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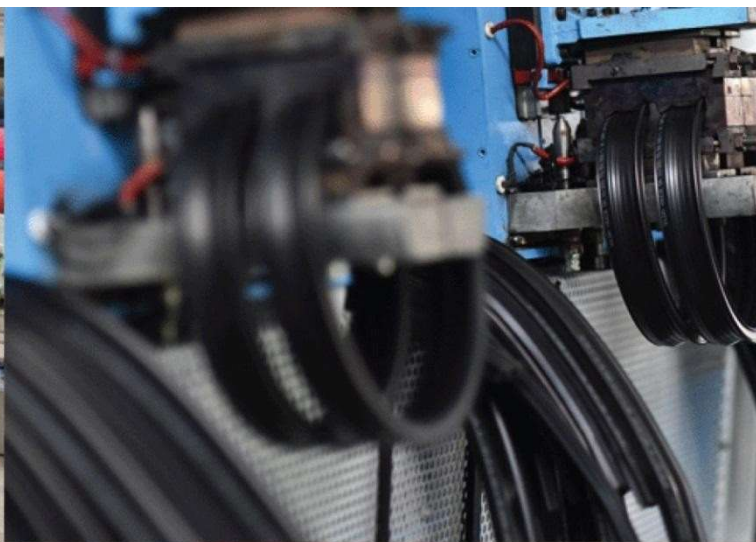
A.M.P.E.R.E(EUROPE)

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Kerone Research & Development Centre (KRDC),
B/47, Addl. MIDC. Anand Nagar, Ambarnath (East), Thane- 421 506, India
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**Batch Horizontal Convection Heat
Treatment for Drying of Soya Choker paste**

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



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Customer :	M/s. Bharooch chemicals Pvt. Ltd
Process :	Batch Horizontal Convection Heat Treatment For Drying of Soya (Okara) paste

TEST REPORT No: 52/KRDC/LAB/66 Mum 02/02/2022

Date Sample reception : 01/02/2022

ID : 52/LAB/02

SAMPLE DESCRIPTION:

Sampling : As Requested

Sample Condition : Acceptable

Quantity : 1 kg

Samples opening date : 01/02/2022

Product : Soya paste (Okara)

Start Date test : 01/02/2022

End Date test : 02/02/2022

LABORATORY EXPERIMENTAL SETUP:

Format: F/R&D/01



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LAB BATCH CONVECTION HEATING 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

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:




Temperature (°C)	26°C (±5°C)
Humidity (%)	≤74% 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



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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: $\pm^{\circ}\text{C}$ (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



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SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on choker paste to speed up its drying rate. For this experimental run, SS tray is cleaned properly and then the soya paste (okara) is spread on the tray. Later, this tray is placed in a Batch Horizontal Convection Oven with suitable set time and temperature profile. The observations are made after every 30 minutes. Also, initial weight before drying, initial moisture content, weight & moisture content for every cycle is noted.

THAWING OF SAMPLE:

For this test, the frozen sample has been taken in a beaker and then thaw by double boiler method for 30-40 mins.

frozen Sample



thawed Sample





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ANALYTICAL RESULTS:**Trial 1**

Initial Wt. of Batter - 300 gms

Initial moisture of Batter – 91.6 %

Setting Temperature: 65°C

No of cycles	Cycle Time (mins.)	Set Temp. (°C)	Product Temp. (°C)	Remarks, if any
C1	After 30 min	85°C	41°C	Drying starts
C2	After 60 min	85°C	43°C	Drying continues
C3	After 90 min	85°C	42°C	Drying continues
C4	After 120 min	85°C	43°C	Dried as desired

Total Cycle time- 2 hours.

Final Wt. of Batter - 112gms.

Final moisture of Batter – 77.5%

Format: F/R&D/01



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Trial 2

Initial Wt. of Batter - 300 gms

Initial moisture of Batter – 91.4 %

Setting Temperature: 85°C

No of cycles	Cycle Time (mins.)	Set Temp. (°C)	Product Temp. (°C)	Remarks, if any
C1	After 30 min	85°C	46°C	Drying starts
C2	After 60 min	85°C	48°C	Drying continues
C3	After 90 min	85°C	50°C	Drying continues
C4	After 120 min	85°C	80°C	Dried as desired

Total Cycle time- 2 hours.

