# RESULTS ON THE PRODUCTION OF HERBA AND OIL OBTAINED IN TWO SPECIES OF AROMATIC PLANTS

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***Abstract.*** *The study refers to the production results and the volatile oil content obtained in the majoram and thyme culture under the climatic conditions of 2016-2017. Research has been conducted in the experimental field in southern Madrid. Dry herb (Herba Mojoranae) contains 0.8-1.1% volatile oil with a production of 2260-2360 kg/ha. Dry herb (Herba Thymi) contains 0.78-0.80% volatile oil with a yield of 1228-1440 kg/ha. In the experimental field to ensure the water need of aromatic plants, four irrigation norms were applied, including the first flood with a norm of 120l/m2, followed by 3 drip irrigation with a norm of 30l/m2 per irrigation. The precipitation recorded in the year 2017 were close to the needs of aromatic crops. Regarding the temperature regime no difference is observed compared to 2016. With 0.23 ml of oil obtained from 100g of dried herb, Origanum majorana L with 0.13 of oil obtained from 100g of dried herb and Origanum vulgare L., with 0.14 ml of oil obtained from 100g of dried herb.( C. F. RUS,ET AL 2013)*

**Keywords:** *aromatic plants, volatile oil, majoram, thyme*

## INTRODUCTION

Majoram (*Orignum majorana L.*) originates from the Arabian Peninsula and North Africa (Egypt) and the Mediterranean region. It is very sensitive to frosts and spring bruises. It is well-suited to summer heat, but it must have sufficient moisture in the soil (E. PĂUN, 1995). Majoram is an aromatic species cultivated for dried aerial parts containing 1% volatile oil (M. VERZEA 2001). The dried out herba (*Herba Mojoranae)* is used both dry for the food industry and fresh for the production of volatile oils. They contain timol and carvacrol (80%), gamaterpinen, linolol, etc. It's a natural, anti-rheumatic antibiotic. It has yields estimated at 6-8 t/ha with a content of 0.2-0.27% volatile oil. The essential oil has terpinene, terpineol, origanol, sabinen and some other substances in smaller quantities. It is a highly appreciated plant in the food industry and oils are especially used for perfumes. Dry herb (*Herba Thymi*) contains 0.8-1.5 volatile oil consisting of timol (20-45%) and smaller amounts of carvacrol, cimen, pinen. Also contains tannin, flavonoid substances, bitter principles, etc. Because of its Mediterranean origin, it is a species with high demands towards temperature and light. It is resistant to drought but in the emergence period it needs plenty of water. It is harvested when the plants have a maximum volatile oil content, which corresponds to the opening of the first flowers in the chain. Harvesting takes place in sunny weather after the dew has been lifted, usually after 10 o'clock. Harvesting is done manually with the sickle cutting off all branches at a height of 10-15cm from the ground, avoiding cutting off their lignified part. The yields obtained from the second crop year are 2000-2500kg/ha.

Climatic characterization of the area where the experimental field was located. Movements of air masses this year do not differ much from those of 2016. The most damaging for aromatic crops ware the winds, because in July, due to the almost total lack of rainfall, the atmospheric humidity has decreased further. Figure 1 shows that the average wind speed was 30 km / hour with December.

