

A CRISIL-NSIC RATED COMPANY ISO-9001-2008COMPANY



In AssociationWith



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



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





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 Customer :
 M/s. AAA CONCEPT PVT. LTD

 Process :
 Batch Convection Heat Treatment on<br/>Ready to eat Pulaw Rice, Pav bhaji & Sambar

### TEST REPORT No: 47/KRDC/LAB/57 Mum 23/10/2021

Date Sample reception	: 23/10/2021
ID	: 47/LAB/57

#### SAMPLE DESCRIPTION:

: As Requested
: Acceptable
: 1 plate each
: 23/10/2021
: Ready to eat Pulaw Rice, Pav bhaji & Sambar
: 23/10/2021
: 23/10/2021

### LABORATORY EXPERIMENTAL SETUP:





#### Format: F/R&D/01





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# LAB BATCH CONVECTION HEATING SYSTEM SPECIFICATIONS:

Heating Zone (width*height*depth)	1300*615*925 mm
No. of Heaters	6
Total Heater Power	6 kW
Motor	0.5 HP
No. of trays	6
Tray size (width*height*depth)	813 x 407 x 30
Centrifugal Exhaust Blower	1440 rpm

# **ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:**

Temperature (°C)	30°C (±5°C)
Humidity (%)	≤71% 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 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: ±°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

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## SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on Ready to eat food to speed up the drying rate. For this experimental run, given sample has been placed on a perforated tray and then placed in Horizontal Batch Convection Oven at certain decided temperature and time cycle. Observations are made on the final moisture content of sample, weight and appearance of product.

### **ANALYTICAL RESULTS:**

## **TRIAL-1: PULAW RICE**

Initial Wt. - 421 g

Initial moisture – 55.8%

### Setting Temperature: 60°C

Sr. No	Cycle Time (Hr.)	Weight of Product (grams)	Weight loss in (%)	Product Temp. (°C)	Moisture Content (%)	Remarks, if any
1	After 2 Hr	328g	37.0%	43.2°C	-	Drying starts
2	After 3 Hr	244g	25.60%	43.0°C	-	Drying Continues
3	After 4 Hr	181g	25.81%	45°C	-	Variant of drying
4	After 4 Hr 30 min	151g	16.57%	44.9°C	4.6%	Dried effectively as desired

Total time cycle: 4 Hr30 min

Final Weight: 151g

Final Weight loss in %: 64.13%

Final Moisture content: 4.6%

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## **BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:**



RFFORF



AFTER

### **THERMAL ANALYSIS REPORTS:**

**During Treatment:** 

Measuremen	ts
Sp1	41.5 °C
Sp2	48.5 °C
Sp3	47.0 °C
Devenuel	
Parameters	
Parameters Emissivity	0.95



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## **TRIAL-2: SAMBAR**

Initial Wt. - 320 g

Initial moisture – 82.6%

Setting Temperature: 60°C

Sr. No	Cycle Time (Hr.)	Weight of Product (grams)	Weight loss in (%)	Product Temp. (°C)	Moisture Content (%)	Remarks, if any
1	After 2 Hr	130g	40.4%	47°C	44.4%	Drying starts
2	After 3 Hr	97g	25.38%	58°C	-	Drying Continues
3	After 4 Hr	65g	32.98%	60°C	9.3%	Dried effectively as desired

Total time cycle: 4 Hr

Final Weight: 75 g

Final Weight loss in %: 76.56%

Final Moisture content: 9.3%

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## **BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:**



**BEFORE** 



AFTER

### **THERMAL ANALYSIS REPORTS:**

**During Treatment:** 

Measurem	ents
Sp1	46.6 °C
Sp2	47.7 °C
Sp3	39.7 °C

Parameters	
Emissivity	0.95
Refl. temp.	20 °C



#### Format: F/R&D/01





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# **TRIAL-3: PAV BHAJI WITH CHEESE**

Initial Wt. - 245 g

Initial moisture – 66.70%

Setting Temperature: 60°C

Sr. No	Cycle Time (Hr.)	Weight of Product (grams)	Weight loss in (%)	Product Temp. (°C)	Moisture Content (%)	Remarks, if any
1	After 2 Hr	175g	28.57%	49°C	-	Drying starts
2	After 3 Hr	135g	22.85%	58°C	-	Drying Continues
3	After 4 Hr	74g	41.26%	60°C	-	Variant of drying
4	After 4 Hr 30min	64g	32.98%	60°C	9.5%	Dried effectively as desired

