

Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambarnath (East), Thane- 421 506, India
Tel- +91-251-2620542/13/44/45/46 E-mail: info@kerone.com, www.kerone.com

Customer :	M/s Foodiverse, Cairo, Egypt
Process :	Batch Dehydration Heat Treatment for Cooking and Drying of Brown lentils

TEST REPORT No: 47/KRDC/LAB/18 Mum 22/03/2018

Date Sample reception : 22/03/2018
ID : 47/LAB/25

SAMPLE DESCRIPTION:

Sampling : As requested
Sample Condition : Acceptable
Quantity : 1.5 kg
Sampling date : 29/03/2018
Product : Brown lentils
Requirement : Final product must be cooked and dried up to 4-5% moisture content
Start Date test : 29/03/2018
End Date test : 29/03/2018

LABORATORY EXPERIMENTAL SET UP:



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Tel- +91-251-2620542/13/44/45/46 E-mail: info@kerone.com, www.kerone.com**LAB BATCH DEHYDRATION 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
No. of trays	6
Tray size (width*height*depth)	560*25*435 mm

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	35°C (±5°C)
Humidity (%)	≤ 36% 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: 160 x 120 IR Thermal sensitivity of 0.10°C

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<p>Moisture Analyzer</p>		<p>Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)</p>
<p>Thermo Hygrometer</p>		<p>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</p>

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on brown lentils without adding any additive to speed up the drying rate. For this experimental run, brown lentils has been soaked in water for 3 hours and then steamed to get 40-50% moisture and then those steamed lentils on dehydrator tray has placed in such a manner that thin layer of sample has been formed for air to circulate for achieving even drying characteristics.

The observations are made after every 15 minutes on the basis of LOD method by checking weight loss. Also, initial weight before drying, final weight after drying, initial moisture content, moisture content after soaking, moisture content after steaming and final moisture content after treatment has been taken.

ANALYTICAL RESULTS:

Setting Temperature: 70°C

Initial Sample Weight: 200 grams

Initial Moisture Content: 6.1%

Moisture Content after soaking: 49.2%

Moisture Content after steaming: 53.1%

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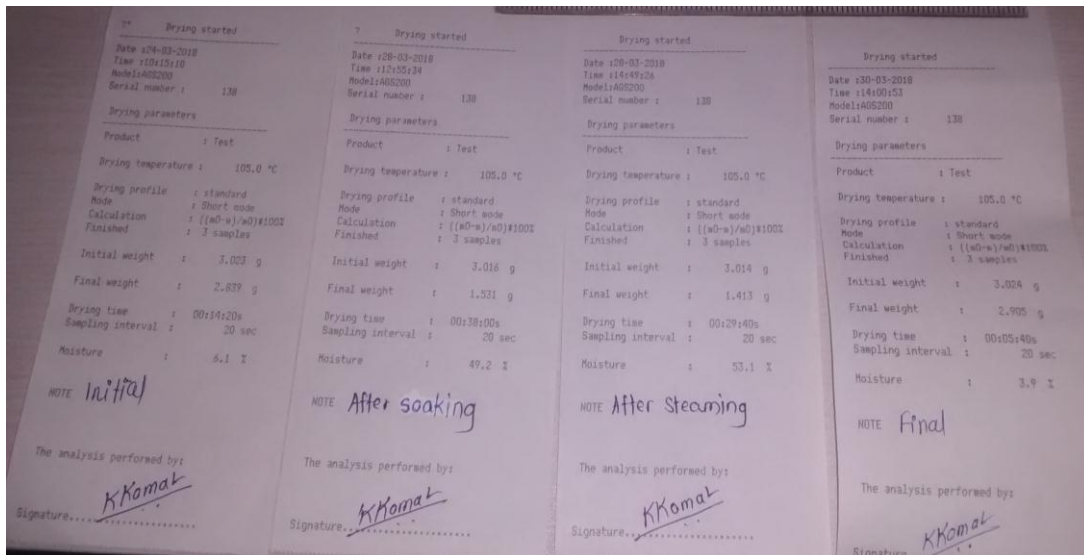
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Sr. No.	Time (minutes)	Weight noted (grams)	Total weight loss(grams)	Temperature on sample(°C)	Remarks, if any
1.	After 15	168	32	43.2	Drying rate started
2.	After 30	147	53	45.4	Drying phase continue
3.	After 45	132	68	47.2	Variant of Drying rate
4.	After 60	117	83	49.8	Variant of Drying rate
5.	After 75	103	97	52.5	Variant of Drying rate
6.	After 90	96	114	52.8	Required Drying rate