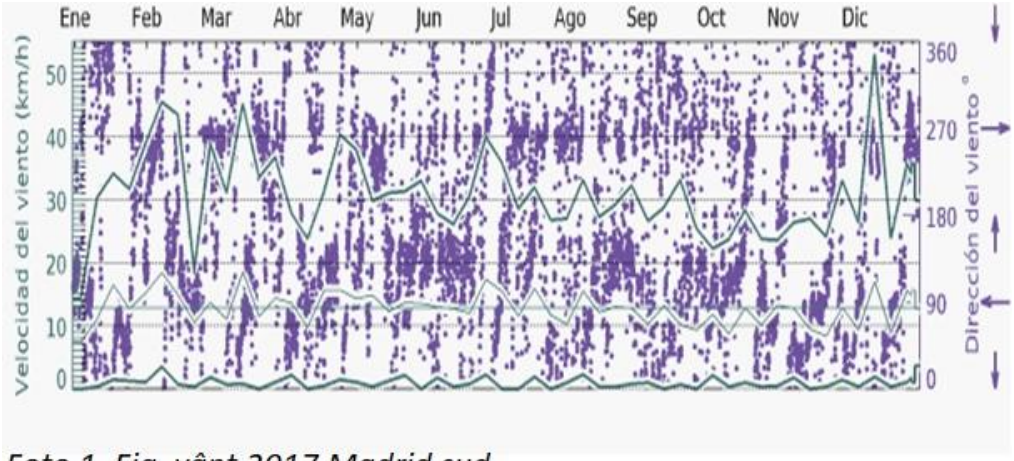


*Foto 1. Fig. vânt 2017 Madrid sud*

Source: Agency Estatal de Meteorology

Frosts around -2 degrees are not harmful to aromatic plants and heat peaks usually occurring after harvesting. For aromatic plants the temperature is very good. If I go through the winter with the high temperature differences from day to night, it seems that 35-40 ° C in the summer and for a period of 2-3 weeks plants do not suffer much.

We know that in the summer there are very few rainfall in this region but the rainfall is recorded during the winter, when there is drought or rainfall. There is no accumulation of water in the soil, combined with warm wind, leading to dehydration of the plants. but without surpassing the septic water regime in the studied area.

In Figure 2 we have the monthly average temperature chart for 2017.

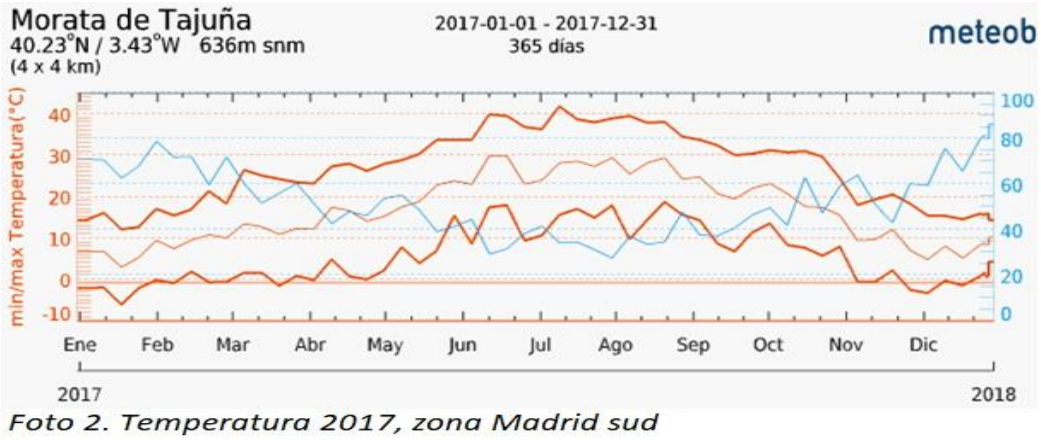


*Foto 2. Temperatura 2017, zona Madrid sud*

Source: Agency Estatal de Meteorology

In February, it was irrigated by flooding to saturation. This is how we secured the water reserve that snow and the winter rains bring to the experimental area. In March, May and July we brought a new water supply, this time through the drip irrigation system. Specify that in the area where the experimental field is located, 30km south of Madrid in the summer does not rain. There may be a storm a few tens of liters per square meter on very small surfaces, but you can not count on this water supply (little rainfall quantities).

