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Solar assisted dehumidifier based heat pump dryer for horticultural crops

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A solar assisted dehumidifier based heat pump dryer was developed and studied by dehydration of the horticultural crop. The heat pump dryer (20 kg/batch) was consisted of the drying chamber, dehumidifier, drying trays, solar air heater, circulation fan, electrical backup, blower and micro-processor based temperature controller. The dehumidifier was used to dehumidify the moist air of the drying chamber. The solar air heating collector was provided to supplement heat to the dryer. The coefficient of performance (COP) of the dehumidifier heat pump was 4.8 (heating and cooling). The COP along with the solar heating system was improved to 6.6. The dehumidifier based dryer was evaluated by drying Amla (Indian goose berry) fruits. The Amla (Emblica officinalis) fruits contains high amount of vitamin-C, which is volatile and highly susceptible to heat. The dryer provided a controllable drying environment (temperature and humidity) for better products quality at low energy consumption. Drying of the Amla was conducted at relatively lower temperatures (35-50°C). The vitamin-C content in the dried Amla was improved up to 88% as compared to the open sun drying.

Biography

Panna Lal Singh has completed his M. Tech at the age of 25 years from Indian Institute of Technology, Khragpur and Ph D from Maulana Azad National Institute of Technology, Bhopal. Both are premier Institutes of India in the technological studies. He is the Sr. Scientist at Central Institute of Agricultural Engineering, Bhopal (ICAR), a premier Institute in the field of agricultural engineering in India. He has published more than 10 papers in reputed journals.

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