POTENTIAL PRODUCTION OF VOLATILE OIL CONTENT IN FOIL AND THE MENTHOL MINT (*MENTHA PIPERITA* L.) UNDER THE INFLUENCE OF FERTILIZATION IN CONDITIONS IN THE LOVRIN

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Abstract: *Mint is one of the oldest herbs known. Mint is an herb well known for its medicinal properties, but also for refreshing flavor. Given the fact that fertilization is one of the measures which, properly applied, lead to increased production of foil, production of volatile oil and the oil content and hence its quality, more research is carried out lately have focused on finding optimal formulas for this.The volatile oil is the most valuable component of the composition of mint leaves (foil). The quality of healing depends on the quality of the finished product that is found in almost all health and beauty products. Calculation of volatile oil production has been achieved in relation to film production in mint. The essential oil obtained from the leaves of Mentha piperita L., has numerous applications in medicine due to antibacterial properties, antiviral and cytotoxic essential oil, fragrance oil and antioxidant properties make it to be used in food and beverage industry. In England, as in the rest of Europe, peppermint is used almost exclusively for sweet and sweet liqueurs where her pungent fresh and refreshing counterbalance to the sweetness of sugar properties. For these purposes, the use of pure essential oil is preferred to avoid the bitter astringent notes of peppermint leaves. Peppermint freshness fits extremely well with chocolate. Peppermint ice cream is delicious on a warm summer day, because it uses soft properties of menthol. Mint is grown in many countries in Europe and Central and West Asia for the production of menthol, which is necessary in pharmaceutical preparations. In most of these countries entered peppermint local cuisine, replacing the local varieties mint. The study aims to enrich knowledge on the role of characteristics of cultivation technologies mint (Mentha piperita L.), to achieve improved their performance, to achieve a high production of essential oil of a higher quality, thus the study of the possibility expansion of cultivation areas are mint. Experience has been located on land belonging in Lovrin. Experience is the type bifactorial with annual repetition. The biological material used was kind Column, as certified seed. Organic and inorganic fertilizers applied peppermint culture, increased production of essential oil and menthol in the foil. The content of active substances, the determination of volatile oil content of mint and menthol, was monitored in the laboratories S.C. Fares Vital Bio Laboratories LLC Drastic, (ISO 9001: 2000). The results of this study are part of a PhD program, having as theme: "Development of cultivation technology of mint (Mentha piperita L.) in conditions of Lovrin". The results of this study are part of a PhD program, having as theme: "Development of technology for cultivation of mint (Mentha piperita L.) in conditions of Lovrin"under the leadership of the distinguished university professor Valeriu Tabără.*

Key words: *peppermint, volatile oil, foil, menthol.*

INTRODUCTION

Peppermint (*Mentha piperita L.)* is one of the most popular and widely consumed aromatic and medicinal plants by people. The reason that peppermint is so popular is that it spreads a great smell nice, but mostly because it is an excellent herb tea that gives a great taste. Being a plant originating in northern Europe, is found in spontaneous, instead it is cultivated on large areas in many parts of the world. Peppermint oil contains high levels of essential active menthol.

The volatile oil of peppermint and the other components of the plant have stomahică

action, carminative, choleretic, cardiotonic, analgesic.

Menthol is widely used in the preparation of toothpaste and mouth washes because of soft properties, antiseptics and the correction of taste and smell.

Peppermint essential oil is widely used in food, the preparation of liqueurs, candies, which prints an odor and a pleasant,.

Proper fertilization with manure, which is the best fertilizer for mint (especially on poor soils), depending on soil applied doses of 20-40 t/ha (incorporated by plowing), it is very important not only for quality production, but also to maintain and improve the productive potential of soil. Herba and foil production is influenced by the technology applied (especially fertilization) that determines the quality and increase production.

MATERIAL AND METHODS

Experience has been placed in the experimental field of research Lovrin resort. The experimental field was located on a chernozem soil type. The experiments were bifactorial type, to repeat the concluding annual cycle so that the experimental field in the first year we have experience, second year and third year. Variety Columna used in experiments.

