

# Influence of quality control on the process of drying herbal plants

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## Introduction

It is known that medicinal herbs have a positive effect on the human body in treating of various types of diseases. Considering that the action of medicinal herbs is based on the creation of biologically active substances (essential oils, alkaloids, tannins, vitamins, etc.), it is of great importance to maintain the concentration of these substances within acceptable limits that will not harm the human body (Silva Júnior et al., 2011).

Medicinal herbs in fresh and natural form contain a large amount of water which, after picking, would lead to fermentation, which would directly cause an increase in the concentration of biologically active substances and a decrease in the effect of herbs. For keeping medical effect of herbs, an important role has the process of drying, by which water is removed from the plant. During this process herbs will retain the properties they had in fresh form (pleasant smell, natural color and medicinal effects). Depending on the part of the herb that is being dried, appropriate methods and conditions are applied (Nikolic, 2012).

The flowers of the herbs can be dried naturally and by unnatural heating. Natural drying is the most common form of drying of medicinal herbs, where air flow should be provided in order for the plants to dry. The plants are dried on a certain substrate in thin layers. During drying the flowers should be rotated occasionally (Kišgeci et al., 1987). Drying by unnatural heating is the application of warm air and can take place in thermal dryers and ovens. The advantage of this type of drying is the shorter duration of the process, as well as the possibility of adjusting the temperature. Depending on the temperature that is used

drying can take several hours or minutes (Kišgeci et al., 1987).

The aim of this work is to show which drying methods and conditions are the best for applying on the flowers of medicinal herbs and how quality control can affect the drying processes in order to obtain a high quality product safe for use.

## Materials and methods

For the purpose of examining the influence of quality control on the drying process, research was performed on two herbs known for their medicinal properties - Marigold (*Calendula officinalis*) and Dandelion (*Taraxacum officinalis*). Analyzes were performed on the flowers of plants that were used for obtaining: marigold macerate, dandelion macerate, marigold balm and dandelion balm. Two methods were used for drying processes: drying flowers naturally indoors and drying flowers with unnatural heating. In order to show how quality control can affect the quality of medicinal herbs, different parameter values were used in the methods.

### *I-a Drying of marigold flowers - naturally indoors*

Material: marigold flowers, base for drying - stretched panel.

Drying time: 7 days.

Procedure: Collect a certain amount of the plant, inspect it and remove damaged leaves, unwanted primes and impurities.

Separate the marigold flowers from the stem and arrange them on a drying base in thin layers. Dry the marigold flowers in this way naturally in a room protected from

direct sunlight. It is necessary to ensure sufficient air flow. During drying, marigold flowers need to be rotated in order to dry evenly. Drying should be done immediately after picking to prevent fermentation. Dried flowers should be stored in a closed glass container protected from sunlight.

*II-a Drying of marigold flowers - by heat (unnatural heating)*

Material: marigold flowers, drying oven, base for drying

Drying time: 1h. Temperature: 45°C.

Procedure: Collect a certain amount of the plant, inspect it and remove damaged leaves, unwanted primes and impurities. Separate the marigold flowers from the stem and arrange them on a drying base in thin layers. Put the drying medium with the arranged marigold flowers in the oven, adjust the temperature and leave it to dry. Drying should be done immediately after picking to prevent fermentation. Dried flowers should be stored in a closed glass container protected from sunlight.

*I-b Drying of dandelion flowers-naturally indoors*

Material: dandelion flowers, base for drying-stretched panel. Drying time: 3 days.

Procedure: Collect a certain amount of the plant, inspect it and remove damaged leaves, unwanted primes and impurities. Separate the dandelion flowers from the stem and arrange them on a drying base in thin layers. Dry the dandelion flowers in this way naturally in a room protected from direct sunlight. It is necessary to ensure sufficient air flow. During drying, dandelion flowers need to be rotated in order to dry evenly. Drying should be done immediately after picking to prevent fermentation. Dried flowers should be stored in a closed glass container protected from sunlight.

*II-b Drying of dandelion flowers - by heat (unnatural heating)*

Material: dandelion flowers, drying oven, base for drying  
Drying time: 1h. Temperature: 60°C.

Procedure: Collect a certain amount of the plant, inspect it and remove damaged leaves, unwanted primes and impurities. Separate the dandelion flowers from the stem and arrange them on a drying base in thin layers. Put the drying medium with the arranged dandelion flowers in the oven, adjust the temperature and leave it to dry. Drying should be done immediately after picking to prevent fermentation. Dried flowers should be stored in a closed glass container protected from sunlight.

## Results and discussion

*Comparison of methods I-a and I-b*

Drying time has a significant impact on obtaining a quality dried product. Marigold flowers were dried for 7 days, while dandelion flowers were dried for only 3 days. As a consequence of insufficient drying time (dandelion flowers), it was obtained dried product which is not safe for use. Characteristics such as color and smell were significantly changed, and since the flowers were insufficiently dried, fermentation had started. Dried herbs with these kind of characteristics are not safe for further use because the concentration of active substances has been changed.

*Comparison of methods II-a and II-b*

Drying process is done by using heat (unnatural heating). In both methods, the drying time is the same (1hour) and the main difference is the drying temperature. Marigold flowers were dried at the temperature of 45C, while dandelion flowers were dried at the temperature of 60C. As a consequence of drying on high (dandelion flowers), it was obtained dried product which is not safe for use. Dandelion flowers have dried up and darkened, the smell has changed, which indicates that there has been a change in the concentration of active substances. Dandelion flowers have dried up and darkened, the smell has changed, which indicates that there has been a change in the concentration of active substances. Dried herbs with these kind of characteristics are not safe for further use.

## Conclusion

In order to obtain a high quality product that is safe for use, care must be taken in the choice of quality methods and parameters. Safe product implies product wglich characteristics are not chaged during the process of drying.

## References

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