3. Experimental Part

3.1 Experimental procedure:

- Species: Three samples of Moroccan origin Epicia are used in the study.
- Sample 1 dimensions: (L = 1.964cm3, R = 1.957cm3, T = 6.126cm3)
- Sample 2: (L = 2.056cm3, R = 2.056cm3, T = 6.029cm3)
- Sample 3: (L = 2.043cm3, R = 2.043cm3, T = 6.112cm3)

The experimental device is:

- A balance (of 10^{-3}g sensitivity) to track the evolution of the mass of the sample over time by gaining weight at successive time intervals, the balance is equipped with a frame with all its sides closed to prevent the disruption caused measures the movement of air in the laboratory.
- An oven to dry the sample at 102 °C and having the measurement of the sample in the anhydrous state.
- Desiccators
- Crystallizer
- Thermometer

3.2 The experimental Contacts

Sample preparation does not require deep pockets. Indeed, the samples were cut in the tangential and radial directions of the longitudinal timber. The solution is distributed with excess salt (NaCl, 76% RH) in the crystallizer that is available in the dryer. The solution may be put directly into the bottom of the desiccators on a height of a few centimeters in order to have a maximum evaporation surface. The sample weight change is measured at well-defined intervals.

4. Results and Discussion

Three types of results are interest in this paper:

- The determination of parameters such as the main diffusivity and moisture content at equilibrium.
- The validity of the analysis and the numerical model is tested by comparing the absorption kinetics obtained by experiments and calculations.
- Determination of concentration profiles.

Measurement Parameters

Transfer to a dimension along a main direction of diffusion and the four sides are protected by a waterproof film. Each main diffusivity is calculated from the straight line obtained by plotting the quantity (Qt) of the moisture carried by the corresponding axis in function of the square root of time, diffusivity is easily calculated when the moisture content of the equilibrium (Q∞).

Along With:

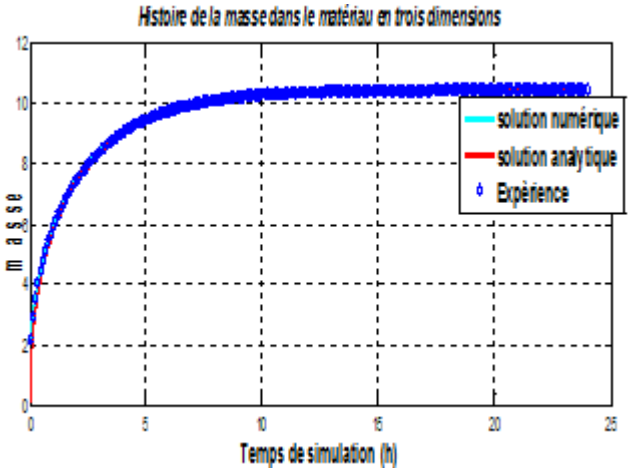
$$\frac{Q_t}{Q_\infty} = \frac{4}{L}\left(\frac{Dt}{\Pi}\right)^{0.5}$$

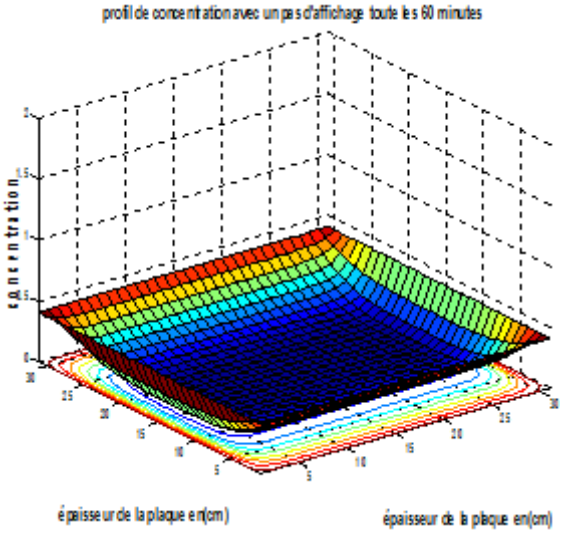
Where L is the thickness of the plate.

Table 1: Parameter Values

Principal axis	Diffusivity (cm^2/s)
Longitudinal	$1{,}97.10^{-5}$
Tangentiel	$1\ ,53.10^{-6}$
Radial	$1{,}49\ .10^{-6}$

The following results are obtained by calculations on scientific software.





- The validity of the digital model is evaluated by comparing the absorption kinetics obtained either by testing or by calculation using the above parameters.
- In these conditions, the analytical solution and the numerical model give the same curves.
- A good agreement is shown between the theoretical and experimental kinetics, proving the validity of the model.

5. Conclusion

According to this study, we conclude that:

- This model simulates in a few hours on transfers of up in reality several months or more.
- The validation of analytical and numerical model was made by comparing the experimental results and the theoretical results.
- The resulting profile provides better information on concentrations of moisture in the wood.

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