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MATHEMATICAL MODEL FOR THE MASS TRANSPORT IN MULTIPLE POROUS SCALES

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Abstract

The transport of species in a vegetable matrix was modelled and studied based on a phenomenological model, in which a solid composed by the cells, pores and tissues was considered. The model is able to predict the multi-scale mass transport by defining only one effective diffusion coefficient, which made by proposing an inter-scale resistance constant. This parameter is a measure of the difficulty to the mass transport between two scales. The model was successfully validated with experimental data on the mass transport in both an organic and an inorganic matrix, which demonstrate the versatility of the model herein proposed.

Keywords: Multi-scale modeling, effective diffusivity, tortuosity, drying, chemisorption

1 Introduction

The vegetable cell is the basic unit of plants, able to produce compounds from hydrogen, carbon, nitrogen, sulfur and phosphorus. These compounds form part of the cellular

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