ORAL PRESENTATION

Smart drying: use of sensors and machine learning for the supervision and control of drying processes

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Abstract

Globalization of market entails the availability of produces regardless their production date, pursued through innovation in products and processes to obtain meat, fish and fruit vegetables with improved shelf-life, organoleptic quality, nutritional value, safety and healthiness during the whole agrofood chain. Consequently, market value of perishable commodity mainly depends on the preservation method used to guarantee food stability and thus to delay physicochemical, biochemical and microbiological spoilage. Among processing methods, drying is one of the oldest, typical, effective and viable preservation process throughout the world, which allow to prevent food spoilage and decay through moisture removal. It is a relatively complex, dynamic, unsteady and nonlinear process that, when not optimized, may be responsible for (1) quality degradation of food and (2) energy wastage. Consequently, new drying technologies must be designed to assure valuable products at the lowest carbon footprint. Among emerging drying technologies, smart drying is one of the newest and promising ones. It has potential to guarantee high-value end products, while enhancing drying efficiency, by implementing innovative and reliable sensors, resources, tools and practices. Moreover, smart drying can be cost-effective in both real-time monitoring of foodstuffs quality and dynamic controlling of operating conditions along the whole drying process. Smart drying is a multi- and inter-disciplinary sector and its recent developments embrace the following R&D areas: artificial intelligence, biomimetic, computer vision, microwave/dielectric spectroscopy, visible and near-infrared spectroscopy, hyper/multispectral imaging, magnetic resonance imaging, ultrasound imaging, electrostatic sensing and control system for the drying environment.

Keywords: chemometrics, artificial intelligence, deep learning

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