

# Technological studies on some horticulture crops

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Basil and marjoram are two of the most important medical herbs that exist in Egypt with a relative advantage after dehydrated and prepared to export. So this study is basically on how to maximize the relative advantage of the two herbs and how to find out the best ways for dehydration and preparing for export purposes with an eye on the highest yields. After sorting and washing and then experimenting four ways before dehydration, steam blanching for 30 sec., Immersion through hot water or magnesium citrate solution (1%) or sodium bicarbonate solution (1%) at 90°C for 10 sec. And after that dehydration by sun, protected-sun, electrical oven or microwave cabinet. The study was carried out to study of the chemical and physical characteristics for fresh basil and marjoram herbs, as well as chemical, microbiological and sensory evaluation of the two herbs leaves immediately after dehydration and during 9 months storage at room temperature. Comparing the experimented samples with another local manufactured sample (dehydrated by sun drying). This sample was gated from the same farm also took place through the samples under this study we can conclude the results as the following:-

1. The moisture content for fresh basil and marjoram was 89.69 and 85.72%, respectively, with a meager increase of moisture content of all blanched samples.
2. Moisture content of dehydrated basil ranged from 4.96 to 6.25%, while ranged between 5.01 to 6.40% for the dehydrated marjoram with a noticeable increase of moisture content for both herbs during storage.
3. Fresh basil and marjoram had 928.71 and 888.58mg/100g chlorophyll on dry weight, respectively with noticeable decrease for chlorophyll as a result of all blanching samples; however it was found that the lowest decrease took place when blanching the two herbs with a hot sodium bicarbonate solution (1 %) at 90°C.
4. A noticeable decrease in chlorophyll content through dehydration process took place at the two herbs. However a less decrease took place during microwave dehydration process as well as during storage.
5. Ash content in fresh basil and marjoram herbs were 13.44% and 9.68% on dry weight, respectively. A scant decrease in ash in case of the blanched samples through hot water or steam. However, a scant increase took place when blanching in salt solution.
6. A small increase in ash content took place during sun drying or protected-sun-drying as a result of dust pollution. While, no noticeable change happened in case of dehydration by electrical oven or microwave cabinet.
7. The ratio of essential oils on dry weight reached 2.04 and 1.88% for basil and marjoram, respectively. Noteworthy to mention that all blanched treatment led to a decrease in essential oils in both herbs.
8. Dehydration and storage periods led to a noticeable decrease the percentage ratio of essential oils. However the lowest decrease took place in both herbs when dehydrated by microwave.
9. The main compounds in basil essential oil were linalool (60%), Eugenol (11.1 %), Eucalyptol (7.93%), Trans-a-Bergamotene (2.78%) and Germacrene-D (2%). On the other hand, the major compound in fresh marjoram were Terpinene-4-ol (37.7%), Linalool (18.5%), Sabinene (9.31%),  $\gamma$ -terpinene (6.97%), Trans-Sabinene hydrate (5.03%), Linalyl-acetate (4.64%), 1,3-pinene (4.33%) and p-cymene (3.35%).
10. Dehydration time was varied according to the methods of dehydration, it ranged between 5-8 minutes by microwave, 9-11 hr by oven, 12-18 hr by protected-sun-drying system and 20-28 hr by sun drying for both herbs.
11. Blanching methods affected negatively on total bacterial count, yeasts and molds count for the fresh of both herbs.
12. All dehydration methods led to a noticeable decrease in total count of bacteria, yeasts and molds in both herbs. The highest decrease happened when using microwave dehydration. While the lowest decrease took place when using sun drying. A fluctuating increase took place during storage up to 9 months.
13. Sensory evaluation showed that samples

dehydrated by microwave were the best among other samples according to color, odor and general appearance as well as over all quality characteristics. Also microwave dehydrated samples met a very good degree of acceptance. 14. The economic part (leaves only) represents 64.2 and 65.2% for fresh basil and marjoram, respectively. While, represented 67.1 and 58.4% for the dehydrated herbs, respectively. 15. The mass volumes (Bulk density) were 176 and 155 kg/m<sup>3</sup> for fresh basil and marjoram, respectively. While the mass volume of dehydrated leaves were 199 and 142/m<sup>3</sup> for basil and marjoram, respectively. 16. After drying and final prepared to export it was found that drying and final herbs ratio varied according to methods of the dehydration as well as the sediment and unfit leaves ratio, they were lower by using microwave, while the higher by using sun drying. Finally, the study recommends developing ways of dehydration by using microwave machines and packaging the product in suitable package for export both of material and dimensions (according to the International Standards), tightly closed and completely filled. So as to have a relative advantaged and high quality export products.