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EFFECTS OF DIFFERENT DRYING METHODS ON THE ESSENTIAL OIL CONTENT IN HERBS

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Abstract

The use of herbs has millennial history. For a long time they had a decisive role, information on the therapeutic effects of these continually proliferated. The main goal of this study was to determinate the essential oil content of herbs (lavender, sage, bitter fennel, anise, garden thyme), dried on three different temperatures (room temperature, 50°C and 100°C). The essential oil content decreases with increasing drying temperature, thus the quality of the herbs is decreased.

Key words: (maximum 6): essential oil, drying, herbs

INTRODUCTION

The use of herbs has a history of millennia. They had a decisive role for many years, and our information about their therapeutic effects has been increasing. These plants are partly used by the pharmaceutical industry, but many of them are important as home-made products. Treatment of the disease, symptom on time is very important, and these plants allow it. They often have an effect, usually without the side effects that modern materials can not achieve (Németh, 2011).

Scientific chemistry developed through general industrialization, which analyzed herbs on the basis of their chemical structure, analyzed compound groups, the main agents were isolated and began to imitate building blocks of nature. By transforming the molecules in the 20th century, new materials were created. This has begun a new era, which has "given us" all the medicines and plastics artificially produced in all areas of life. 90% of medicines have been plant origin for the last century. About 100 years later, the chemical industry became a great power and devastated mankind with 60000 different plastics, 50000,000 pesticides and fertilizers, and 30,000 drug store products. (Theiss & Theiss, 1989)

The rapid development of the pharmaceuticals a few decades ago tried to demonstrate that the use of herbal medicines and herbal teas also ceased, on the one hand, because they could synthetically produce botanicals inexpensively and unlimitedly, and on the other hand, new non-naturally

occurring chemicals substances will be used as medicines. This was not the case, because the development of drug research has increased the importance of herbs. (Rápóti & Romváry, 1997)

Nowadays, more and more are heard of the disadvantages of excessive antibiotic and drug consumption, so it is no wonder that we are turning more and more into our herbs. Their knowledge gives them a sense of security, because if we experience that we can rely on their healing power, fear from disease stems and helps us to strengthen our body.

The herbs are again in the forefront of interest because of the after-effects and side effects of chemical substances used as medicines. Research on the mechanism of action of herbs has been revived around the world, according to which the natural substances brought into the body promote and strengthen the regenerative and internal balance restoration processes. However, this does not mean that proven medical remedies can be replaced by herbal remedies. (Varró, 2011)

Five types of herbs (lavender, medical sage, bitter fennel, anise, thyme) were tested in our study. The purpose of the study was to determine the essential oil content of herbs after using 3 different drying temperatures (room temperature, 50 ° C, 100 ° C).

MATERIAL AND METHOD

For our investigations, we used herbs from different parts of Hungary, which were collected in 2014-2015.

Essential oil content determination and color measurement were performed with 5 spices (lavender, medical sage, bitter fennel, anise, thyme). The essential oil distillation was carried out in a large Hungarian herb processing plant.

The loss of drying of drugs is the loss of mass of the test drug by drying at 105 ° C and by weight to a decimal. For the determination, an average sample of uncapped and shredded drug should be made in such a way that the parts are not larger than 3 mm. The seeds and crops must be crushed even less than 3 mm. 10 g of the prepared drug was weighed down in a desiccated drying vessel cooled and weighed in a desiccator previously dried at 105 ° C in a desiccator containing calcium oxide or silica gel. Dry the vessel without the lid at 105 ° C for 120 minutes in a drying oven. After drying, allow the drying vessel to cool in a desiccator, then cover with cover and weigh up to mg reading accuracy. Unless otherwise specified, according to Pharmacopoeia Hungarica VII, drying at 105 ° C is repeated for 60 minutes until the difference between the two measurements is at most 0.25%. Oil seeds and essential oil-containing drugs have a drying time of 3

hours. (Pharmacopoeia Hungarica VII / I, 1986). In our experiment, a drying temperature of 50 ° C and 100 ° C was used with this drying time.

The moisture content of the herbs entering the herb processing plants must be at the acceptance limit. This value can be calculated according to the pharmacopoeia for lavender at max. 14%, max. 10%, max. 8%, with anise max. 7%, while the thyme is max. 10%. The mean samples of these items are used to determine the essential oil content with a vapor distillation apparatus. 2-2 parallel samples from each herb were analyzed and the effect of different drying temperatures was evaluated based on the results obtained.

The essential oil content of drugs is determined by the volume of essential oil extracted from vapour distillation.

In lavender, sage and thyme, the amount of essential oil extracted was determined by direct volume measurement. The essential oil content of the drug is expressed in ml by two decimal places per 100 g of drug dried at 105 ° C. (Pharmacopoeia Hungarica VII / I, 1986).

In the case of aniseed and bitter fennel, the essential oil content was determined on the basis of the increase in the volume of decalin auxiliary phase. In this case, the volume of dekalin previously read was deducted from the volume of decalin solution of the essential oil. The volume difference is the essential oil content of the drug, expressed in milliliters per 100 g of the drug dried at 105 ° C, rounded to two decimal places. (Pharmacopoeia Hungarica VII / I, 1986)

