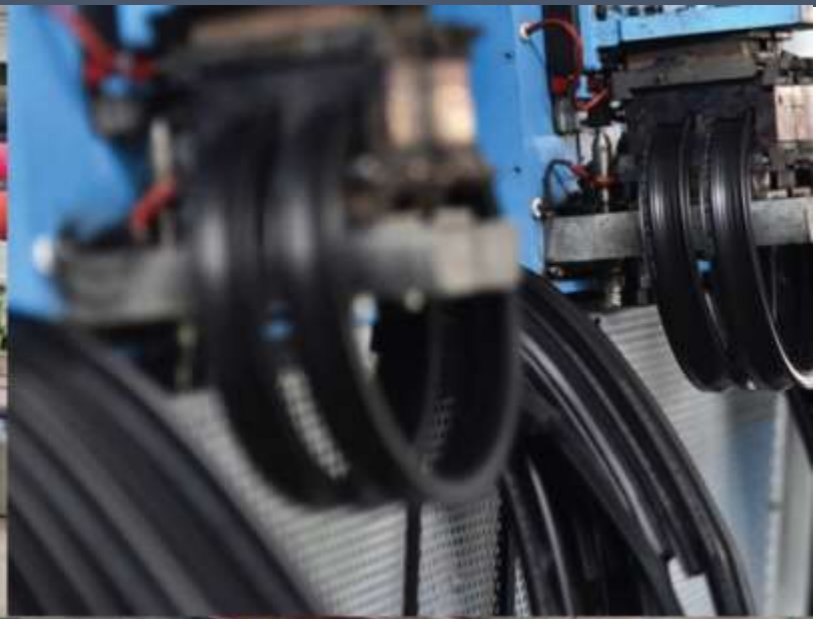


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Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com



**Batch Convection Heat Treatment  
for Drying of Jaggery Powder**

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Customer :	M/s. Girnar Food & Beverages Pvt. Ltd
Process :	Batch Convection Heat Treatment for Drying of Jaggery Powder

**Test Report No: 182/KRDC/LAB/17 Mum 23/01/2023**

Date Sample reception : 21/01/2023  
ID : 182/LAB/23

**Sample Description:**

Sampling : As Requested  
Sample Condition : Acceptable  
Sampling date : 21/01/2023  
Product : Jaggery Powder  
Requirement : Dried Jaggery powder with desired Moisture content 1-2%  
Start Date test : 21/01/2023  
End Date test : 21/01/2023

**Laboratory Experimental System -**



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### System Specifications -

Heating Zone (width*height*depth)	510*480*410 mm
No. of Heaters	6
Total Heater Power	6 kW
Motor	0.5 HP
No. of trays	6
Tray size (width*height*depth)	560 x 435 x25
Centrifugal Exhaust Blower	1440 rpm

### Laboratory's Environmental Conditions –




Temperature (degree C)	29.4°C (±5°C)
Humidity (%)	≤50% RH
Pressure (kN/m <sup>2</sup> 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		<b>Model: FLIR E-30</b> <b>Resolution: 160x 120IR Thermal</b> <b>sensitivity of 0.10°C</b>
Thermo Hygrometer		<b>Model No: HTC-2</b> <b>Temperature accuracy: <math>\pm^{\circ}\text{C}</math> (1.8°F)</b> <b>Temperature resolution: 0.1°C (0.2°F)</b>  <b>Humidity range: 10%~99% RH</b> <b>Humidity accuracy: <math>\pm 5\%</math> RH</b> <b>Humidity resolution: 1% RH</b>
Moisture Analyzer		<b>Make: Axis Balance</b> <b>Description:</b> <b>Moisture range: 1%(sample 0.02/0.05g),</b> <b>0.1% (Sample 0.5/5g),</b> <b>0.01%(Sample&gt;5g)</b>

Format: F/R&D/01

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### Procedure of the Experiment -

- The experiment was performed on Jaggery Powder to speed up the heating rate.
- For this experimental run, the given sample was taken in the SS tray and placed in the heating system with suitable parameters.
- After the heating treatment, the sample was analyzed.

