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Crop drying potential of solar chimney dryers

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Abstract. In this study the potential of crop drying using the solar chimney was examined. The heat trapped under the solar collector is used to heat large volumes of air and this air is allowed to flow over the food product to remove the moisture and also take away from the surrounding of the product. A mathematical modeling based on the effective moisture removal rate was developed. The prediction showed good agreement with the experimental result. The solar chimney dryers for Nakhon Ratchasima province in Thailand were examined. It was found that they offer the drying air temperature that is within the allowable temperature limit for food product (15-20°C higher than the ambient temperature). The improvement of collector efficiency from 5% to 10% can increase the system potential notably. Additionally, it was found that the dryers studied here are not economically practical for electricity generation. The proposed model can be used in a design of a solar chimney dryer for any specific drying capacity.