FACTOR A - organic fertilization - 20 t / ha

a1: $N_oP_oK_o$

a2: $N_{60}P_{60}K_{60}$

a3: $N_{90}P_{90}K_{90}$

a4: $N_{120}P_{90}K_{90}$

a5: $N_{120}P_{90}K_{90}$ + foliar fertilization

FACTOR B – unfertilized organic

a1: $N_oP_oK_o$

a2: $N_{60}P_{60}K_{60}$

a3: $N_{90}P_{90}K_{90}$

a4: $N_{120}P_{90}K_{90}$

a5: $N_{120}P_{90}K_{90}$ + foliar fertilization

RESULTS AND DISCUSSIONS

Volatile oil and menthol content of the foil to mint (*Mentha piperita L.*) in the experimental field of Lovrin.

Results of the content of volatile oil obtained from foil production in mint (*Mentha piperita L.*) under the influence of factor A - the mineral and organic fertilized Lovrin are shown in Figure 1.

Table 1

Influence of organic and mineral fertilization on the production of essential oil from the foil at the mint, the Lovrin

Nr.crt.	**A –** organic/mineral fertilizer	Crops kg/ha	%	Diference kg/ ha	Significance
1.	a1 N0P0K0	161	100	-	
2.	a2 N60P60K60	200	124	39	xxx
3.	a3 N90P90K90	223	139	62	xxx
4.	a4 N120P90K90	266	165	105	xxx
5.	a5 N120P90K90 + FF	286	178	125	xxx

DL5%= 18 kg/ha; DL 1% = 25 kg/ha; DL 0,1% = 37 kg/ha.

Production for the factor A given product is a result harvest - oil content.

The higher oil production from Lovrin under the influence of mineral and organic fertilization is achieved in variants N120P90K90 + FF - 286 kg / ha oil N120P90K90 - 266kg/ha oil N90P90K90 - 223 kg / ha oil, and N60P60K60 - 200 kg / ha oil. It appears that the 5 variants studied, only three achieved oil production over 200 kg / ha and oil that are statistically very significant.

The smallest production of essential oil of peppermint is recorded on the foil version of the mineral fertilized only with organic N0P0K0 value of 161 kg / ha oil.

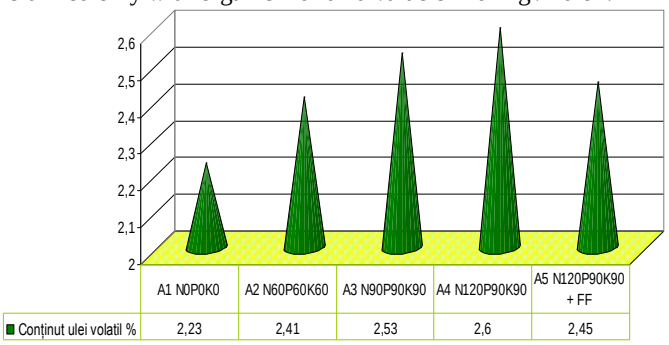

Figure1. The oil content of foil production under the influence of factor A at peppermint - organic fertilizer to Lovrin

It was found that the volatile oil is formed in the plant, depending on the origin of some genetic conditions, time of harvest, the leaves on the stem position.

The analysis results shows that there is a high variability of essential oil content of mint foil at the 5 variants studied. This variability is within the limits, 2.23% oil only organic and mineral fertilized variant 2.6% N120P90K90 version.Of the five variants studied 4 to 1 oil content above 2.4% (N60P60K60, N90P90K90, N120P90K90 and N120P90K90 + FF). Of the variants studied, four exceed the oil content of only organic mineral fertilized variant, 2.23%. Variation of volatile oil content and its components that differ from the leaves of mint, depending on the time of harvest of their geographical location.

The content of volatile oil obtained from foil yield in peppermint (*Mentha piperita L.*) under the influence of **factor B** to Lovrin.