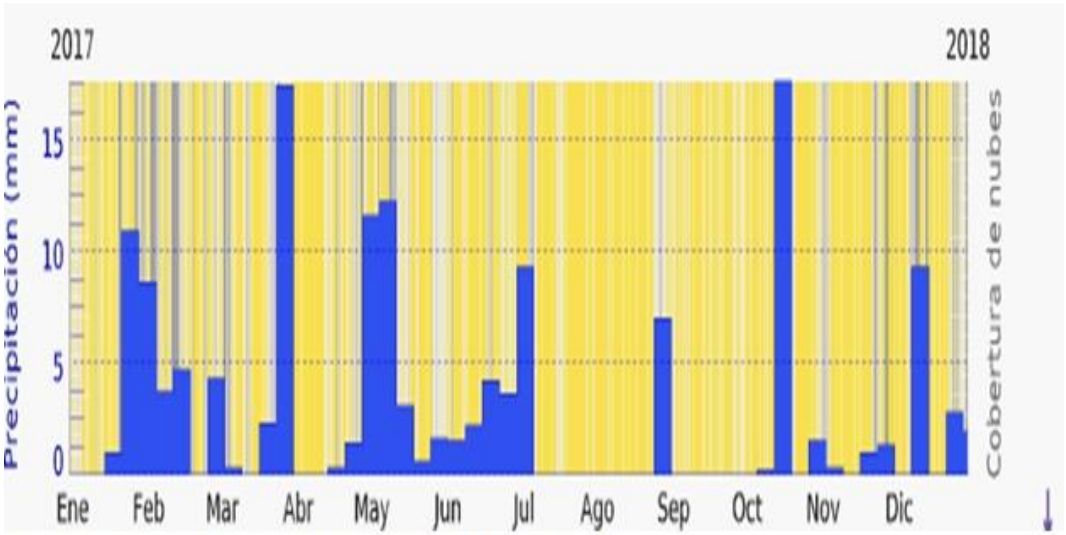


*Foto 3. Precipitații 2017, zona Madrid sud*

Source: Agency Estatal de Meteorology

**MATERIAL AND METHODS**

The biological material (seedlings) was produced by Semiflor s.l., province of Alicante, Spain. There have been seedings of about 2 months, sown in August directly in the alveoli. In October they were delivered and on October 10 they were planted in the experimental field. Thymus was harvested on June 25th. The plants were 12-15 cm high with open flowers approximately 50%.

Majoram was harvested on July 1, with 25 cm high plants and more than half of the flowers open. A 100 liter alembic with heated water vapor was used for obtaining the essential oils. The 2 species of plants studied were grown in the Mediterranean climate zone. Herb harvesting took place in 2017 at the time of flowering after a sunny period because light favorably influence the synthesis and accumulation of volatile oils, alkaloids, glycosides and other active ingredients. [L.S.MUNTEAN.2007]. The plants at the time of harvesting for this study were in the second year of vegetation. Fresh herb was conditioned and left to dry in a cool place, away from sunlight. The collected plants are in the voucher specimen number, deposited in the Herbarium Department Medicinal Plants - USAMVB Timisoara. Essential oils were obtained by hydrodynamics. The boiling water boiler has a capacity of 100 liters. Herba was distilled to obtain the oil. When the water vapor is boiled, the mass of vegetal material will pass through the dried herb oil molecules. The plant material was kept in the distillate about 25

minutes after the first steam passed through the dried herb table. The essential oil was extracted with a pipette and stored at 4 ° C in brown bottles until use.

Majoram is a undergrown shrub plant with stems that grow to lignify at maturity, reaching up to 0.8 m hight when flowering. It is perennial, resists negative temperatures up to minus 10.

Thymus is a submarine plant, 30-40cm high, perennial, present in culture for 5-7 years.

**RESULTS AND DISCUSSIONS**

For the 2 species of plants studied (*Thymus vulgaris* L. and *Origanum majorana* L.) the amount of oil obtained from 100 g of dry herb was determined and the drying yield was calculated. The drying yield is expressed as a percentage and represents the total amount of remaining dry herb compared to the original quantity of fresh herb weighed immediately after harvesting and conditioning.

From the graph illustrated in Figure 4, we notice that the production of herb at Thymus vulgaris L. obtained in the climatic conditions of 2017 was between 1140 and 1440 kg / ha, compared to the experimental field of 1281 kg / ha

