Article

Effect of Drying on Lettuce leaves using Indirect Solar Dryer Assisted with Photovoltaic Cells and Thermal Energy Storage.

Supplementary Material:

Some aspects of interest of the drying vehicles in the solar installation. Water and air.

Fig. S1 shows the thermal history of the 5 points where the temperature of the water in the solar drying installation was measured while the complete drying process of the shredded lettuce leaves took place. These points corresponded to: water at the entrance of collector 1, at collector 1 towards 2, and at the exit of the collector 2, at the entrance of the heat exchanger (air-water) and at the exit of this (recirculation) on the way to the hydropneumatic and isothermal storage tank.

As expected, the lowest thermal measurement was the point corresponding to the input of collector 1, followed by the measurement point at the exit of collector 1 on the way to the entrance of the collector 2. The third was the measurement point of the temperature of the water at the exit of the heat exchanger (air-water), on the way isothermal hydropneumatic tank. The fourth thermal history recording that followed was the point at the entrance of the heat exchanger and finally the point corresponding to the exit of collector 2 towards the hydropneumatic and isothermal storage tank in which temperature values between 60.8 to 61.1°C were reached for the times from 280 to 320 min, respectively.

Fig S2 shows the behavior of air temperatures at the exit and inlet of the solar drying system through the rectangular insulated aluminum duct, placed from the exit of the drying chamber 2, which is divided longitudinally into two zones (Fig. 1), and whose purpose is the recovery of part of the heat of the humid air leaving the outside of the solar drying installation, with the air at room temperature entering from the outside.

It is observed in Fig. S2 the trajectories of the air temperatures during the whole drying process, both at the entrance and at the exit of the installation, observing that for the incoming and outgoing the values, the air was in the range of 21.3 to 30.4 ° C, and 28.9 to 35.2 ° C, respectively. However, the interesting thing about these trajectories is the temperature differences (ΔT) that occurred throughout the process, being most significant after 100 min (ΔT = 5.8 ° C) and ending at 600 min (ΔT = 8.5 ° C), although in some sections the ΔT was in the range of 10.0 ° C to 9.1 ° C, since 400 to 500 min. This leads to some caloric energy savings when the air enters the heat exchanger at temperatures higher than those of the environment. A more detailed and precise study of thermal savings will be carried out in future research for the aforementioned solar drying installation.

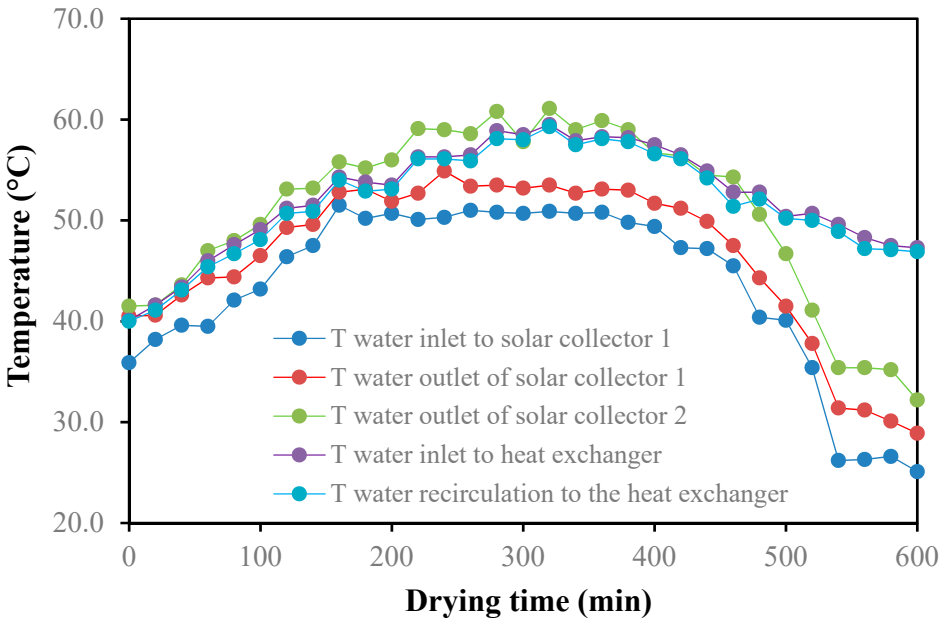

Figure S1. Water temperature in different places of the circuit performed by the solar drying installation.

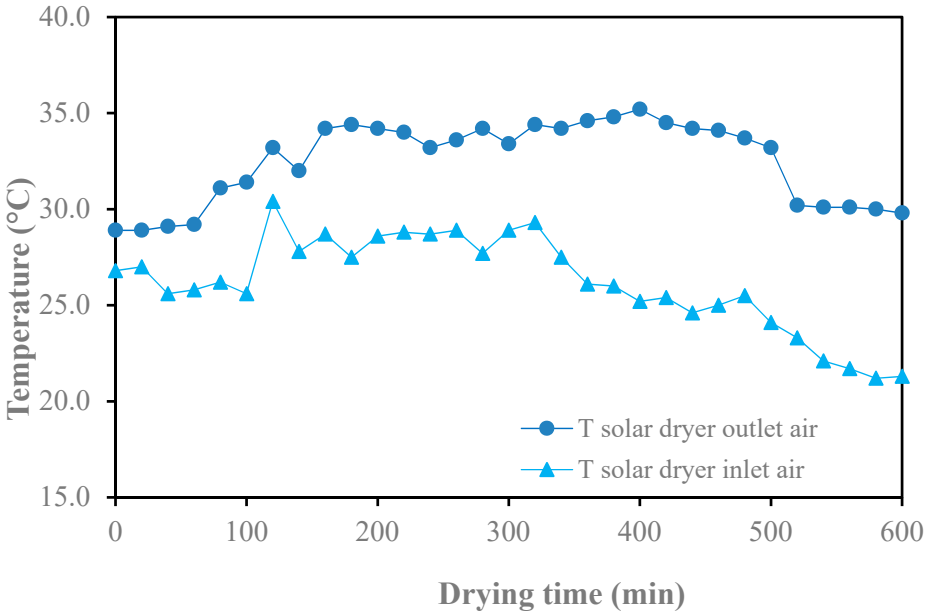

Figure S2. Inlet and outlet air temperature in the solar drying installation