

Thermo-Ecological Assessment of a Hybrid Solar Greenhouse Dryer for Grape Drying

Authors : Ilham Ihoume, Rachid Tadili, Nora Arbaoui

Abstract : The use of solar energy in agricultural applications has gained significant attention in recent years as a sustainable and environmentally friendly alternative to conventional energy sources. In particular, solar drying of crops has been identified as an effective method to preserve agricultural produce while minimizing energy consumption and reducing carbon emissions. In this context, the present study aims to evaluate the thermo-economic and ecological performance of a solar-electric hybrid greenhouse dryer designed for grape drying. The proposed system integrates solar collectors, an electric heater, and a greenhouse structure to create a controlled and energy-efficient environment for grape drying. The thermo-economic assessment involves the analysis of the thermal performance, energy consumption, and cost-effectiveness of the solar-electric hybrid greenhouse dryer. On the other hand, the ecological assessment focuses on the environmental impact of the system in terms of carbon emissions and sustainability. The findings of this study are expected to contribute to the development of sustainable agricultural practices and the promotion of renewable energy technologies in the context of food production. Moreover, the results may serve as a basis for the design and optimization of similar solar drying systems for other crops and regions.

Keywords : solar energy, sustainability, agriculture, energy analysis

Conference Title : ICREA 2024 : International Conference on Renewable Energy and Applications

Conference Location : Florence, Italy

Conference Dates : May 16-17, 2024