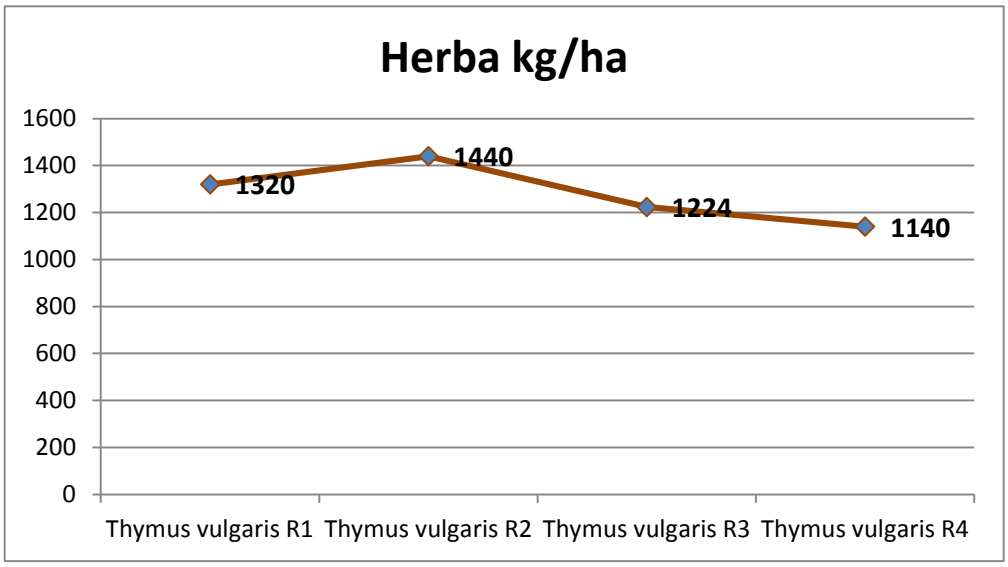


Figura 4. la Thymus vulgaris L. herb production (Kg/ha) 2017

Figure 5 shows the amount of essential oil obtained from dried herb in 2017, ranging between 8.3 and 11.5 l / ha, with a field average of 10.02 l / ha

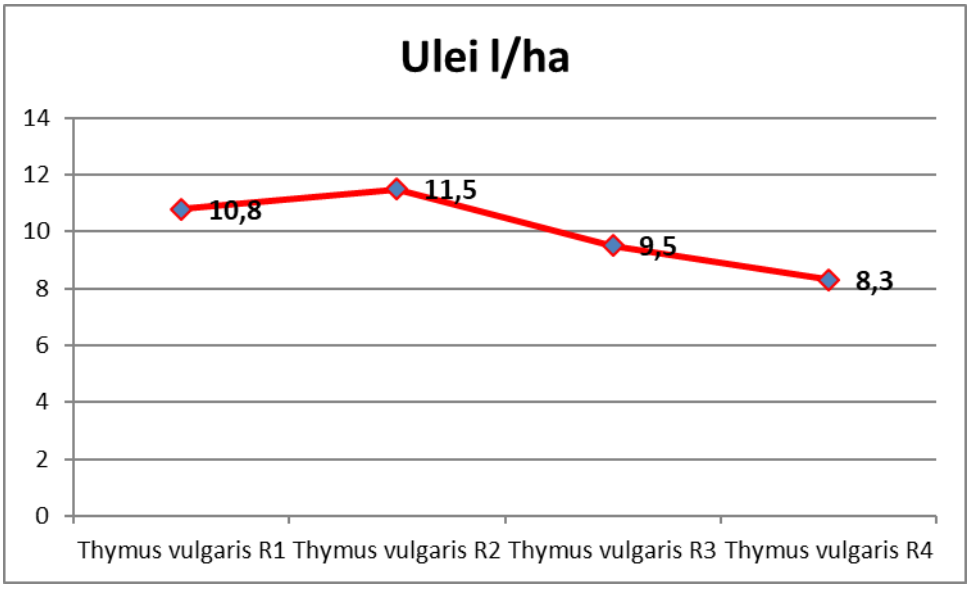


Figure 5. The quantity of essential oil (l / ha) obtained from dried herb in 2017

Figure 6 shows that the production of herb at Origanum majorana L. obtained in the climatic conditions of 2017 was between 2260 and 2800 kg / ha, compared to the experimental field of 2475 kg / ha.

