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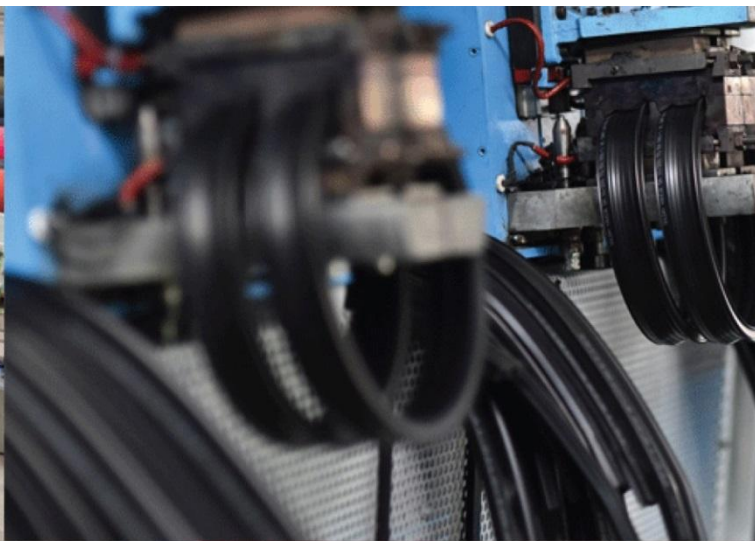
A.M.P.E.R.E (EUROPE)

In Association With



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 Microwave+Convection Heat
Treatment for Drying of Maida**

ISO 9001-2008 | ISO 9001-2015 | EMS 14001 | OHSAS 18001
In Association with SVCH-Technologii, Moscow (Russia)



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Customer :	M/s. FoodCognics India Pvt Ltd
Process :	Batch Microwave+Convection Heat Treatment for Drying of Maida

TEST REPORT No: 47/KRDC/LAB/17 Mum 06/10/2020

Date Sample reception : 06/10/2020
ID : 47/LAB/184

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 10 kg
Sampling date : 06/10/2020
Product : Maida
Requirement : Final Moisture Content should be less than 8% without condensation
Start Date test : 06/10/2020
End Date test : 06/10/2020

LABORATORY EXPERIMENTAL SET UP:



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LAB BATCH MICROWAVE+CONVECTION HEATING SYSTEM SPECIFICATIONS:

Microwave Power	2 kW(CW)
Frequency	2450 MHz \pm 50
Convective Power	3.5 kW (air flow 350 l/min at 20°C)
Microwave Exposure Zone (cavity)	1 cubic meter
Mode Stirrer	One
Thermal Monitoring System	Single Channel Fiber Optic: Range -40 to 250°C
Exhaust Power	1HP
Tray Size	450x950x50 mm




ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	33°C (\pm 5°C)
Humidity (%)	\leq 82% RH
Pressure (kN/m ² 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



EQUIPMENTS USED:

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

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on Maida in batch microwave+convection heating system for drying treatment. For this experimental run, given sample of maida has been placed in glass tray with uniform layer of about 10-15 mm to achieve even drying characteristics and and this tray has been placed in microwave+convection heating system for drying. Drying treatment has been given for different temperature and time.

ANALYTICAL RESULTS:

	Trial No. 1	Trial No. 2	Trial No. 3
Microwave Power (kW)	1	1	1

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Setting Temperature (°C)	60	80	120
Product Temperature (°C)	55-65	75-85	90-100
Initial Moisture Content (%)	9.9	9.9	9.9
Final Moisture Content (%)	8	5.7	4

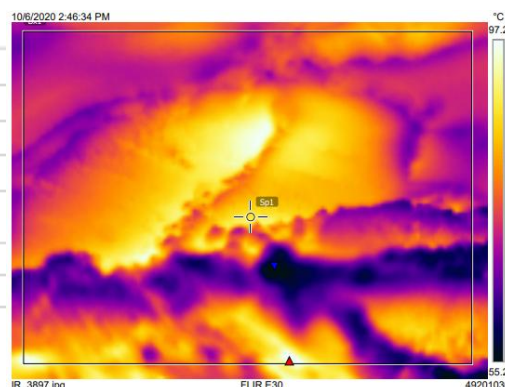
THERMAL IMAGE SHOWING TEMPERATURE PROFILE AFTER HEAT TREATMENT:

Measurements

Bx1	Max	97.7 °C
	Min	53.6 °C
	Average	76.9 °C
Sp1		89.3 °C

Parameters

Emissivity	0.95
Refl. temp.	20 °C



BEFORE AND AFTER PICTURES OF TREATED SPCIMEN SAMPLE:



BEFORE



AFTER

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MOISTURE ANALYSIS REPORTS:

Drying started	Drying started	Drying started	Drying started
Date : 4-10-2020 Time : 11:30:33 Model: AOS200 Serial number : 130	Date : 4-10-2020 Time : 11:40:08 Model: AOS200 Serial number : 130	Date : 4-10-2020 Time : 11:53:33 Model: AOS200 Serial number : 130	Date : 4-10-2020 Time : 12:01:45 Model: AOS200 Serial number : 130
Drying parameters	Drying parameters	Drying parameters	Drying parameters
Product : Test	Product : Test	Product : Test	Product : Test
Drying temperature : 105.0 °C	Drying temperature : 105.0 °C	Drying temperature : 105.0 °C	Drying temperature : 105.0 °C
Drying profile : standard	Drying profile : standard	Drying profile : standard	Drying profile : standard
Mode : Short mode	Mode : Short mode	Mode : Short mode	Mode : Short mode
Calculation : $\frac{(w_0 - w)}{w_0} \times 100\%$	Calculation : $\frac{(w_0 - w)}{w_0} \times 100\%$	Calculation : $\frac{(w_0 - w)}{w_0} \times 100\%$	Calculation : $\frac{(w_0 - w)}{w_0} \times 100\%$
Finished : 3 samples	Finished : 3 samples	Finished : 3 samples	Finished : 3 samples
Initial weight : 2.454 g	Initial weight : 2.056 g	Initial weight : 2.414 g	Initial weight : 2.020 g
Final weight : 2.183 g	Final weight : 1.891 g	Final weight : 2.277 g	Final weight : 1.940 g
Drying time : 00:10:00s	Drying time : 00:09:20s	Drying time : 00:11:00s	Drying time : 00:06:00s
Sampling interval : 20 sec	Sampling interval : 20 sec	Sampling interval : 20 sec	Sampling interval : 20 sec
Moisture : 11.7 %	Moisture : 8.0 %	Moisture : 5.7 %	Moisture : 4.0 %
NOTE Initial	NOTE Final (Trial No.1)	NOTE Final (Trial No.2)	NOTE Final (Trial No.3)
The analysis performed by: Signature: <u>K Komal</u>	The analysis performed by: Signature: <u>K Komal</u>	The analysis performed by: Signature: <u>K Komal</u>	The analysis performed by: Signature: <u>K Komal</u>

OBSERVATIONS:

The drying behavior of Maida has been investigated under the Microwave+Convection Heating System. The drying rate is found to be increasing with respect to increasing drying time. It has been found that the moisture content on the dry basis (%) decreases with respect to increase in drying time. As per physical investigation, it has been observed that there is little condensation on the surface of tray and required final moisture content has been achieved.

K Komal

Miss. Komal Bhoite
Tested By

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