### Analytical Results:

#### **Trials 1 –**

Initial Weight- 300g

Initial Moisture- 3.8%

Cycles	Cycle time (mins.)	Specifications of Microwave	Moisture Content (%)	On product Temperature (°C)	Remark
1	After 15 mins.	Set temp.-70°C	0.6	(70-80)	Dried as desired moisture content

Final Weight- 291g

Final Moisture- 0.8%

### Images during trials:



**Untreated Sample**



**Treated Sample**

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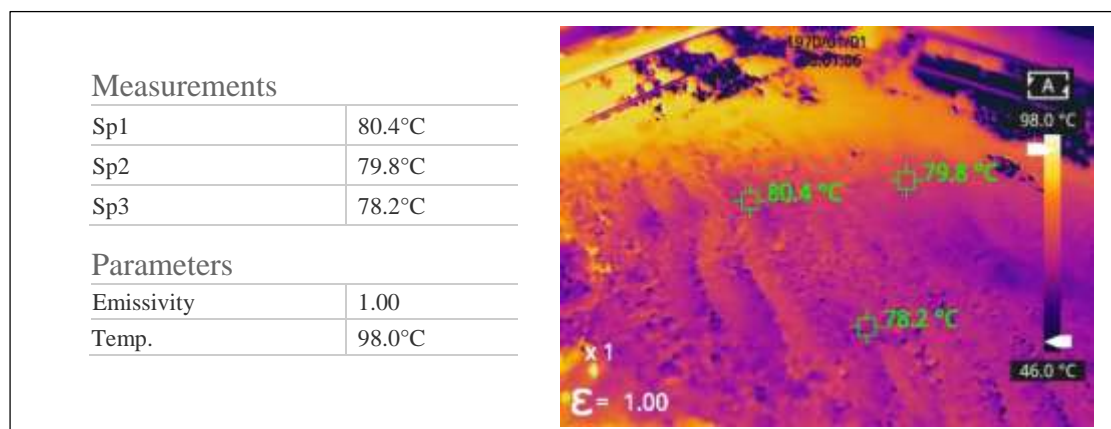
**Moisture Analysis Report:**

*Sagony.*

Drying started	
Date:	21-01-2023
Time:	10:00:32
Model:	AD0200
Serial number:	138
Drying parameters	
Product:	10
Drying temperature:	105.0 °C
Drying profile:	standard
Mode:	Short mode
Calculation:	$((m0-m)/m0)*100\%$
Finished:	3 samples
Initial weight:	0.611 g
Final weight:	0.588 g
Drying time:	00:02:00s
Sampling interval:	20 sec
Moisture:	3.8 %
NOTE:	<i>Initial moisture</i>
The analysis performed by:	
Signature:	<i>Angel</i>

Drying started	
Date:	21-01-2023
Time:	10:01:15
Model:	AD0200
Serial number:	138
Drying parameters	
Product:	10
Drying temperature:	105.0 °C
Drying profile:	standard
Mode:	Short mode
Calculation:	$((m0-m)/m0)*100\%$
Finished:	3 samples
Initial weight:	0.650 g
Final weight:	0.655 g
Drying time:	00:01:40s
Sampling interval:	20 sec
Moisture:	0.8 %
NOTE:	<i>Final moisture</i>
The analysis performed by:	
Signature:	<i>Angel</i>

**Thermal Images:**



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### Observations:

The heating behavior of Jaggery Powder was investigated under the Convection heating system. The heating rate was found to be increasing with respect to the increase in time. As per the physical investigation, it was observed that the product was free-flowing after heat treatment. Also, the product was dried to desired moisture content. Some taste difference was noted for product temperature above (55-60) °C.



**Ms. Sayali Asole**  
( Tested By )