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EVALUATION OF DRYING KINETICS AND MASS TRANSFER IN CONVECTIVE DRYING OF *CYNARA CARDUNCULUS*

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The dried thistle flower of *C. cardunculus* L., is widely used in the manufacture of various cheeses, in the Mediterranean regions and also in Portugal, where it is used for example to manufacture the traditional cheese owing the PDO (Protected designation of Origing) *Serra da Estrela*.
In the present work the mass transfer properties of thistle flower (*Cynara cardunculus* L.), were evaluated for the convective drying at temperatures between 35 and 65 °C with and air flow of 0.5 m s^{-1}. The calculations followed two different algorithms, based on mathematical models derived from the thin layer drying equation and the Fick's second law of diffusion. The results obtained indicated that the different methodologies resulted in different values of the mass transfer properties, which is an alert that care must be taken when choosing which calculation method might be more appropriate in a specific practical application. Regarding the values of the moisture diffusion and mass transfer coefficients, in all cases were found to increase with increasing operating temperature. The values of diffusivity increased from 2.7866×10^{-9} to 1.4027×10^{-8} m^2 s^{-1} when using the thin layer model based algorithm and from 1.9256×10^{-10} to 1.2033×10^{-9} m^2 s^{-1}, if based on the Fick's equation model. The values of the mass transfer coefficient increased from 8.4335×10^{-8} to 8.4400×10^{-7} m s^{-1} and from 5.8277×10^{-9} to 7.2398×10^{-8} m s^{-1}, respectively for the thin layer or Fick's law based models.

Keywords: activation energy, convective drying, diffusivity, mass transfer coefficient

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