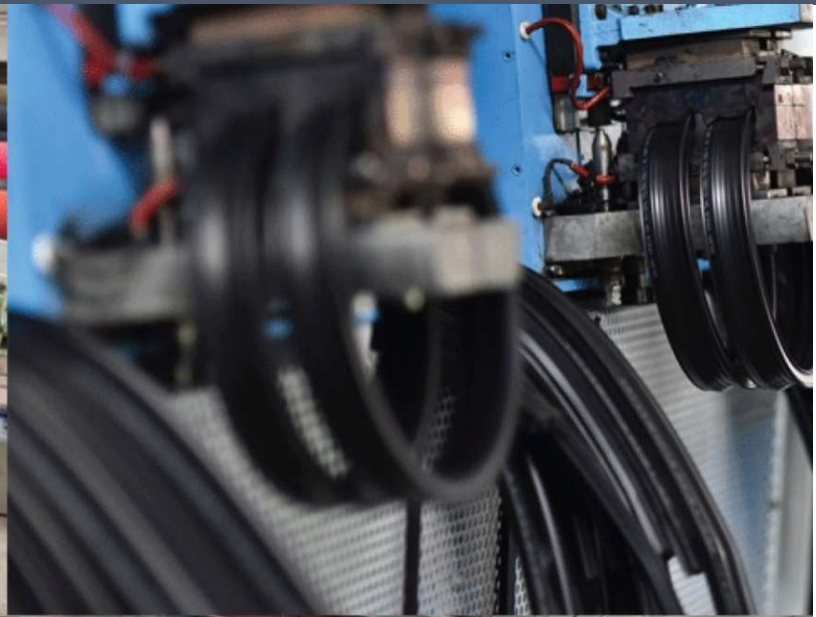


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Heat Pump Dryer Treatment for Drying of Dates



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Customer :	
Process :	Heat Pump Dryer for Drying of Dates

Test Report No: 246/KRDC/LAB/17 Mum 23/11/2023

Date Sample reception : 04/11/2023
ID : KRDC/R&D/23-24/23/11

Sample Description:

Sampling : As Requested
Sample Condition : Acceptable
Sampling date : 06/11/2023
Product : Dates
Requirement : Drying of Dates
Start Date test : 06/11/2023
End Date test : 09/11/2023

Laboratory Experimental System –



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System Specifications –

IR Power	5 kW
Type of IR Emitters	Quartz Infrared
Rotary Drum Size	Φ324 mm x 800 mm long x 3mm Thick.
Thermal Monitoring System	Single Channel Fiber Optic: Range -40 to 250°C
Exhaust	Exhaust port with manual damper
Air Circulation Fan	Radial Fan FHP 0.5HP

Laboratory's Environmental Conditions –

Temperature (degree C)	29.4°C (±5°C)
Humidity (%)	≤50% RH
Pressure (kN/m² or kPa)	Not recorded

Note for recommendation: Environmental conditions have a direct impact on test results. Accuracy and consistency of test data are affected by the laboratory conditions






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Equipment Used –

Name of Equipment	Picture of Equipment	Specifications
Compact Thermal Imaging Camera		Model: FLIR E-30 Resolution: 160x 120IR Thermal sensitivity of 0.10°C
Thermo Hygrometer		Model No: HTC-2 Temperature accuracy: $\pm^{\circ}\text{C}$ (1.8°F) Temperature resolution: 0.1°C (0.2°F) Humidity range: 10%~99% RH Humidity accuracy: $\pm 5\%$ RH Humidity resolution: 1% RH
Analytical Balances LINB-A10		Capacity : 100 g Minimum weighing : 0.0004 g Resolution : 0.0001 g Pan size : \approx 80 mm



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Procedure of the Experiment -

- The experiment was performed on Dates to speed up the heating rate.
- For this experimental run, the given sample was taken and then passed into the Heat Pump drying system with suitable parameters.
- After the drying treatment, the sample was analyzed.

Analytical Results:

Initial Moisture: 15.7

Trials	Cycle time	Initial weight	System Specifications	Final weight	Remark
C1	34 hrs.	900 g	Set temp: 60°C Rh – 10 %	626g	Dried as desired

Final Moisture: 1.5%

Before and After images:



Untreated Sample



Treated Sample



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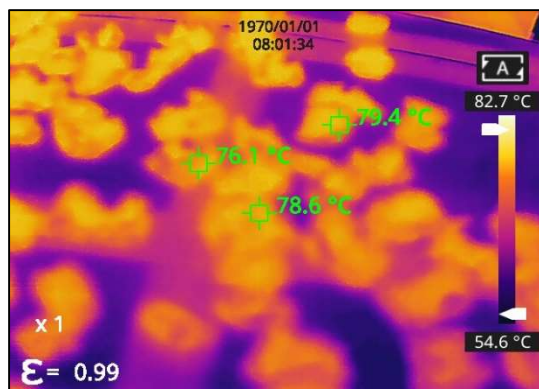
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Thermal images:Measurements