Analysis of volatile oil content of the foil at the mint produced by sowing mineral fertilization variants under the influence of climatic conditions Lovrin reveals that four of the five variants have a higher oil content in the foil version N0P0K0 unfertilized (2.02%).

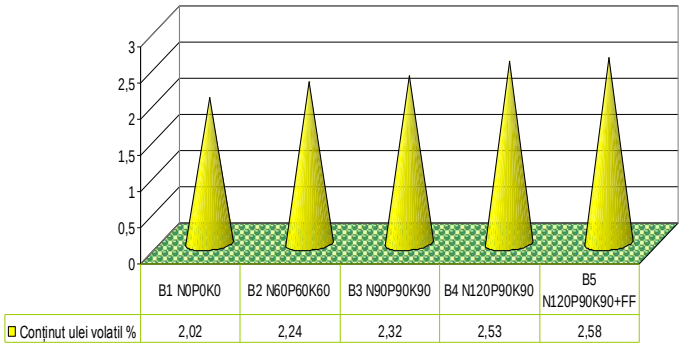

Figure 2. Influence of fertilization on oil content of foil yield in peppermint (*Mentha piperita L.*) in Lovrin

The high content of volatile oil foil under the influence of mineral fertilization seeding mint performed on variants N60P60K60 - 2.24%; N90P90K90 - 2.32%; N120P90K90 - 2.53% and N120P90K90 + FF - 2.58 %. The lowest oil content was recorded in the variant fertilized N0P0K0 - 2.02%.

If we compare the content of essential oil from peppermint planted the foil under the influence of mineral and organic fertilization and sowing mineral fertilization influence under the influence note that by sowing mineral fertilization, volatile oil content of the foil, all options are reduced.Production of essential oil from the foil at the mint, under the influence of mineral fertilization is presented in table 2.

Table 2

Influence of mineral fertilization on the yield of essential oil of peppermint in the foil at the experimental field Lovrin

Nr.crt.	**B** mineral fertilizer	**Crops kg/ha**	**%**	**Diference kg/ ha**	**Significance**
1.	b1 N0P0K0	161	100	-	
2.	b2 N60P60K60	203	126	42	
3.	b3 N90P90K90	244	152	83	x
4.	b4 N120P90K90	267	165	106	xx
5.	b5 N120P90K90 + FF	238	148	77	

DL5%= 58 kg/ha; DL 1% = 83 kg/ha; DL 0,1% = 120 kg/ha.

Analyzing the results of the oil production under the influence of 5 different sowing mineral fertilization of Lovrin conditions shows the following:

- production of essential oil of peppermint foil is dependent on production levels,
- foil production determines the level and volatility of oil production,
- volatile oil content falls under the influence of sowing mineral fertilization,
- the difference between variants is higher in terms of foil yield of essential oil from peppermint planted under the influence of organic fertilization.

Such variants N120P90K90, N90P90K90 and increases the production of essential oil from the foil are respectively 83 106 kg / ha oil and are statistically significant and distinct as significant. The highest yields of essential oil of mint is recorded on the foil versions with N90P90K90 mineral fertilizer - 244 kg / ha oil N120P90K90 - 267 kg / ha oil.

Menthol content in the foil at the mint under the influence of mineral and organic fertilization.

Chief component of the essential oil of peppermint is menthol foil.After the parts were removed from menthol oil, oil is marked as (dementolizat corrected).

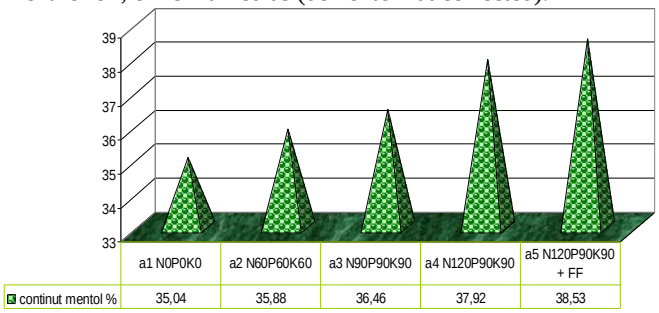

Figure 3. Menthol content of mint foil at the Lovrin under the influence of organic and mineral fertilization

Menthol is the most valuable component of the film composition of peppermint. The analysis results shows that there is great variability in the menthol content in peppermint foil.

