

**AN EMERGENT TECHNOLOGY FOR MODELLING DRYING:
COMPUTATIONAL FLUID DYNAMICS (CFD)**

Ö. Süfer*

Osmaniye Korkut Ata University, Faculty of Engineering,
Dept of Food Engineering, Osmaniye, Turkey

Drying is a complex process because both heat and mass transfer occur at the same time. The aim of this process is not only the removal of moisture from food material, but also acquiring a new well qualified product. On the other hand, drying needs huge amounts of energy, thus a development in any kind of drying equipment would be advantageous for reducing energy costs and quality losses of food. In this sense, a growing technology – Computational Fluid Dynamics (CFD) – is able to be used for mathematical modeling of drying phenomena and designing and optimising of a dryer in a confidential way. CFD solves problems numerically in a defined geometry using the Navier's stokes equations. These transport equations contain mass, heat and momentum balances. While problems are being solved, usually one of three techniques named as finite element, finite volume and finite differences is used. Finite element and finite volume techniques are more common. Mentioned numerical methods give temperature, velocity, pressure profiles inside dryer or system. Solutions can also be presented by shapes, vectors, graphics and/or animations with 2D or 3D images. In literature, researches have been generally focused on the simulation of spray dryers. Heat transfer investigation in impinging jet dryers has also drawn attention in recent years. Unfortunately, studies about modeling heat flow in tray and fluidized bed dryers have been very limited. Further CFD applications will highlight complicated flow behaviors in dryers and make easier to optimization.

Keywords: Computational fluid dynamics, drying, dryer, modeling

* Corresponding author: ozgesufer@osmaniye.edu.tr