Sp1	76.1°C
Sp2	79.4°C
Sp3	78.6°C

Parameters

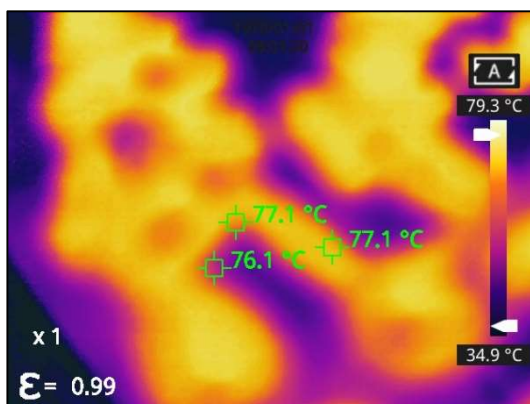
Emissivity	0.99
Temp.	82.7°C

Measurements

Sp1	77.1°C
Sp2	76.1°C
Sp3	77.1°C

Parameters

Emissivity	0.99
Temp.	79.3°C





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Moisture Analysis Report:

Drying started		Drying started	
Date :	8-11-2023	Date :	18-11-2023
Time :	17:36:17	Time :	17:26:42
Model :	AGS200	Model :	AGS200
Serial number :	138	Serial number :	138
Drying parameters		Drying parameters	
Product :	0	Product :	0
Drying temperature :	105.0 °C	Drying temperature :	105.0 °C
Drying profile :	standard	Drying profile :	standard
Mode :	Short mode	Mode :	Short mode
Calculation :	$((m_0-m)/m_0)*100\%$	Calculation :	$((m_0-m)/m_0)*100\%$
Finished :	3 samples	Finished :	3 samples
Initial weight :	1.117 g	Initial weight :	1.071 g
Final weight :	0.942 g	Final weight :	1.055 g
Drying time :	00:15:40s	Drying time :	00:02:20s
Sampling interval :	20 sec	Sampling interval :	20 sec
Moisture :	15.7 %	Moisture :	1.5 %
NOTE	Initial Moisture	NOTE	Final Moisture
The analysis performed by:		The analysis performed by:	
Signature..... <i>Rayde</i>		Signature..... <i>Rayde</i>	

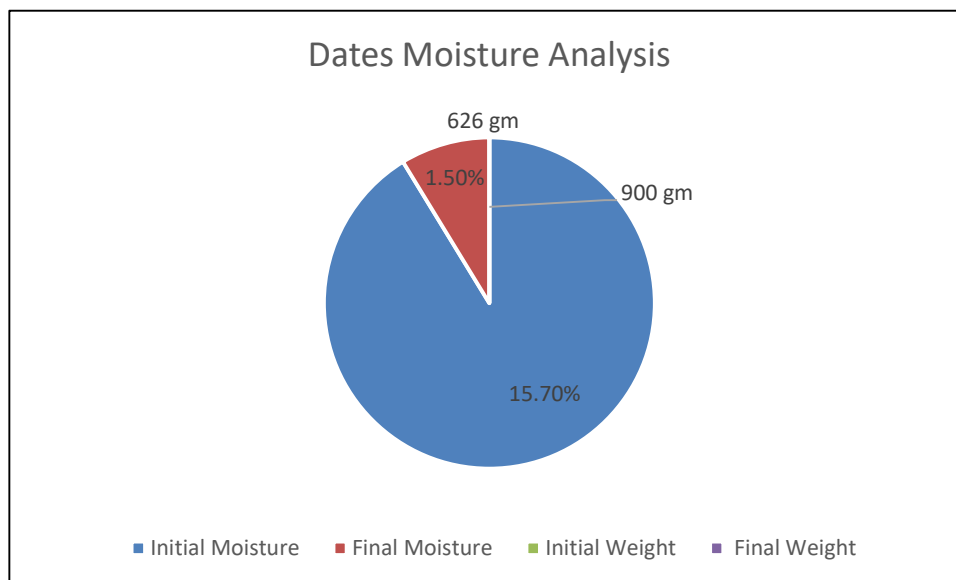


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Pie Diagram:



Observations:

The heating behavior Dates of were investigated under the Heat Pump Dryer system. The heating rate was found to be increasing with respect to increasing in time. The physical investigation observed that the product was dried as desired.

Mrs. Priya Tayde

(Tested By)