

Research in Agricultural Drying in Thailand



Asst.Prof.Dr. Busarakorn Mahayothee Department of Food Technology Faculty of Engineering and Industrial Technology Silpakorn University, Nakhon Prathom, Thailand Email: busarakornm@yahoo.com www.foodtech.eng.su.ac.th







Facilities for Drying Activities at Silpakorn Uni. A Parabolic Greenhouse Solar Dryer



by Serm Janjai and the team



Quality analyses facilities

More than 700 units

www.solardryerdede.com



• Sun drying is the most common drying method.



Hygienic problem; Does not follow Good Manufacturing Practices, GMP



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Hygienic problem; Does not follow Good Manufacturing Practices, GMP



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Insufficient protection against weather



• Sun drying is the most common drying method.

Indian gooseberry





Food Safety Concern; long time for drying, high risk from mold



• Sun drying is the most common drying method.



Food Safety Concern; long time for drying, high risk from contaminations











Fig. 1. Pictorial view of the greenhouse solar dryer.

Available online at www.sciencedirect.com

ScienceDirect

Solar Energy 83 (2009) 1550-1565



www.elsevier.com/locate/solener

Experimental and simulated performance of a PV-ventilated solar greenhouse dryer for drying of peeled longan and banana

S. Janjai^{a,*}, N. Lamlert^a, P. Intawee^a, B. Mahayothee^b, B.K. Bala^c, M. Nagle^d, J. Müller^d

^a Solar Energy Research Laboratory, Department of Physics, Faculty of Science, Silpakorn University, Nakhon Pathom 73000, Thailand ^b Department of Food Technology, Faculty of Engineering and Industrial Technology, Silpakorn University, Nakhon Pathom 73000, Thailand ^c Department of Farm Power and Machinery, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh ^d Institute of Agricultural Engineering, University of Hohenheim, Stuttgart 70593, Germany

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• Structure



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- The dryer consisted of a parabolic roof structure with a size of $8.0 \times 5.5 \times 3.5$ m³ covered with 6-mm thick polycarbonate sheets.
- The DC fans operated by the solar cell modules were installed in the wall opposite to the air inlet to ventilate the air in the dryer.

Fig. 2. The structure and dimension of the dryer and the positions of the thermocouples (T), hygrometers (rh), air speed (V) and product samples for weights (M).





















• Solar Radiation

Fig. 4. Variations of solar radiation during a typical experimental drying run for peeled longan.













































located in Muang Nakhon Pathom District, Nakhon Pathom Province 17







Implementing a parabolic solar dryer to Farmer cooperatives





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Original article

Influence of drying conditions on colour, betacyanin content and antioxidant capacities in dried red-fleshed dragon fruit (*Hylocereus polyrhizus*)

Busarakorn Mahayothee,¹* (D) Nilobon Komonsing,¹ Pramote Khuwijitjaru,¹ Marcus Nagle^{2,3} & Joachim Müller²

1 Department of Food Technology, Faculty of Engineering and Industrial Technology, Silpakorn University, Nakhon Pathom 73000, Thailand

2 Institute of Agricultural Engineering, Tropics and Subtropics Group, Universität Hohenheim, Stuttgart 7059

3 Agricultural Research and Development Program, Central State University, Ohio 45384, USA

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Impact of drying temperature on color of dried red-flesh dragon fruit



Figure 2 Visual comparison of red-fleshed dragon fruits in different drying conditions. (a) air velocity of 1.0 m s⁻¹ and (b) air velocity of 1.5 m s⁻¹. [Colour figure can be viewed at wileyonlinelibrary.com]







and new flavo

NING











Dried mango

22



Effect of drying temperature and drying method on drying rate and bioactive compounds in cassumunar ginger (*Zingiber "Plai oil" as a montanum*) muscle pain relief oil

Busarakorn Mahayothee ª 🖰 🖾, Thipharat Thamsala ª, Pramote Khuwijitjaru ª, Serm Janjai ^b

drying of cassumunar ginger (*Zingiber montanum*) slices using a hot air dryer at 40, 50, 60, 70, and 80 °C, a largescale greenhouse solar dryer, and sun drying 23



. 2. Drying curves (A) and drying rate (B) of cassumunar ginger slices in the greenhouse solar dryer and the sun drying. Two replications are presented separately to the nature of the method.

https://doi.org/10.1016/j.jarmap.2020.100262















Cassumunar ginger,

Plai







Nilobon Komonsing, Pramote Khuwijitjaru, Marcus Nagle, Joachim Müller, <u>Busarakorn Mahayothee</u>. (2022). Effect of drying temperature together with light on drying characteristics and bioactive compounds in turmeric slice. *Journal of Food Engineering* 317: 110695.





Nilobon Komonsing, Sebastian Reyer, Pramote Khuwijitjaru, <u>Busarakorn Mahayothee</u>, and Joachim Müller. (2022). Drying Behavior and Curcuminoids Changes in Turmeric Slices during Drying under Simulated Solar Radiation as Influenced by Different Transparent Cover Materials. Foods 11: 696.



Loadcell connected to a data logger







Polycarbonate sheet



Integrating of a parabolic solar dryer with Medicinal plants

Curcuma zedoaria (Christm.) Roscoe





Drying 2-3 days





Drying of medicinal plant using a parabolic greenhouse solar dryer

Black galingale (Kaempferia parviflora)



Solar Drying: drying time = 3-3.5 days or until moisture content (MC) less than 10% Major bioactive compound: 5,7-dimethoxyflavone



Drying of medicinal plant using a parabolic greenhouse solar dryer

Black galingale (Kaempferia parviflora)





YouTube Channel Food Technology Silpakorn University³¹







International Knowledge and Technology Transfer



References

Janjai, S., N. Lamlert, P. Intawee, B. Mahayothee, B. K. Bala, M. Nagle, and J. Müller. 2009. "Experimental and Simulated Performance of a PV-Ventilated Solar Greenhouse Dryer for Drying of Peeled Longan and Banana." Solar Energy 83 (9): 1550–65. https://doi.org/10.1016/j.solener.2009.05.003.

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