

## **A chimney of low height to diameter ratio for solar crops dryer**

### **Abstract**

Sabah, Malaysia is rich with solar energy where the daily mean daylight is the for is available for 4–8h. The sunlight can be used effectively in a suitable solar crops drying system. Solar crops dryer with mechanical system is an efficient and suitable option for crops drying. Mechanical system can be replaced with a modified chimney and a conceptual design is proposed. Previously, in the laboratory, a number of experiments had been conducted by using conventional chimney and modified chimney with four different heat loads varied from 1 to 2.5kW and also for different chimney heights varying from 0.3 to 1.2m as well as three different types of chimney model with face areas of 0.56, 1.00, and 2.25m<sup>2</sup>. It had been found that the modified chimney significantly reduced the effect of flow reversal or cold inflow and restored the loss in flow rate. The current study using computational fluid dynamics (CFD) managed to show draft enhancement by the modified chimney and revealed the pressure prior to exit to be higher than ambient compared with the lower pressure in normal chimney, indicating vulnerability of normal chimneys to flow reversal but positive prevention in a modified chimney.