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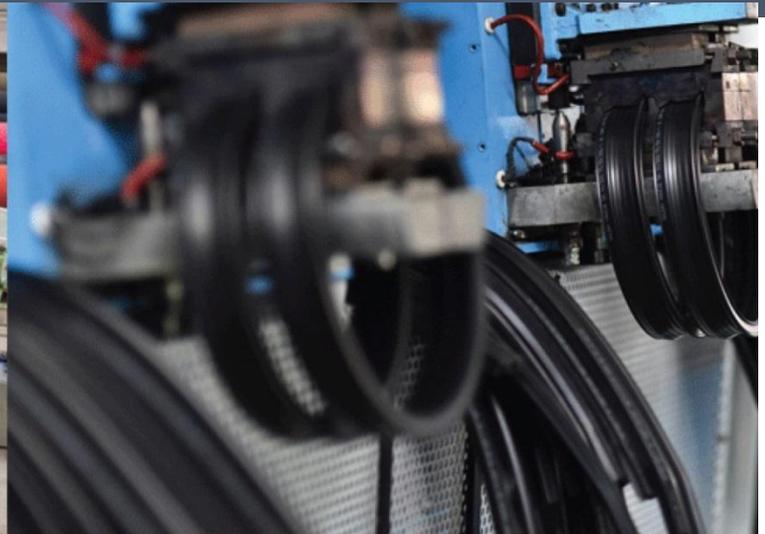
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In Association With



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 Convection Heat Treatment
for Drying of Potato Peel and Smash**



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Customer :	Laboratory Experimental Analysis
Process :	Batch Convection Heat Treatment for Drying of Potato Peel and Smash

TEST REPORT No: 47/KRDC/LAB/17 Mum 04/12/2018

Date Sample reception : 04/12/2018
ID : 47/LAB/73

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 2 packets
Sampling date : 01/01/2019
Product : Potato Peel and Smash
Requirement : Final product must have moisture content less than 10%
Start Date test : 01/01/2019
End Date test : 03/01/2019

LABORATORY EXPERIMENTAL SET UP:



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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
Centrifugal Exhaust Blower	1440 rpm
Vacuum Blower	0.85kW
No. of trays	6
Tray size (width*height*depth)	560*25*435 mm

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	28.5°C (±5°C)
Humidity (%)	≤64% 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: ±°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 potato peel and potato smash without adding any additive to speed up the drying rate. For this experimental run, the given sample of potato peel has been placed on perforated dehydrator tray, while potato smash has been placed on non-perforated tray and the loaded tray placed in heating system with suitable setting parameters. The observations are made on LOD basis. Also, initial weight before drying, final weight after drying, initial moisture content, final moisture content after heat treatment has been noted.

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ANALYTICAL RESULTS:

1. POTATO PEEL:

Setting Temperature: 70°C

Initial Moisture Content: 86.4%

Initial Weight: 400 grams

Sr. No.	Time (minutes)	Weight noted (grams)	Total weight loss (%)	Temperature on sample(°C)	Remarks, if any
1.	After 30	200	50	58.7	Drying rate started
2.	After 60	134	66.5	61.9	Drying phase continue
3.	After 90	98	75.5	67.4	Variant of Drying rate
4.	After 120	55	86.25	70.2	Required Drying rate

Sample weight after drying: 55 grams

Total weight loss on drying: 86.25%

Final Moisture Content: 2%

2. POTATO SMASH:

Setting Temperature: 70°C for 1 hour and then 80°C

Initial Moisture Content: 73.2%

Initial Weight: 800 grams

Sr. No.	Time (hours)	Weight noted (grams)	Total weight loss (%)	Temperature on sample(°C)	Remarks, if any
1.	After 1	679	15.12	55.7	Drying rate started
2.	After 2	457	42.87	60.2	Drying phase continue
3.	After 3	244	69.5	67.9	Variant of Drying rate
4.	After 4	216	73	75.3	Variant of Drying rate
5.	After 5	196	75.5	79.9	Required Drying rate

