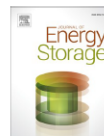


**5. Abdelkader, T. K., Salem, A. E., Zhang, Y., Gaballah, E. S., Makram, S. O., & Fan, Q. (2021). Energy and exergy analysis of carbon nanotubes-based solar dryer. Journal of Energy Storage, 39, 102623.**

### **Abstract**

Solar dryers play a pivotal role in minimizing drying energy consumption in small farms. Therefore, its development is an urgent need. In this study, a developed solar dryer comprised of a smooth solar air heater, shell and tube storage unit, and drying chamber, has been constructed and tested to dry a Chinese medicinal fungus (*Poria Cocos*). The dryer has been operated under two airflow rates and then, energy and exergy analysis applied to the system. The results show that: solar air heater averaged thermal and exergy efficiency were 66.2% and 4.6%, 70.2 and 4.4% for 1st and 2nd experiments, respectively. Carbon nanotubes- paraffin wax shell and tube storage unit averaged overall thermal efficiency was 12.2% and 19.6% leading to 8.1% and 11.9% as averaged overall exergy efficiency for 1st and 2nd experiments, respectively. The specific energy consumption (SEC) was 6.545 and 7.917 kWh / kg moisture, also, the dryer's overall thermal efficiency was 36.4 and 30%, for 1st and 2nd experiments, respectively. The final moisture content of *Poria Cocos* was in the range of 6.6-8% w.b. The system payback period is 1.55 years.



## Energy and exergy analysis of carbon nanotubes-based solar dryer

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### ARTICLE INFO

#### Keywords:

Indirect solar dryer  
Shell and tube storage unit  
CNTs-paraffin wax  
Poria Cocos drying

### ABSTRACT

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