**	**medium**	**upper**
Prilep 66	2011	0,31±0,05 a	0,51±0,08 a	0,93±0,12 a
	2012	0,40±0,05 a	0,61±0,07 a	1,13±0,09 a
Basma 82	2011	0,40±0,09 a	0,69±0,04 a	1,01±0,08 a
	2012	0,45±0,1 a	0,65±0,09 a	1,08±0,06 a
Јака 125/3	2011	0,32±0,08 a	0,58±0,08 a	0,97±0,06 a
	2012	0,34±0,1 a	0,68±0,07 a	1,12±0,08 a

The existence of proportional dependence between the leaf oldness and enhanced essential oil synthesis is adequate to the research of[5] which concluded a positive relation in production of essential oil and development phase of the leaf mass. The increased synthesis of essential oil from the tobacco leafs is highly applicable in medicinal purposes, ie extracts from the middle tobacco leafs are showing greater antimicrobial activity (Escherichia coli, Staphylococcus aureus and Pseudomonas aeruginosa.) than the upper ones.[5]

Concret and absolut are widely used in the perfumery industry, like aromatic addition with waxy texture (after the extraction of the essential oil) are used in the pharmaceutical industry. The analyses for percentage of concret in the examined tobacco types are made from this aspect, regarding to their phase during the two cycles.

The comparison of the results recorded as a histogram display shows the linear increase of the values in the direction of the phase of upper leaves. This proportional dependence is noticeable in all types in both harvests. If they are shown through numerical values, the highest values are found in the type Basma in the three leaf zone compared to the types Prilep and Jaka. Namely, these variations are statistically insignificant in all types and their leaf zones. In the type Prilep (within the leaf zones) they are ranging from 3,75±0,07 in the lower zone to 7,04±0,09 in the upper zone (harvest 2011) and 4,16±0,08 and 7,62±0,09 (harvest 2012) with slight variations in type Basma which values are ranging from 4,07±0,05 in the lower, to 6,12±0,08 in the middle and 7,75±0,12 in the upper zone (2011), so that the next year those variations go towards obtaining higher results, but still in the boundries of an insignificant positive correlation within the zones. Simmilar results with slight deviations are found in the type Jaka (Tab. 2). It could be generalized that the production of concret is highest in type Basma within the phase of upper leaves (8,55±0,11) (2012), while the lowest (3,13±0,07) is within the phase of lower leaves in type Jaka (2011) (Fig. 3.; Fig. 3a).

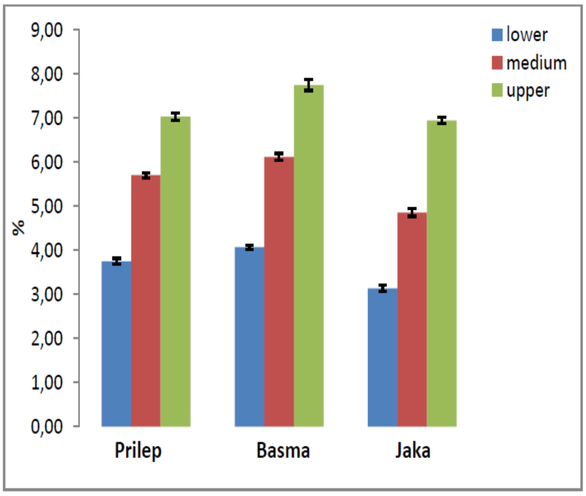

Fig. 3: Concret production (%) within leaf zones of the varieties Prilep 66, Basma 82 and Jaka 125/3 (harvest 2011).

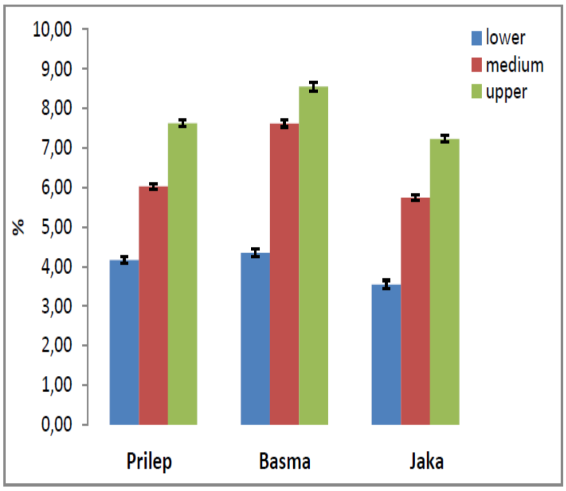

Fig. 3a: Concret production (%) within leaf zones of the varieties Prilep 66, Basma 82 and Jaka 125/3 (harvest 2012).

Tab 2: Variations in concret production (%) within leaf zones between harvests 2011 and 2012.

Concret (%)	Prilep 2011	Prilep 2012	Basma 2011	Basma 2012	Јака 2011	Јака 2012
Lower leaf area	3,75±0,07	4,16±0,08	4,07±0,05	4,35±0,10	3,13±0,07	3,54±0,11
Medium leaf area	5,71±0,06	6,03±0,07	6,12±0,08	7,62±0,09	4,86±0,09	5,74±0,08
Upper leaf area	7,04±0,09	7,62±0,09	7,75±0,12	8,55±0,11	6,95±0,07	7,23±0,09

Like the essential oil, the concret (due to its optimal representation in all three tobacco types) because of the richness with phenolic components, furfural, ketones, solanesol (and over 3000 volatile and non-volatile components) is used in the pharmaceutical, cosmetic and perfumery industry.[6]

CONCLUSION

Today's research is in direction of developing so-called green chemistry or developing mechanisms for plant's self protection from the usage of pesticides. Namely, the high toxicity and reduced possibility of biodegradation of synthetic pesticides and the creation of bio residues in the soil are the main reasons for setting up green biopesticides that, with their active components are increasing the resistance to animals on the one hand and self protection on the other hand. Everything goes in the direction of finding sources- natural products (cultures with increased essential oil production, like tobacco) which will be the source for implementation of new highly selective and biodegradable pesticides, whereby the long-standing problem will be solved. The natural products would be good alternative for the synthetic pesticides, in order to reduce the negative impact on the anthropogenic population and the environment.

REFERENCES

1. Guenther E., (1948). The Essential Oils. D.Van Nostru, Company. Inc. New York Harrewijn P., Van A.M Oosten., Piron P.G.M. (2001). Natural Terpenoids as Messengeres. Dordrecht: Kluwer Academic Publishers.
2. Rafi A. (1993). The Chemistry of the Essential oils of the Pakistani Species of Family Umbelliferae. Phd Thesis submitted to University of Punjab.
3. Harrewijn P., Van A.M, Oosten P.G.M., Piron. (2001). Natural terpenoids as messengeres. Dordrecht : Kluwer Academic Publishers.
4. Hammer K.A., Carson C.F., and Riley T.V.,(1999) Antimicrobial activity of essential oils and other plant extracts, Journal of applied Microbiology, 86: 985-990.
5. Palic R., Stojanovic G., Alagic S., Nikolic M., Lepojevic Z. (2002). Flavour and Fragrance Journal, 17(5): 323–326.
6. Popova V., Gochev V., Girova T., Iliev I., Ivanova T., Stoyanova A. (2016). Extraction products from tobacco-aroma and bioactive compounds and activities. Current bioactive compounds, 11(1): 31-37.