Final Wt. of Batter - 27gms.

Final moisture of Batter – 10%



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Trial 3**Initial Wt. of Batter - 260 gms****Initial moisture of Batter – 91.6 %****Setting Temperature: 90°C**

No of cycles	Cycle Time (mins.)	Set Temp. (°C)	Product Temp. (°C)	Remarks, if any
C1	After 30 min	90°C	48°C	Drying starts
C2	After 60 min	90°C	49°C	Drying continues
C3	After 90 min	90°C	58°C	Drying continues
C4	After 120 min	90°C	80°C	Dried as desired

Total Cycle time- 2 hours.**Final Wt. of Batter - 24gms.****Final moisture of Batter – 3.8%**



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AFTER PICTURES OF TREATED SPECIMEN SAMPLE:

Trial 1

Untreated Sample

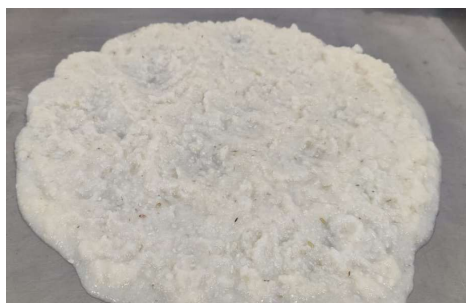


Treated Sample

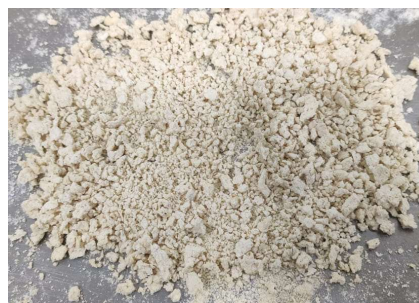


Trial 2

Untreated Sample



Treated Sample





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Trial 3

Untreated Sample



Treated Sample



Moisture Analysis report:

Trail 1

Drying started	
Date :	1-02-2022
Time :	17:29:32
Model:	AGS200
Serial number :	138
Drying parameters	
Product :	
Drying temperature :	105.0 °C
Drying profile :	standard
Mode :	Short mode
Calculation :	$((m0-m)/m0)*100\%$
Finished :	3 samples
Initial weight :	3.574 g
Final weight :	0.301 g
Drying time :	00:45:20s
Sampling interval :	20 sec
Moisture :	91.6 %
NOTE - Initial moisture	
The analysis performed by:	
Signature.....	

Drying started	
Date :	1-02-2022
Time :	17:22:21
Model:	AGS200
Serial number :	138
Drying parameters	
Product :	
Drying temperature :	105.0 °C
Drying profile :	standard
Mode :	Short mode
Calculation :	$((m0-m)/m0)*100\%$
Finished :	3 samples
Initial weight :	1.120 g
Final weight :	0.252 g
Drying time :	00:17:20s
Sampling interval :	20 sec
Moisture :	77.5 %
NOTE (Final moisture	
The analysis performed by:	
Signature.....	

Forma



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Trail 2

Drying started	
Date : 2-02-2022	
Time : 12:39:25	
Model: AGS200	
Serial number : 138	
Drying parameters	
Product :	
Drying temperature : 105.0 °C	
Drying profile : standard	
Mode : Short mode	
Calculation : $((m_0 - m)/m_0) \times 100\%$	
Finished : 3 samples	
Initial weight : 2.651 g	
Final weight : 0.224 g	
Drying time : 00:35:00s	
Sampling interval : 20 sec	
Moisture : 91.6 %	
NOTE Initial moisture	
The analysis performed by:	
Signature.....	

Drying started	
Date : 2-02-2022	
Time : 16:45:04	
Model: AGS200	
Serial number : 138	
Drying parameters	
Product :	
Drying temperature : 105.0 °C	
Drying profile : standard	
Mode : Short mode	
Calculation : $((m_0 - m)/m_0) \times 100\%$	
Finished : 3 samples	
Initial weight : 0.450 g	
Final weight : 0.406 g	
Drying time : 00:03:20s	
Sampling interval : 20 sec	
Moisture : 10 %	
NOTE Final moisture	
The analysis performed by:	
Signature.....	

