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Effects of Applying Different Drying Strategies on Quality Characteristics and Post-processing of Lemon Balm (*Melissa officinalis* L.)

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Abstract

In medicinal plants many physical-chemical reactions are activated by temperature and therefore the application of drying causes an acceleration of these reactions. For this reason it is important to conduct research in order to minimise the negative effects of drying. The objective of this study was to observe the influence of drying on the final moisture, colour change and loss of essential oil considering two strategies; drying of leaves and stalks separately and drying of branches (leaves and stalks jointly). For the research, Lemon balm was considered as product and the drying experiments were conducted using a cabinet dryer. For each drying test, 100 g of product was used. The initial and final moisture contents of each sample were determined by the oven-drying methodology. To determine the colour changes, a Chroma-meter® device was used, in accordance with the norm DIN 6174. For the determination of the essential oil content, the method described in DAB 10 was considered. Drying was performed at 40°C and for comparison of results a fixed drying period of 11h was considered, in this period the recommended final moisture of leaves is reached. As result of the drying tests, severe differences in moisture content (wet basis w.b.) after 11h were observed. When performing drying at 40°C of single leaves, with initial moisture content of 80 % w.b. the moisture content of the leaves was 10 % w.b, and considering the drying of branches at 40°C, with the same initial moisture, and observing the leaves in this condition their moisture was 7.98 % w.b. Moreover, in the same tests, the moisture of the branches was observed. When the branches reach the recommended final moisture of 10 % w.b, after 25h, the leaves from these branches have final moisture of 7.41 % w.b. showing over-drying, that affects severely the quality characteristics. Likewise, appreciable differences in colour change and loss of essential oils were observed, comparing among the drying strategies and conditions proposed. From these results, it is possible to define the adequate drying parameters to minimise the effects on quality characteristics and the difficulty for post-processing, for example separation of leaves and stalks.

Keywords: Drying quality characteristics, drying strategies, medicinal plants, *Melissa officinalis*, moisture content