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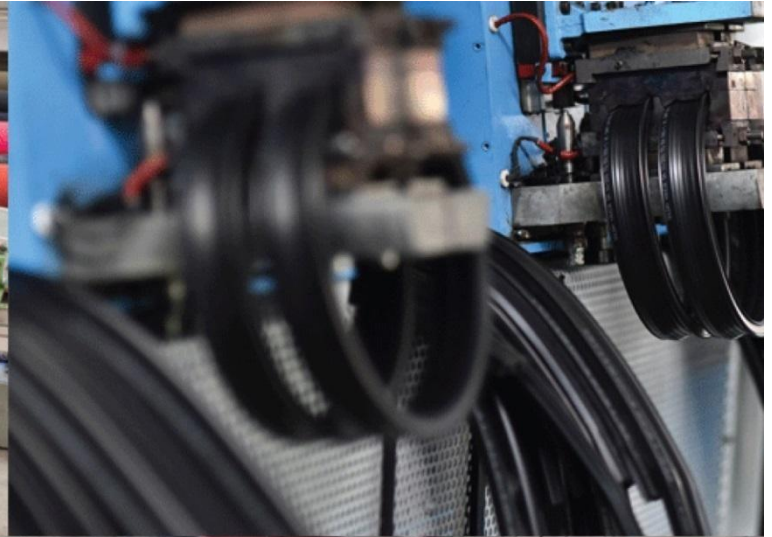
A.M.P.E.R.E(EUROPE)

In AssociationWith



ELECTRO MAGNETIC innovative technologies

Kerone Research & Development Centre (KRDC),
B/47, Addl. MIDC. Anand Nagar, Ambarnath (East), Thane- 421 506, India
Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com



**BATCH IR HEAT TREATMENT FOR DRYING OF
PAPAD**





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Customer :	M/s. EMPIRE SPICES & FOODS LTD
Process :	Batch IR heat treatment for drying of Papad

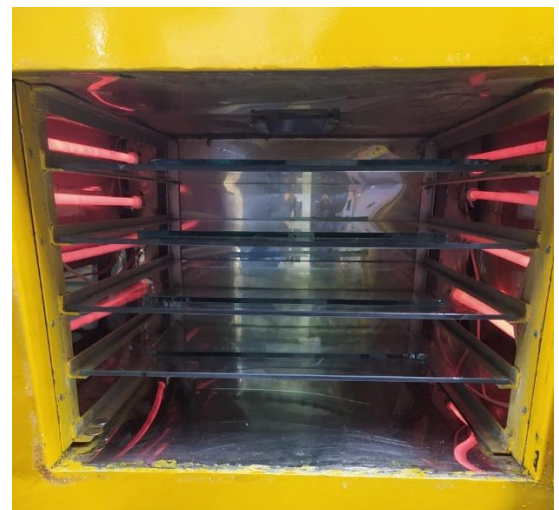
TEST REPORT No: 76/KRDC/LAB/17 Mum 06/06/2022

Date Sample reception : 01/06/2022
ID : 76/LAB/06

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Sampling date : 06/06/2022
Product : Papad
Requirement : Moisture content should be 11-12%
Start test Date : 06/06/2022
End test Date : 06/06/2022

LABORATORY EXPERIMENTAL SETUP: LAB BATCH IR HEATING SYSTEM



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LAB BATCH IR HEATING SYSTEM SPECIFICATIONS:

IR Medium Wave Emitters	8 Nos (-each having 0.5 kW)
IR wavelength range	0.7 to 10 microns
Temperature Range	0-400°C
Capacity	8kg
Tray size (width*height*depth)	813 x 407 x 30

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:




Temperature (degree C)	30°C (±5°C)
Humidity (%)	≤67% 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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EQUIPMENTS USED:

Name of Equipment	Picture of Equipment	Specifications
<p>Compact Thermal Imaging Camera</p>		<p>Model:FLIR E-30 Resolution: 160x 120IR Thermal sensitivity of 0.10°C</p>
<p>Thermo Hygrometer</p>		<p>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</p>
<p>Moisture Analyzer</p>		<p>Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)</p>



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SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on given sample i.e. Papad material for drying treatment. For this experimental run, sample were placed on the perforated tray and treated Batch IR heating system. The observations are made on the basis of moisture content and physical changes in product samples.

