

Title            Technical and Economic Performance of a Tray Dryer for Medicinal and Aromatic Plants  
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### **Abstract**

This research considers engineering design, operation, functional performance and economic analysis of a heated-air tray dryer designed for medicinal and aromatic plants. In investigating the performance of the dryer, six drying tests with varying loading density were conducted with *Mentha piperita* and *Hypericum perforatum*. The drying process which reduced the product moisture contents from 59 to 80% (w.b.) to moisture content below 15% (w.b.) took 6–9 h depending on the material being dried and loading density. To obtain the high-quality dried products in terms of flavour and colour, the temperature of the drying air was controlled at  $46\pm 4^{\circ}\text{C}$  during drying experiments. This dryer can be successfully used to dry 145 kg of *M. piperita* and 120 kg of *H. perforatum* in each drying batch. The specific heat energy consumption of the dryer for *M. piperita* and *H. perforatum* were determined as 4840 and 7694  $\text{kJ kg}^{-1}$ [water], respectively, when the dryer was operated at maximum capacity. The payback period of the dryer is estimated to be less than 2.0 months for *M. piperita* drying and less than 0.5 months for *H. perforatum* drying.