Trail 3

Drying started	
Date : 2-02-2022	
Time : 13:09:59	
Model: AGS200	
Serial number : 138	
Drying parameters	
Product :	
Drying temperature : 105.0 °C	
Drying profile : standard	
Mode : Short mode	
Calculation : $((m_0 - m)/m_0) \times 100\%$	
Finished : 3 samples	
Initial weight : 2.272 g	
Final weight : 0.196 g	
Drying time : 00:27:00s	
Sampling interval : 20 sec	
Moisture : 91.4 %	
NOTE Initial moisture	
The analysis performed by:	
Signature.....	

Drying started	
Date : 2-02-2022	
Time : 16:40:39	
Model: AGS200	
Serial number : 138	
Drying parameters	
Product :	
Drying temperature : 105.0 °C	
Drying profile : standard	
Mode : Short mode	
Calculation : $((m_0 - m)/m_0) \times 100\%$	
Finished : 3 samples	
Initial weight : 1.115 g	
Final weight : 1.073 g	
Drying time : 00:03:00s	
Sampling interval : 20 sec	
Moisture : 3.8 %	
NOTE Final moisture	
The analysis performed by:	
Signature.....	

Format: F/R&D/01



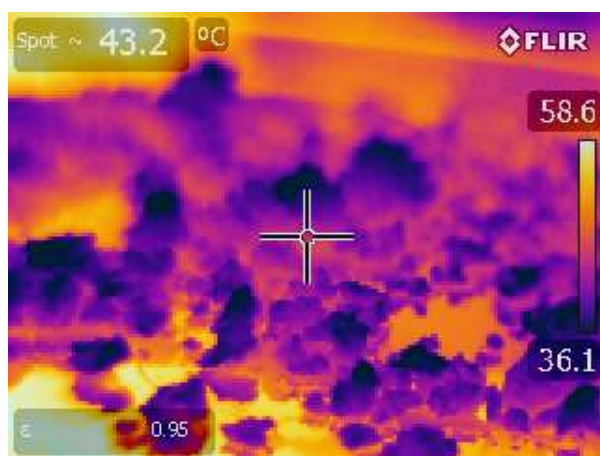
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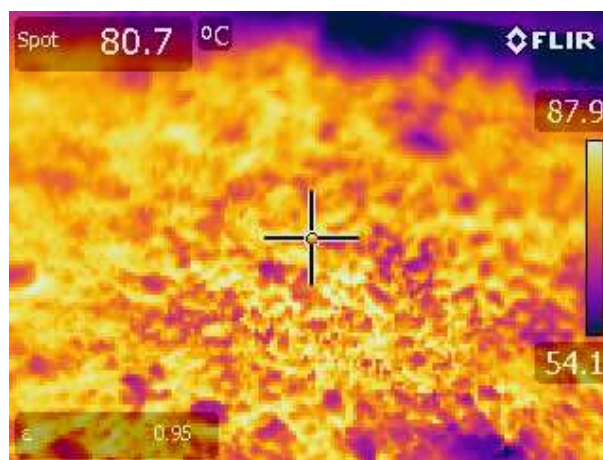
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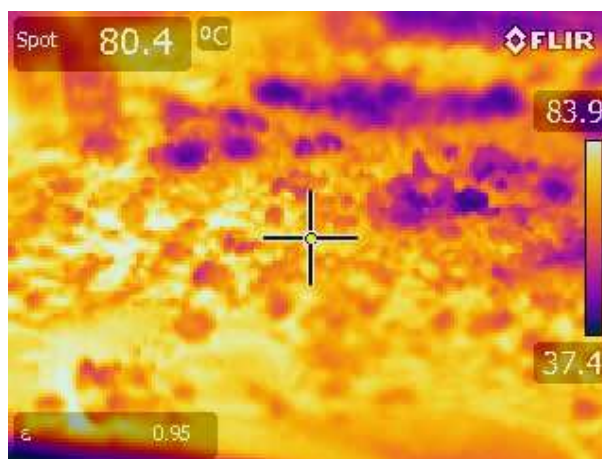
THERMAL ANALYSIS REPORTS:



Trail 1



Trail 2



Trial 3

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OBSERVATIONS:

The Drying behavior of Soya paste (okara) 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 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 no colour change and product is perfectly dried without charring.

Ms. Sayali Asole
Tested By