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The effect of hot air and microwave drying on thermophysical and chemical properties of parsley, celery and coriander leaf powders

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Abstract

Background: This study aimed to evaluate the effect of drying methods on the drying characteristics, chemical composition, color and thermophysical properties of parsley, celery and coriander leaf powders. It also sought to predict the effective thermal conductivity (ETC) of these dried leaves using seven structural models and to compare the measured and predicted values.

Results: The leaves were dried using hot air at 60 °C and microwave drying at 200 W, with drying times ranging from 15 to 56 min depending on the method and plant species. The physico-chemical properties were mainly influenced by the plant species, whereas the effect of the drying method was less pronounced. However, the drying method significantly affected the color of the powders. Among the seven models tested, the parallel and co-continuous models provided the most accurate predictions of ETC.

Conclusion: Overall, plant species played a dominant role in determining the physico-chemical properties of the powders, whereas the drying method mainly influenced color. The parallel and co-continuous models proved to be the most suitable for predicting the ETC of the dried aromatic leaves.
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Keywords: drying; leaf powders; mathematical modeling; physicochemical properties; thermal properties.

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