

## **Recent advances of novel thermal combined hot air drying of agricultural crops**

### **ABSTRACT**

**Background:** Developing an efficient drying system with combined novel thermal and conventional hot-air drying of agricultural crops has become potentially a viable substitute for conventional drying techniques. Due to the synergistic effect, the total energy and time required can be drastically reduced, and the final quality of agricultural crops preserved. The growing interest and research in recent years have already shown that novel thermal with hot-air drying technology can adequately be used in the drying of agricultural crops. **Scope and approach:** This review attempts to give a summary of recent advances in the research and applications of novel thermal combined hot-air drying technology for agricultural crops, with particular emphasis on the combination mode, process conditions, process-quality interaction, drying kinetics, energy demand and drying efficiency. **Key findings and conclusions:** The combination of novel thermal with hot-air drying provides distinctive opportunities in the development of advanced agricultural crop drying technologies. The most significant advantages of using the above method were the reduction in the drying time and energy consumption as well as, an increase in the drying rate and overall efficiency. More so, the application of infrared and hot-air drying on agricultural crops is advantageous in obtaining dried products of better quality. In conclusion, the findings suggest that these technologies have great potentials. Therefore, more studies, especially in their industrial and commercial application are indispensable.

**Keyword:** Novel thermal technology; Hybrid technology; Hurdle technology; Hot air assisted drying; Advanced drying techniques; Drying kinetics