This variability is within the limits of 35.04% menthol in organic fertilized variant only - N0P0K0 and 38.53% for the variant N120P90K90 + FF. Of the five variants studied only three of menthol content exceeding 36% (N90P90K90 - 36.46% N120P90K90 - 37.92% and N120P90K90 + FF - 38.53%).The lowest amount of menthol content of the foil under the influence of organic fertilizer and chemical conditions in the recorded version N0P0K0 Lovrin.

Menthol content in the foil at the mint (*Mentha piperita L.*) under the influence of mineral fertilization. Menthol content in peppermint yield of the foil under inflența mineral fertilization is presented in Figure 4.

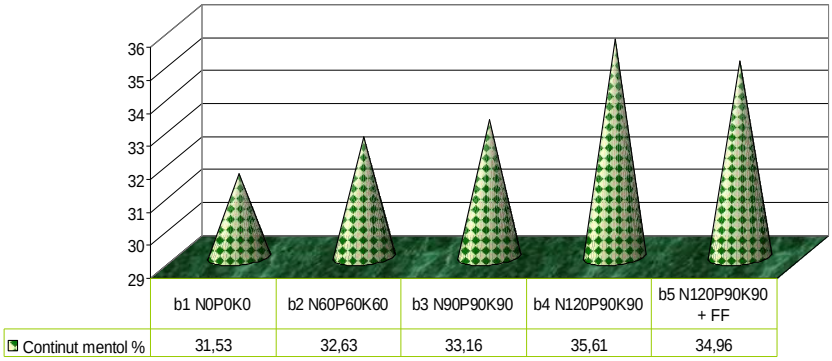

Figure 4. Influence of mineral fertilization on the content of menthol in mint foil at the conditions of Lovrin

Content analysis of menthol in the mint produced the foil under the influence of mineral fertilization conditions in Lovrin reveals that four of the variants studied have a higher menthol content unfertilized variant (31.53%).

The high content of menthol in mint foil at the conditions of Lovrin performed on variants N120P90K90 - 35.61% and N120P90K90 + FF - 34.96%.Under the menthol content of the foil are variants with variants 120N 90N - 33.16% menthol, 60N - 32.63% and unfertilised variant - 31.53% menthol.

A single variants has a menthol content of greater than 35% (N120P90K90 - 35.61%). It is noted that the five variants studied, only 4 to 1 over 32% menthol content.

If we compare the content of menthol in the mint produced the foil under the influence of mineral and organic fertilization and menthol content of the foil obtained under the influence of mineral fertilization, we find that under the influence of mineral fertilization, the contents of menthol mint in the foil is reduced by 3 - 4%.

CONCLUSIONS:

In the Lovrin experimental field was recorded good results in oil and menthol content of mint foil at harvest.

Climatic conditions during sowing and harvesting have largely positive influence on the level of the foil at the mint crop.

Volatile oil content and oil production in mint foil are different depending on the influence of organic and mineral fertilization.

In the variant sown under the influence of organic and mineral fertilization were obtained the highest values of volatile oil content, menthol and oil production.

It is noteworthy that mineral fertilization to have a production decreases in the content

of volatile oil, menthol and peppermint oil production of each variant, compared with the content of volatile oil, menthol and mint oil production made under the influence of organic fertilizers and minerals.

If we compare the content of menthol in the foil mint obtained under the influence of mineral and organic fertilization and menthol content from the foil obtained under the influence of mineral fertilization, we find that under the influence of mineral fertilization, the content of menthol mint in the foil is reduced by 3 - 4%.

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