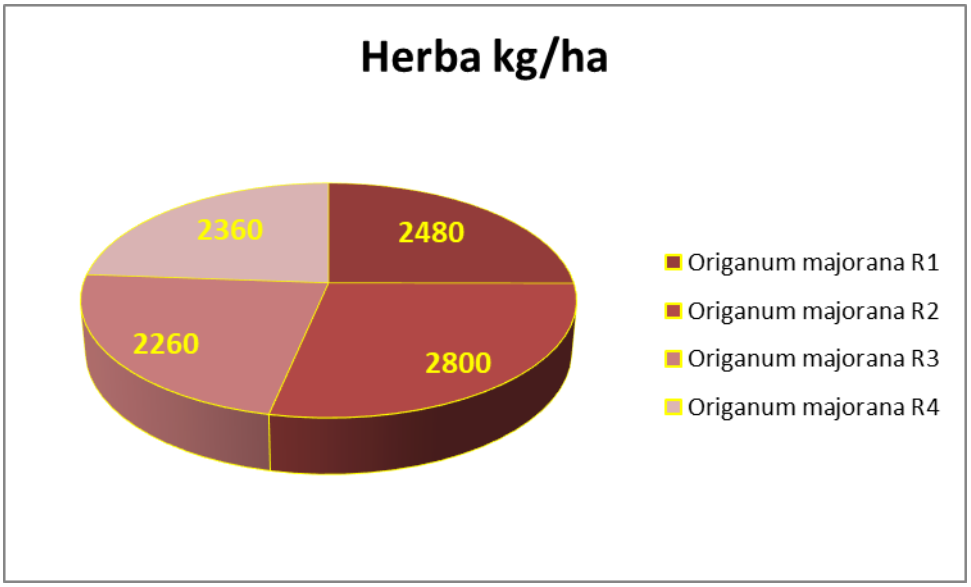


Figure 6. Production of herb (Kg / ha) of Thymus vulgaris L. obtained in 2017

Figure 7 shows the amount of essential oil obtained from dried herb in 2017, ranging from 8.3 to 11.5 l / ha, with a field average of 10.02 l / ha.

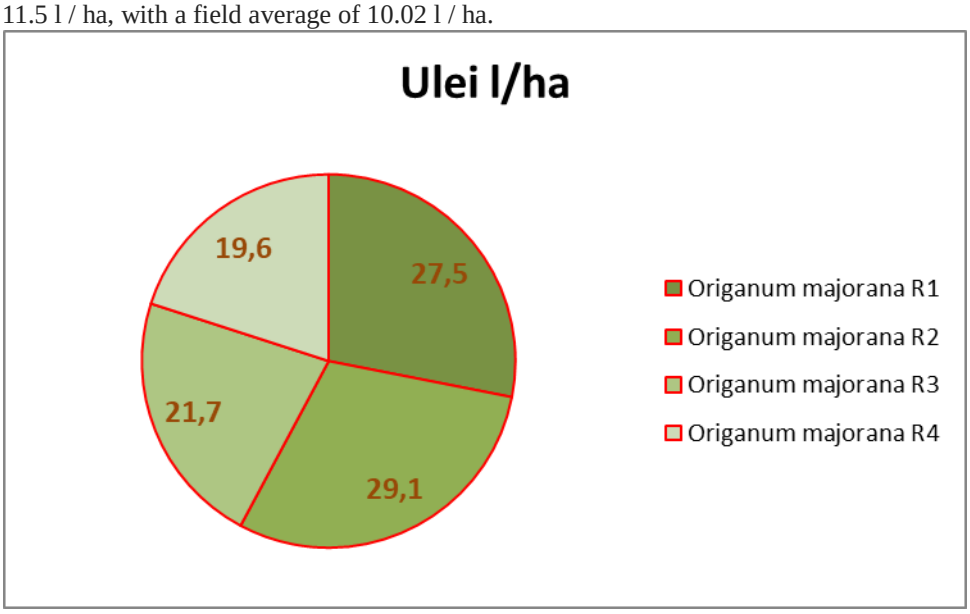


Figure 7. The quantity of essential oil (l / ha) obtained from dried herb in 2017

**The dimensions of the experimental field** were as follows: 16 plots with 12 rows/plot; line spacing 70cm/per row 50cm; parcel area 25.2sqm, strip surface 78.5 sqm; total area 482 sqm.

## CONCLUSIONS

The climatic conditions of 2017 were favorable for the development of WFP crops with the water supply specification mentioned above.

The sum of temperature and cold or heat peaks are not significantly different from 2016, which is considered optimal for all 4 WFP cultures from our experience. Of course, with the irrigation water that was made.

High temperatures and lack of rain in the spring months were the best for the accumulation of volatile oils in plants. The same cannot be said about the amount of herb produced at the surface unit that would certainly have been less without the mentioned water intake.

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