Total time cycle: 4 Hr 30 min

Final Weight: 64 g

Final Weight loss in %: 73.87%

Final Moisture content: 9.5%

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## **BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:**



BEFORE



AFTER

#### **THERMAL ANALYSIS REPORTS:**

### **During Treatment:**

Sp1	41.8 °C
Sp2	44.1 °C
Sp3	43.0 °C
Parameters	
Emissivity	0.95
	00.00



#### Format: F/R&D/01





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# **MOISTURE ANALYSIS REPORTS:**

Drying started		Drying started	
ate :23-10-2021 me :14:41:36 odel:AGS200 erial number :	138	Date :25-10-2021 Time :10:53:51 Model:AGS200 Serial number :	138
Drying parameters		Drying parameters	
roduct	: 0	Product	; 0
Orying temperature	: 105.0 °C	Drying temperature	: 105.0 °C
Drying profile Mode Calculation Finished	: standard : Short mode : ((mD-m)/mD)*100% : time over	Drying profile Mode Calculation Finished	: standard : Short mode : ((mO-m)/mO)*100% : 3 samples
Initial weight	: 4.738 g	Initial weight	: 2.724 g
Final weight	: 2.092 g	Final weight	: 2.599 g
Drying time Sampling interval	: 01:00:00s : 20 sec	Drying time Sampling interval	: 00:15:20s : 20 sec
loisture	: 55.8 %	Moisture	4.6 %
Anitia (pulaw	(Rice)	NOTE final	moisture of
		pulaw	Rite
The analysis performed by: O		The analysis performed by: 0	
ignature	al.	Signature	al.

TRIAL-1

Drying started	Drying started		
Date :23-10-2021 Time :13:28:56 Model:A65200 Serial number : 138	Date :23-10-2021 Time :17:21:13 Model:A65200 Serial number : 138		
Drying parameters	Drying parameters		
Product : 0	Product : D		
Drying temperature : 105.0 °C	Drying temperature : 105.0 °C		
Drying profile Hode Calculation Finished Initial weight Final weight Drying time Sampling interval Sampling interval S	Drying profile : standard Node : Short mode Calculation : ((mD-m)/mD)%1 Finished : time over Initial weight : 2.237 ( Final weight : 2.029 Drying time : 00:12:02s Sampling interval : 20 s		
Moisture : 82.6 %	Moisture : 9.3 final moisture NOTE After 4 hrs		
The analysis performed by: 0 Signature	(Sambar) The analysis performed by: 0 Mondal Signature		

**TRIAL-2** 

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Drying started		Drying started	
Date :23-10-2021 Time :13:04:49 Model:AGS200 Serial number :	138	Date :25-10-2021 Time :11:32:29 Model:AGS200 Serial number :	138
Drying parameters		Drying parameters	
Product	: 0	Product	: 0
Drying temperature	: 105.0 °C	Drying temperature	: 105.0 °C
Drying profile Mode Calculation Finished	: standard : Short mode : ((m0-m)/m0)*100% : time over	Drying profile Mode Calculation Finished	: standard : Short mode : ((mD-m)/mD)¥100% : 3 samples
Initial weight	: 2.483 g	Initial weight	: 2.709 g
Final weight	: 0.826 g	Final weight	: 2.452 g
Drying time Sampling interval	: 01:00:00s : 20 sec	Drying time Sampling interval	: 00:24:40s : 20 sec
loisture	. <u>66.7</u> %	Moisture	: 9.5 %
INTE A	- 14	NOTE final	moisture of
Initial moisture of		Pau bhaiji	
Pav Bhayi		The analysis performed by: 0	
ne analysis perfor	ied by: U		1
youal.		Komar.	
Signature		Signature	

TRIAL-3

## **OBSERVATIONS:**

The Drying behavior of Cooked Pulaw rice, Pav bhaji & Sambar has been investigated under the convection heating system. The drying rate is found to be increasing with respect to increasing drying time. It has been found that when product is allowed to dry steadily at comparatively lower temperature(around 60°C), then the product is dried as desired. The colour of product is mostly retained and dried without burning.

Ms. Komal Ingle Tested By

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