RESULTS

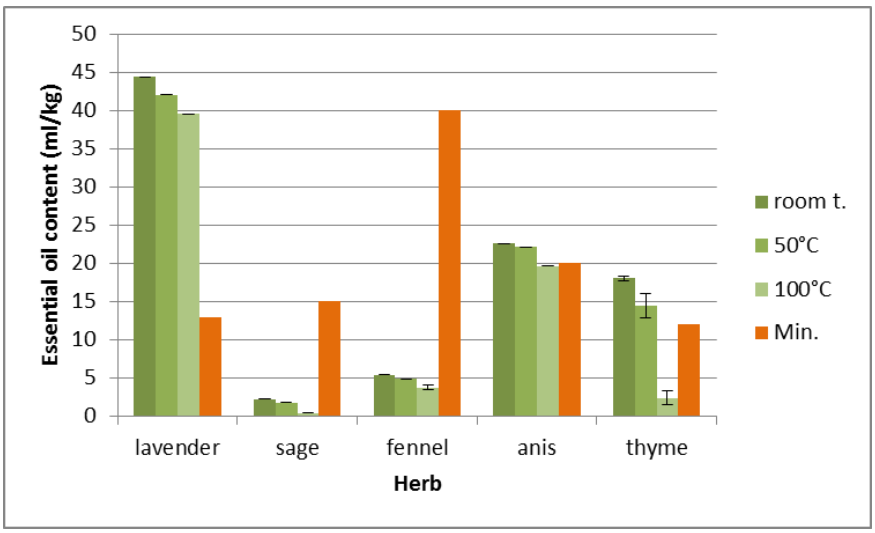

Fig.1 Minimal and measured essential oil content of the tested dry herbs

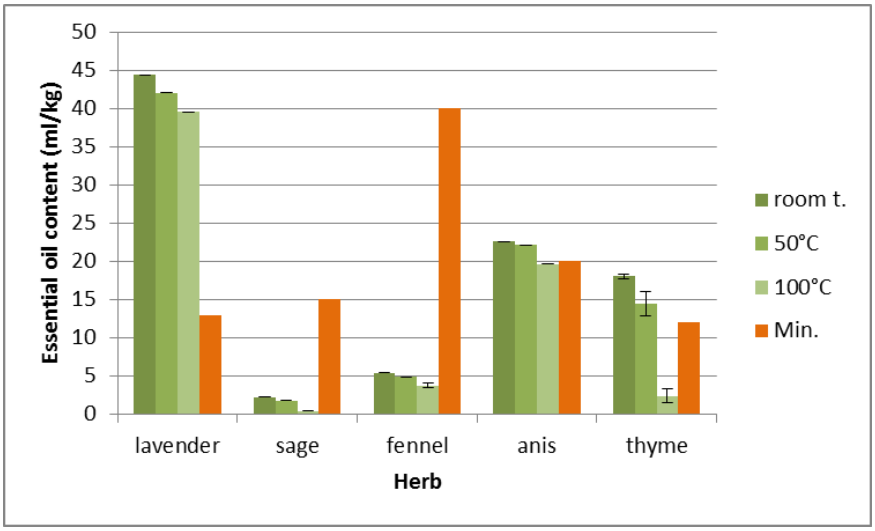

Table 1

Essential oil and moisture content of the tested dry herbs

Herb (min. essential oil cont.)	Essential oil content (ml/kg)			Moisture content (%)		
	room temp.	50°C	100°C	room temp.	50°C	100°C
lavender (13ml/kg)	44,35	42,04	39,51	9,81	9,6	8,89
medical sage (15ml/kg)	2,22	1,78	0,44	9,93	9,89	9,04
bitter fennel (40ml/kg)	5,42	4,9	3,76	11,39	10,29	9,66
anis (20ml/kg)	22,57	22,11	19,62	9,6	9,54	8,27
thime (12ml/kg)	18,06	14,44	2,41	10,27	9,98	8,75

The good quality of the examined lavender is demonstrated by the fact that the essential oil content was well above the expected limit for all three test methods (Table 1). The non-heat-treated material had the most oil and then decreased slightly at 50 ° C. Lavender dried at 100 ° C gave the least amount of active ingredient.

The amount of essential oil extracted from the medical sage dried at room temperature is below the minimum. As a result of the heat treatment, this value decreased further, after drying at 100 ° C, the oil content was almost unexposed.

The bitter fennel produced weaknesses similar to the medical sage. The essential oil content of the dried material at room temperature did not reach the minimum of 40 ml / kg. In the case of heat-treated samples, a decrease was observed in the initial 5.42 ml / kg.

The oil content of the anise at room temperature and at 50 ° C was higher than the minimum oil content, ie 20 ml / kg. As a result of stronger heat treatment, the oil content decreased to 19.62 ml / kg.

In the case of thyme, the oil content after the distillation from dried samples at room temperature was 18.06 ml / kg. After drying at 50 ° C, this value only showed a slight decrease. After the 100 ° C heat treatment test, the oil content was drastically reduced, almost immeasurable.

The bar graphs of Figure 1 illustrate the decrease of the essential oil content due to the drying modes. The lavender essence of the lavender has remained above the limit after the initial high value after 100 ° C drying. The essential oil content of the medical sage was almost unnoticed after the 100 ° C drying. The bitter fennel showed a tendency similar to that of the sage. The essential oil content of the anise dried at room temperature and 50 ° C was somewhat below the minimum value, after 100 ° C drying, this value fell below the minimum. The largest change was made in the thyme, where the baseline normal result was approx. 87% decrease.

CONCLUSIONS

Essential oil content decreases with increasing drying temperature, and the quality of herbs decreases. Of the herbs we examined, medical sage and bitter fennel samples did not reach the standard minimum. For other herbs, there was no problem here. In the case of thyme, samples dried at 100 ° C without heat treatment and at 50 ° C dried samples did not reach the limit, so the quality of the drug dropped significantly. For other plants, this decrease is not that drastic.

The application of different drying processes is also to be considered by the processing industry. Based on our measurements it can be seen that the highest essential oil content is achieved by the non-heat-drying process in all herbs we have studied. While drying at 50 ° C lowers essential oil content, the drying time can be reduced to increase productivity. Although drying at 100 ° C will further accelerate the drying process, I would not recommend this procedure because of the decrease in the essential oil content.

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