Sample weight after drying: 196 grams

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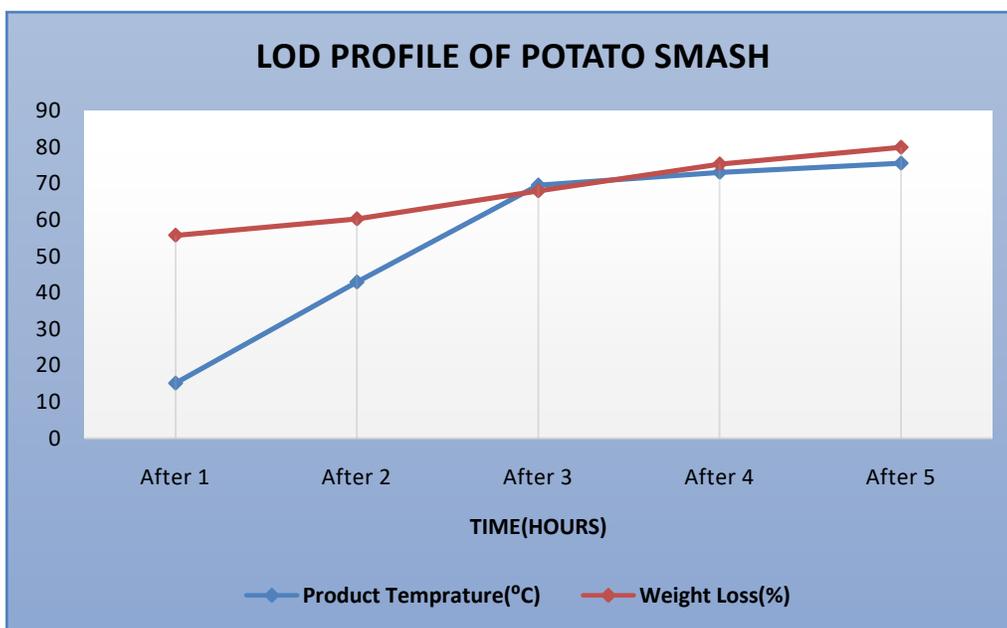
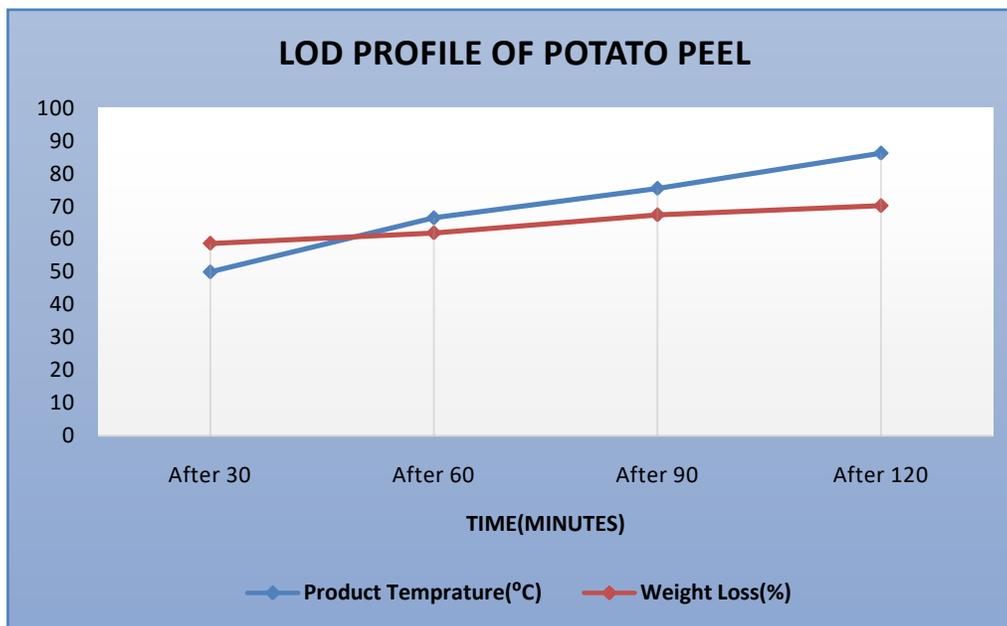
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Total weight loss on drying: 75.5%

Final Moisture Content: 2.7%

GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:



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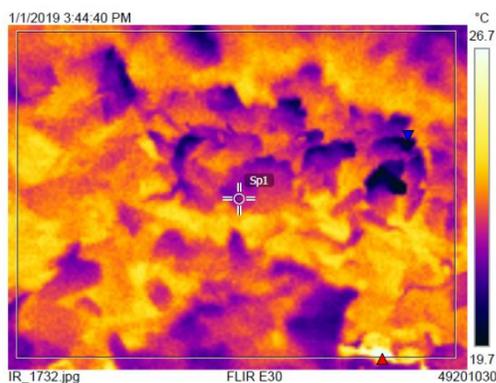
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THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. POTATO PEEL:

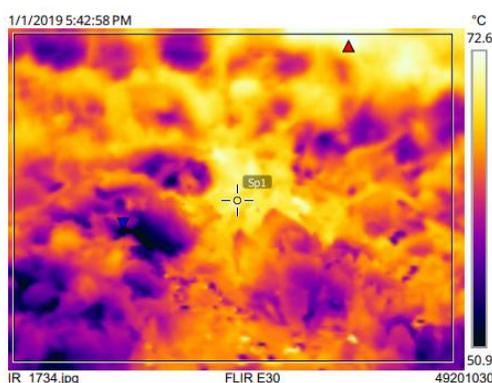
Before Heat Treatment:

