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Kerone Research & Development Centre (KRDC)
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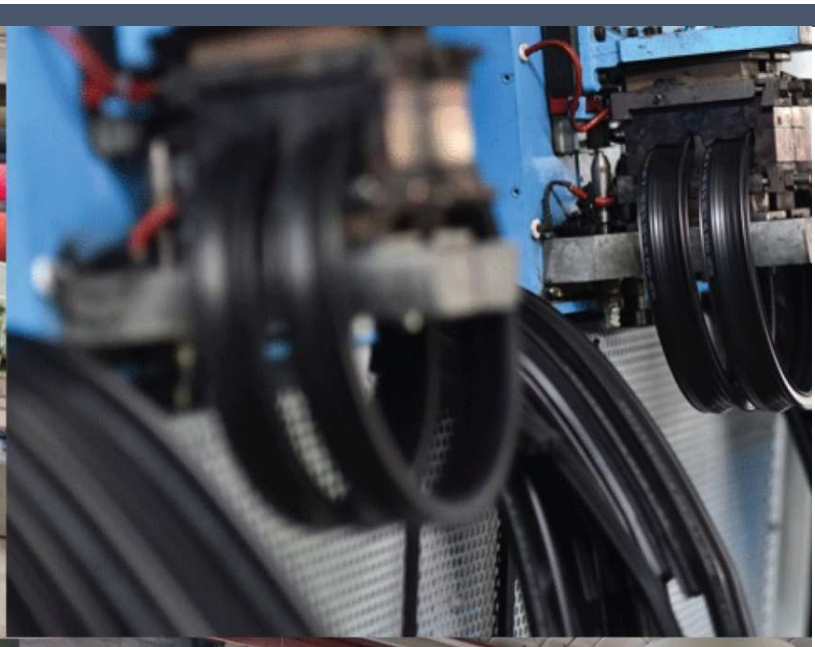

Heat Pump Dryer Treatment for Drying of Marigold Flowers

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Customer:	
Process:	**Heat Pump Dryer for Drying of Marigold Flowers**

Test Report No*: *243/KRDC/LAB/17 Mum 02/11/2023

Date Sample reception : 01/11/2023
ID : KRDC/R&D/23-24/02/11

***Sample Description*:**

Sampling : As Requested,
Sample Condition : Acceptable
Sampling date : 01/11/2023
Product : Marigold Flowers
Requirement : Drying of Marigold Flowers
Start Date test : 01/11/2023
End Date test : 01/11/2023

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 250ºC
Exhaust	Exhaust port with manual damper
Air Circulation Fan	Radial Fan FHP 0.5HP

Laboratory's Environmental Conditions –

Temperature (degree C)	29.4ºC (±5ºC)
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

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**

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Thermo Hygrometer		**Model No: HTC-2** **Temperature accuracy: ±°C (1.8°F)** **Temperature resolution: 0.1°C (0.2°F)** **Humidity range: 10%~99% RH** **Humidity accuracy: ±5% RH** **Humidity resolution: 1% RH**
Analytical Balances LINB-A10		**Capacity : 100 g** **Minimum weighing : 0.0004 g** **Resolution : 0.0001 g** **Pan size : ⌀ 80 mm**

Procedure of the Experiment **-**

- The experiment was performed on Marigold Flowers 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:

Trial – 01
Initial Moisture: 81.7%

Trials	Cycle time	Initial weight	System Specifications	Final weight	Remark
C1	20 mins	100gm	Set temp:70˚C Rh – 30 %	11gm	Dried as desired