ANALYTICAL RESULTS:

Trial No. 1:

Initial Weight: 18g

Initial Moisture: 17.8%

Setting temperature: 45°C

Intensity of IR: 100%

Sr. No.	Cycle Time (minutes)	Product Temp. (°C)	Moisture Content. %	Remarks.
1.	After 3 min.	(45-46) °C	12.2	Dried as desired.

Final weight: 15g

Final Moisture: 12.2%

Total cycle time: 3 min.

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BEFORE AND AFTER PICTURES OF TREATED SAMPLE:

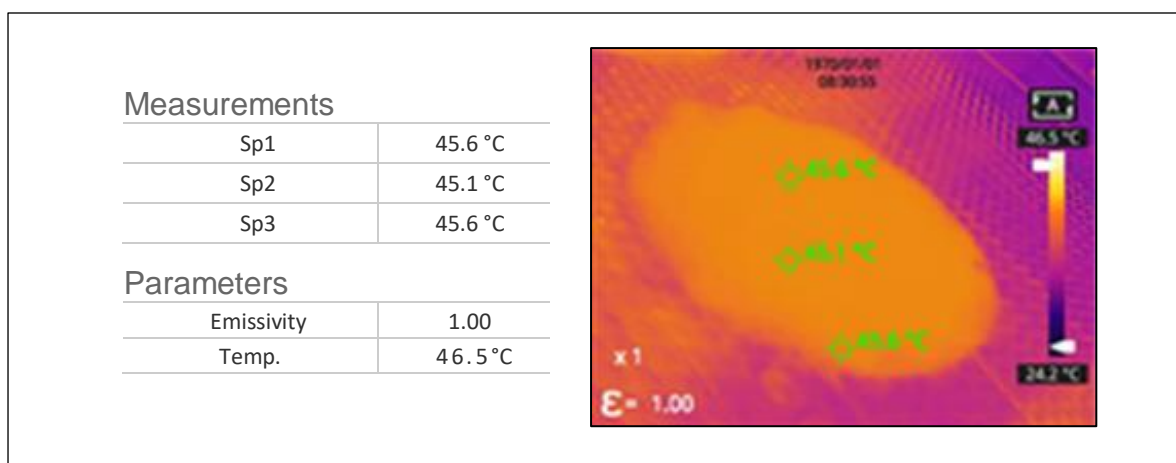


a) Untreated



b) Treated

THERMAL IMAGE HEAT TREATMENT



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MOISTURE ANALYSIS REPORTS:

Drying started		Drying started	
Date :	6-06-2022	Date :	6-06-2022
Time :	12:49:56	Time :	13:23:31
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 :	$((m0-m)/m0)*100\%$	Calculation :	$((m0-m)/m0)*100\%$
Finished :	3 samples	Finished :	3 samples
Initial weight :	0.624 g	Initial weight :	0.834 g
Final weight :	0.513 g	Final weight :	0.732 g
Drying time :	00:09:20s	Drying time :	00:08:00s
Sampling interval :	20 sec	Sampling interval :	20 sec
Moisture :	17.8 %	Moisture :	12.2 %
NOTE	Initial moisture	NOTE	Final moisture
The analysis performed by:		The analysis performed by:	
Signature.....	<i>[Signature]</i>	Signature.....	<i>[Signature]</i>

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OBSERVATIONS:

The heating behavior of Papad has been investigated under the Batch IR Heating System. The heating rate is found to be increasing with respect to increasing cycle time. As per the physical investigation, the sample was soft before treating. The material after treatment is in acceptable condition without charring. The requirement of 11-12% moisture content in the sample material has been successfully achieved.

A handwritten signature in black ink, appearing to read "Sayali" with a stylized flourish at the end.

Ms. Sayali Asole

Tested By

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