Sample weight after drying: 96 grams
Total weight loss on drying: 114 grams
Final Moisture Content: 3.9%

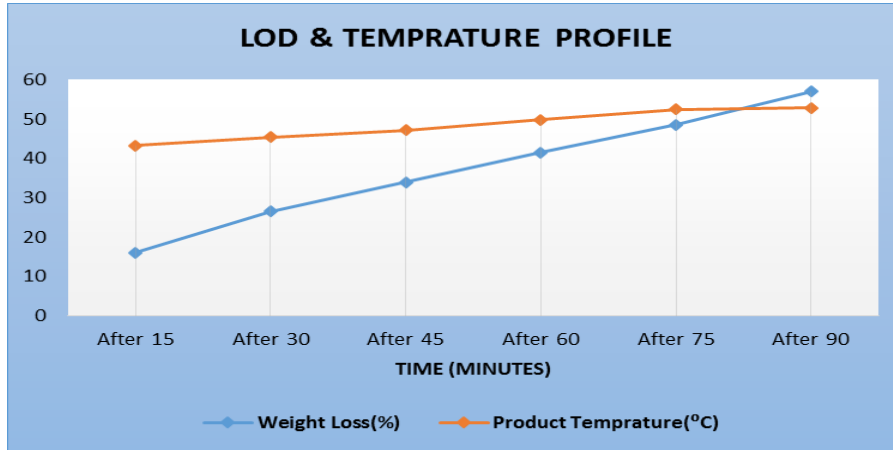
MOISTURE ANALYSIS REPORTS:



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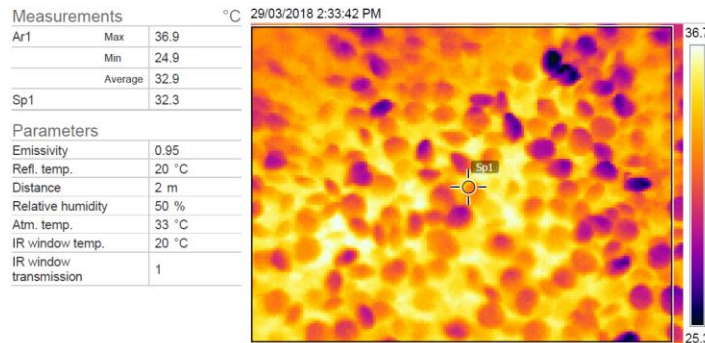
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GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:

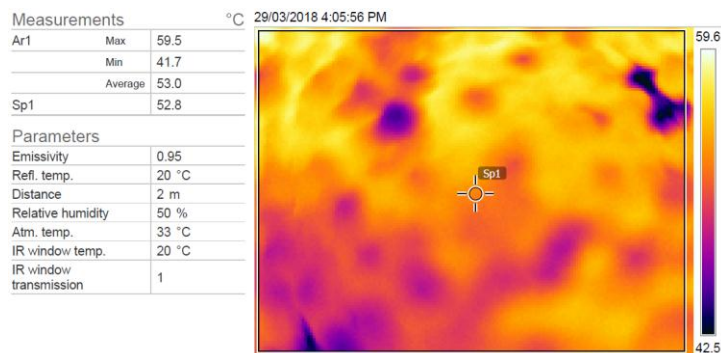


THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. Before Heat Treatment



2. After Heat Treatment:



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BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:



PICTURES OF LENTIL SIZE AFTER EVERY TREATMENT:



INITIAL



AFTER
SOAKING



AFTER
STEAMING



FINAL

COOKING TEST:

For cooking test, little amount of treated sample has been taken in a mug and then boiled water added to it and covered it for 2 minutes followed by stirring.



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MOISTURE GAINED AFTER COOKING TEST:



Drying started	
Date	29-03-2018
Time	13:41:21
Model	ABS200
Serial number	138
Drying parameters	
Product	Test
Drying temperature	105.0 °C
Drying profile	standard
Mode	Smart mode
Calculation	((w0-w)/w0)*100%
Finished	3 samples
Initial weight	3.019 g
Final weight	1.072 g
Drying time	00:29:20s
Sampling interval	20 sec
Moisture	64.5 %
NOTE After cooking test	
The analysis performed by:	
<i>K Komal</i>	
Signature:	

OBSERVATIONS:

The Drying behavior of steamed brown lentils 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 some crunchiness in texture without burning and there is little color change was observed.



Miss. Komal Bhoite
Tested By



Dr. Uttam K. Goswami
Approved By

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