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Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambernath (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 Dehydration of Cooked food

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

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Customer :	M/s. ALS Foods & Beverages
Process :	Batch Microwave+Convection Heat Treatment for Dehydration of Cooked food

## **TEST REPORT No: 47/KRDC/LAB/17 Mum 15/12/2018**

Date Sample reception	: 15/12/2018
ID	: 47/LAB/70

#### SAMPLE DESCRIPTION:

Sampling	: As Requested
Sample Condition	: Acceptable
Quantity	: 4 boxes
Sampling date	: 15/12/2018
Product	: Cooked food (Gravy, pavbhaji, poha,sabudana khichdi)
Requirement	: Final product should be dried like powder form with minimum
	moisture content
Start Date test	: 15/12/2018
End Date test	: 15/12/2018

## LABORATORY EXPERIMENTAL SET UP:





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## LAB BATCH MICROWAVE+CONVECTION HEATING SYSTEM SPECIFICATIONS:

Microwave Power	2 kW(CW)	
Frequency	2450 MHz ± 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)	28.2°C (±5°C)
Humidity (%)	≤65% 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
Compact Thermal Imaging Camera		Model :FLIR E-30 Resolution: 160x 120IR 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	THE REAL OF	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

## SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on cooked food in batch microwave heating system for dehydration treatment. For this, given cooked food samples has been placed on microwave safe tray with uniform layer to achieve even drying characteristics in microwave system. Drying treatment has been continued till it gives dry powder form of texture. After every half hour pictures of dried samples has been captured and toppling is given to samples.

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## **ANALYTICAL RESULTS:**

Microwave Power: 0.5 kW

Temperature: 45°C

	Poha	Sabudana Khichdi	Pavbhaji	Gravy
Initial Moisture Content (%)	10.4	37.2	72.4	67.8
Final Moisture Content (%)	2.5	0.4	1.5	1.6
Total Drying Time (hours)	2.5	3	4	3.5

## SAMPLE PICTURES DURING TRIAL:

#### 1. After 30 minutes:









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2. After 60 minutes:









3. After 90 minutes:





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4. After 120 minutes:



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5. After 150 minutes:









6. After 180 minutes:



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7. After 210 minutes:





8. After 240 minutes:



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## **MOISTURE ANALYSIS REPORTS:**

Brying started	Drying started	Drying started	
Puto 115-12-2018 Time 115:55:12 Hodel:ABS200 Sorial number : 138	Dute :15-12-2018 Time :15:144:07 Model:A05200 Serial number : 138	Date 115-12-2018 Time :15:45:51 Model:ASS200 Serial number : 138	Date :15-12-2018 Time :16:55:21 Rode:18:65:09 Serial mamber : 130
Trying parameters	Drying parameters	Drying parameters	Drying parameters
Product : Test	Product : Test	Product : Test	Product : Test
Drying temperature : 105.0 °C	Brying temperature : 105.0 °C	Drying temperature : 105.0 °C	Drying temperature : 105.0 °C
Brying profile : standard Mode : Short mode Calculation : ((m0-m)/MO)#1002 Finished : 3 samples	Drying profile : standard Mode : Short mode Calculation : ((40-4)/AD)X100X Finished : 3 samples	Drying profile t standard Node i Short mode Calculation t ((m0-m)/m0)#1005 Finished t 3 samples	Drying profile i standard Rode i Short mode Calculation i ((mD-m)/wE)stimm Finisked i 3 samples
Initial weight : 0.647 g	Initial weight : 0.804 g	Initial weight : 0.714 g	Initial weight : 1.200 g
Final weight : 0.580 g	Final weight : 0,784 g	Final weight : 0.574 g	Final weight t 1.203 g
lying time : 00:09:00s ampling interval : 20 sec	Drying time : 00:03:20s Sampling interval : 20 sec	Drying time : 00:33:40s Sampling interval : 20 sec	Drying time : 00:01:40s Sampling interval : 20 met
oisture t 10.4 %	Moisture : 2.5 %	Moisture : 37.2 %	Moisture : D.A I
me Poha-IniHal	NOTE Poha - final	NOTE Sabudana Khicdi - Initial	HOTE Sabudana Khicdi - Fenal
e analysis performed by:	The analysis performed by:	The analysis performed by:	The analysis performed by:
	KKomal	KKomaL	KKomal
KKomal	KAO!	Signature	Signature.

7 Brying started	Date :17-12-2018	Drying started	
Date :15-12-2219 Time :14:41:44 Model:ABS200 Serial number : 138	Time :10:22:03 Model:A65200 Serial number : 138 Drving parameters	Date :15-12-2010 Time :15:10:20 Model:455200 Serial number : 130	Time 17213:38 Model:405500 Serial number 1 138 Drying parameters
Drying parameters		Brying parameters	Product s Test
Product : Test Drying temperature : 105.0 *C	Product : Test Drying temperature : 105.0 °C	Product : Test Drying temperature : 105.0 °C	Drying temperature : 105.0 *C
Drying profile : standard Hode : Short mode Calculation : ((mC-m)/mO)#1002 Envished : Lime over	Drying profile : standard Node : Short mode Calculation : ((wO-m)/mO)#100% Finished : 3 samples	Drying profile : standard Mode : Short mode Calculation : ((m0-m)/m0)#100X Finished : 3 sumples	Drying profile : standard Node : Shart wole Calculation : ((m <sup>2</sup> -s)/AC(%) Finished : 3 samples
Initial weight : 2.503 g	Initial weight : 0.777 g	Initial weight : 0.822 9	Initial weight : 1.215 9 Final weight : 1.196
inal weight 1 0.692 g	Final weight : 0.767 g Drying time : 00:01:40s	Final weight : 0.265 g	Drying time : 00:02:40+ Sampling interval : 20
rying time : 01:29:29s mpling interval : 20 sec	Sampling interval : 20 sec	Drying time : 00:27:20s Sampling interval : 20 sec	Moisture 1 1.6
isture : 72.4 Z	Moisture : 1.5 %	Moisture : 67.8 %	Geog
E Pau Bhaji Initial	NOTE Pav bhaji-final	NOTE Gravy - Initial	HOTE Gravy - Fina
analysis performed by:	The analysis performed by:	The analysis performed by: KKomaL	The analysis performed by: Signature KKomdL

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#### **OBSRVATIONS:**

The Drying behavior of cooked food 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 drying time. As per physical investigation, it has been observed that there is crunchiness in texture without burning and there is little colour change in every sample. Also there is stickiness observed in case of Sabudana Khichdi.

Komal

Miss Komal Bhoite Tested By

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