Measurements	
Bx1	Max 27.4 °C
	Min 19.2 °C
	Average 22.9 °C
Sp1	22.1 °C
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



After Heat Treatment:

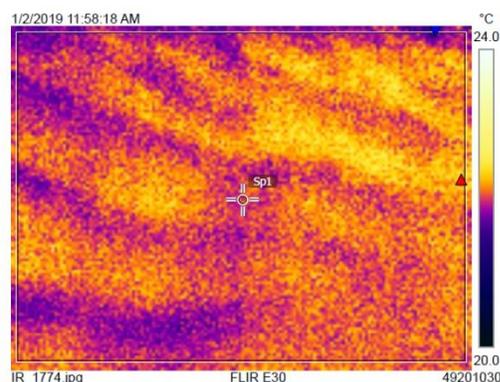
Measurements	
Bx1	Max 71.6 °C
	Min 52.8 °C
	Average 62.2 °C
Sp1	70.2 °C
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



2. POTATO SMASH:

Before Heat Treatment:

Measurements	
Bx1	Max 22.7 °C
	Min 21.3 °C
	Average 22.1 °C
Sp1	21.9 °C
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



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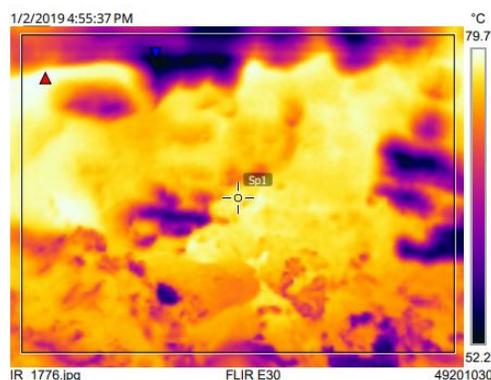
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After Heat Treatment:

Measurements		
Bx1	Max	79.9 °C
	Min	50.8 °C
	Average	73.4 °C
Sp1		77.5 °C

Parameters	
Emissivity	0.95
Refl. temp.	20 °C



BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:

1. POTATO PEEL:



2. POTATO SMASH:



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MOISTURE ANALYSIS REPORTS:

Drying started		? Drying started	
Date : 1-01-2019	Time : 16:24:28	Date : 2-01-2019	Time : 11:05:28
Model: AGS200	Serial number : 138	Model: AGS200	Serial number : 138
Drying parameters		Drying parameters	
Product : Test		Product : Test	
Drying temperature : 105.0 °C		Drying temperature : 105.0 °C	
Drying profile : standard		Drying profile : standard	
Mode : Short mode		Mode : Short mode	
Calculation : $((w_0 - w) / w_0) * 100\%$		Calculation : $((w_0 - w) / w_0) * 100\%$	
Finished : 3 samples		Finished : 3 samples	
Initial weight : 1.290 g		Initial weight : 0.221 g	
Final weight : 0.176 g		Final weight : 0.217 g	
Drying time : 00:29:00s		Drying time : 00:01:40s	
Sampling interval : 20 sec		Sampling interval : 20 sec	
Moisture : 86.4 %		Moisture : 2 %	
NOTE Initial (Potato Peel)		NOTE Final (Potato Peel)	
The analysis performed by:		The analysis performed by:	
Signature: <u>KKomal</u>		Signature: <u>KKomal</u>	

? Drying started		? Drying started	
Date : 3-01-2019	Time : 14:30:42	Date : 3-01-2019	Time : 12:05:43
Model: AGS200	Serial number : 138	Model: AGS200	Serial number : 138
Drying parameters		Drying parameters	
Product : Test		Product : Test	
Drying temperature : 105.0 °C		Drying temperature : 105.0 °C	
Drying profile : standard		Drying profile : standard	
Mode : Short mode		Mode : Short mode	
Calculation : $((w_0 - w) / w_0) * 100\%$		Calculation : $((w_0 - w) / w_0) * 100\%$	
Finished : 3 samples		Finished : 3 samples	
Initial weight : 1.460 g		Initial weight : 1.184 g	
Final weight : 0.391 g		Final weight : 1.152 g	
Drying time : 00:59:40s		Drying time : 00:06:40s	
Sampling interval : 20 sec		Sampling interval : 20 sec	
Moisture : 73.2 %		Moisture : 2.7 %	
NOTE Initial (Potato smash)		NOTE Final (Potato Smash)	
The analysis performed by:		The analysis performed by:	
Signature: <u>KKomal</u>		Signature: <u>KKomal</u>	

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OBSERVATIONS:

The drying behavior of potato peel and smash has been investigated under the batch 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 crunchiness in texture without change in colour and without burning in case of potato peel. But, in case of potato smash there is crunchiness with little colour change.

Miss Komal Bhoite
Tested By