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Final Moisture: 12.5%

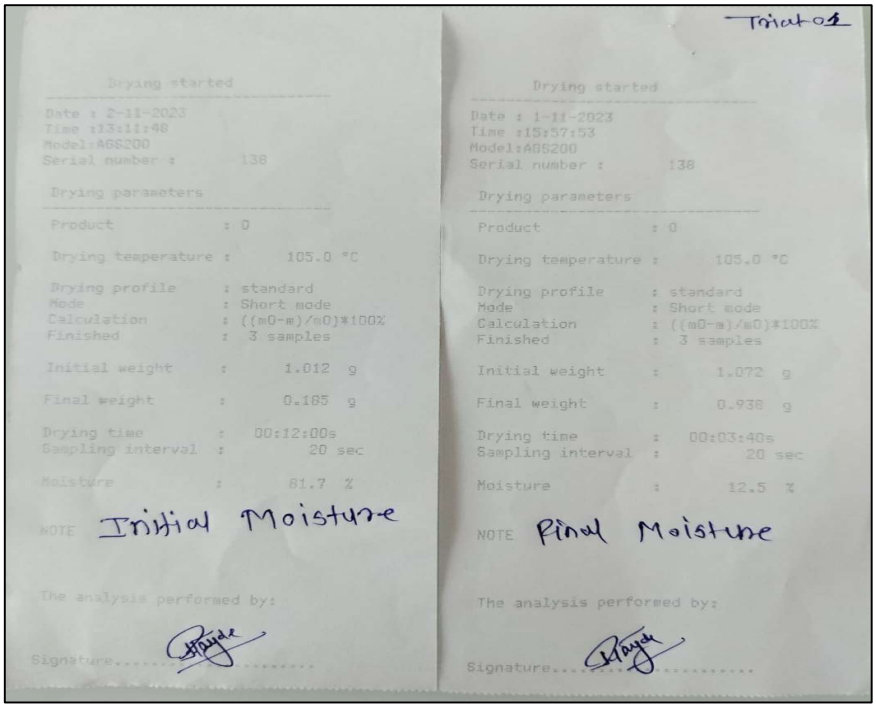
Before and After images:

Trial -01

Untreated Sample

Treated Sample

Moisture Analysis Report:



Trial 01

Drying started
Date : 2-11-2023
Time :13:11:48
Model:AGS200
Serial number : 138

Drying parameters
Product : 0
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples
Initial weight : 1.012 g
Final weight : 0.185 g
Drying time : 00:12:00s
Sampling interval : 20 sec
Moisture : 81.7 %
NOTE Initial Moisture
The analysis performed by:
Signature.....

Drying started
Date : 1-11-2023
Time :15:57:53
Model:AGS200
Serial number : 138

Drying parameters
Product : 0
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples
Initial weight : 1.072 g
Final weight : 0.938 g
Drying time : 00:03:40s
Sampling interval : 20 sec
Moisture : 12.5 %
NOTE Final Moisture
The analysis performed by:
Signature.....

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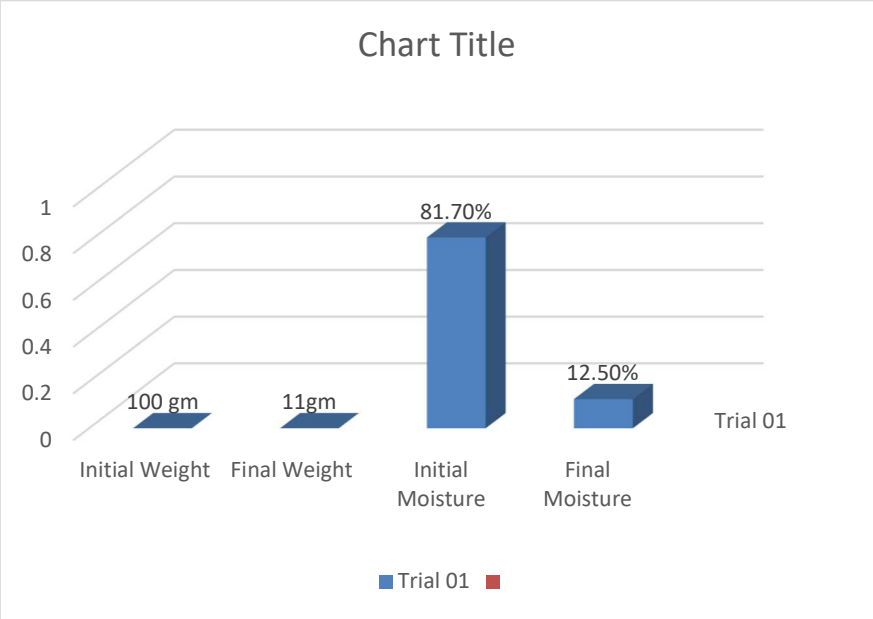
Histogram:



Observations:

The heating behavior of Marigold Flowers was 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 dry without any Cheering effect.

Mrs. Priya Tayde

(Tested By)