

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, Email-[info@kerone.com](mailto:info@kerone.com), [www.kerone.com](http://www.kerone.com)

Customer :	Amalgamated Plantations Private Limited, Kolkata.
Process :	Continuous Microwave Heat Treatment for Drying of Ginger

**TEST REPORT No: 47/KRDC/LAB/17 Mum 22/01/2018**

Date Sample reception : 22/01/2018  
ID : 47/LAB/15

**SAMPLE DESCRIPTION:**

Sampling : As Requested  
Sample Condition : Acceptable  
Quantity : 1.5 kilograms  
Sampling date : 22/01/2018  
Product : Ginger  
Requirement : Dried product must be absolute dry with lowest moisture content  
Start Date test : 23/01/2018  
End Date test : 23/01/2018

**LABORATORY EXPERIMENTAL SET UP:**



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Tel- +91-251-2620542/13/44/45/46, Email-[info@kerone.com](mailto:info@kerone.com), [www.kerone.com](http://www.kerone.com)**Lab Microwave Heating System Specifications:**


Microwave Power	1.45 kW(CW)
Frequency	2450 MHz $\pm$ 50
Infra-red Power	6 kW
Microwave Exposure Zone (Cavity)	1000 mm length wise
Web width	380mm
Entry Vestibule length	1200mm
Exit Vestibule Length	1200 mm
Exhaust Power	0.5 HP

**Environment-laboratory Ambient Conditions:**

Temperature (degree C)	28 degrees C ( $\pm$ 5 degrees C)
Humidity (%)	$\leq$ 37 % RH
Pressure (kN/m <sup>2</sup> 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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Tel- +91-251-2620542/13/44/45/46, Email-[info@kerone.com](mailto:info@kerone.com), [www.kerone.com](http://www.kerone.com)**Moisture Analyzer****Make: Axis Balance****Description:****Moisture range: 1%(sample  
0.02/0.05g), 0.1% (Sample 0.5/5g),  
0.01%(Sample>5g)****SAMPLE PREPARATION AND METHOD/PROCEDURE:**

The experiment has been performed on ginger slices which were dried in continuous infra-red heating system upto 30% moisture content without adding any additive to speed up the drying rate. These partial dried ginger slices on microwave safe tray has placed in such a manner that every slice get uniform exposure of microwaves and this tray passed through continuous microwave heating system with low conveyor speed.

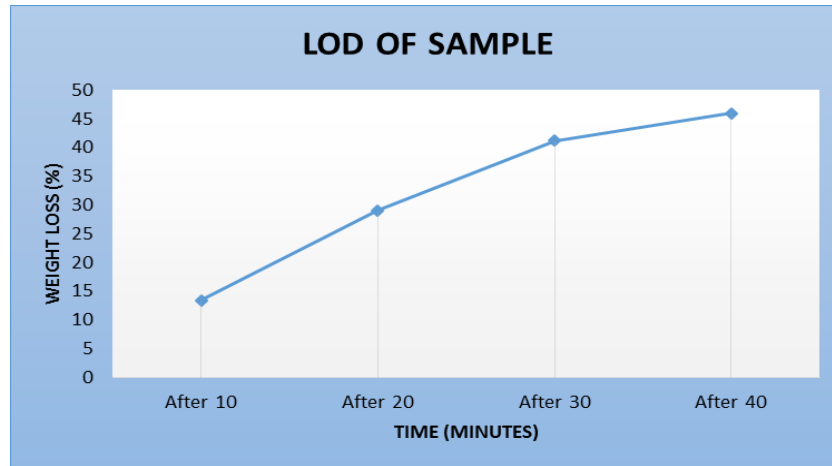
The observations are made after every 1 pass of 10 minutes on the basis of LOD method by checking weight loss. Also, initial weight before drying and final weight after drying was taken.

**ANALYTICAL RESULTS:****Initial sample weight: 313 grams****Initial Moisture Content: 31.47%**

Sr. No.	Time (minutes)	Intensity (%)	Weight noted (grams)	Weight loss (grams)	Remarks, if any
1.	After 10	100	271	42	Drying rate started
2.	After 20	100	222	91	Drying phase continue
3.	After 30	100	184	129	Variant of Drying rate
4.	After 40	100	169	144	Required Drying rate

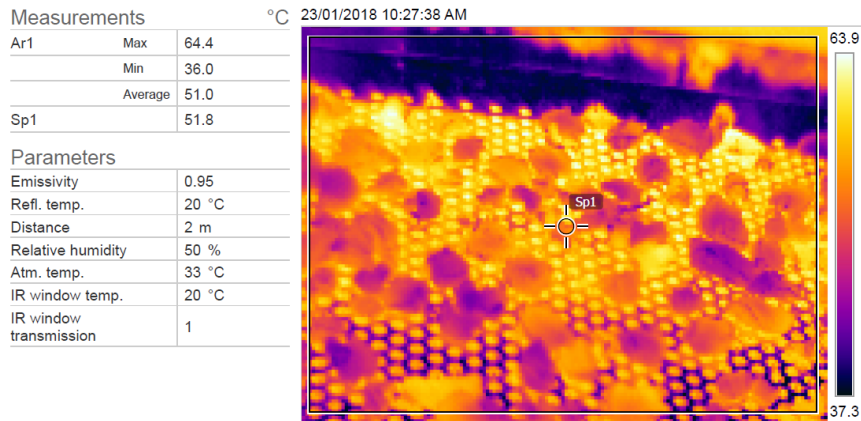
**Sample weight after drying: 169 grams****Total weight loss on drying: 144 grams****Final Moisture Content: 1.8 %****GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:****Format: F/R&D/01**

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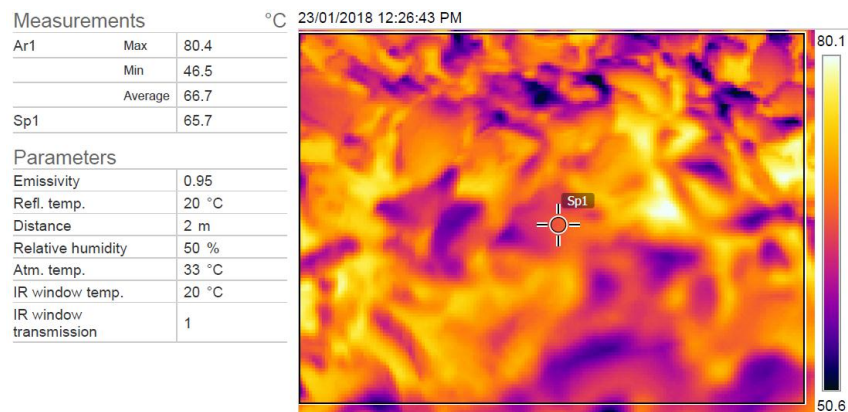


## THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

### 1. Before Heat Treatment



### 2. After Heat Treatment:



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



#### Observation:

The Drying behavior of ginger slices has been investigated under the continuous microwave heating system. The drying rate is found to be decreasing 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.

In the processed sample, the fat, fiber, textural and color content has to analyze. As per physical investigation, it has been observed that there is no enzymatic browning, also there is hardness in texture and colour change.



Miss Komal Bhoite  
Tested By



Dr. Uttam K. Goswami  
Approved By

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