

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. Laxmi Enterprises, Navi Mumbai
Process :	Conveyorized Microwave Heat Treatment for Drying of Ginger and Turmeric

TEST REPORT No: 47/KRDC/LAB/18 Mum 05/01/2018

Date Sample reception : 05/01/2018
ID : 47/LAB/09

SAMPLE DESCRIPTION:

Sampling : As requested
Sample Condition : Acceptable
Quantity : 2 kilograms
Sampling date : 10/01/2018
Product : Ginger and Turmeric rhizomes
Requirement : Final moisture content in turmeric 8 -11% and Ginger 2-4%
Start Date test : 10/01/2018
End Date test : 11/01/2018

LABORATORY EXPERIMENTAL SET UP:



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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)	25 degrees C (\pm 5 degrees C)
Humidity (%)	<80 % 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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Moisture Analyzer		Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)
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SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on turmeric and ginger rhizomes without adding any additive to speed up the drying rate. The ginger and turmeric roots has been fed on the tray in Conveyorized microwave heating system in such a manner that none of the pieces are touching and there is some space around each root for air to circulate for achieving even drying characteristics.

For experimental run, some amount of samples was taken and placed it on microwavable tray and observations are made after 5 or 10 and 15 minutes by checking the weight loss on drying.

ANALYTICAL RESULTS:**1. Ginger**

Initial sample weight: 400 grams

Initial Moisture Content: 13.43%

Sr. No.	Time (minutes)	Intensity (%)	Weight noted (grams)	Weight loss (grams)	Remarks, if any
1.	After 5	80	391	9	Drying rate started
2.	After 10	80	384	16	Drying phase continue
3.	After 15	80	378	22	Required drying rate

Sample weight after drying: 38 grams

Total weight loss on drying: 195 grams

2. Turmeric finger (long)

Initial sample weight: 500 grams

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Initial Moisture Content: 7.26%

Sr. No.	Time (minutes)	Intensity (%)	Weight noted (grams)	Weight loss (grams)	Remarks, if any
1.	After 5	80	500	0	Drying rate started
2.	After 15	80	490	10	Drying phase continue
3.	After 25	80	484	16	Variant of Drying rate
4.	After 35	80	478	22	Required drying rate

Sample weight after drying: 478 grams

Total weight loss on drying: 22 grams

3. Turmeric finger (short)

Initial sample weight: 600 grams

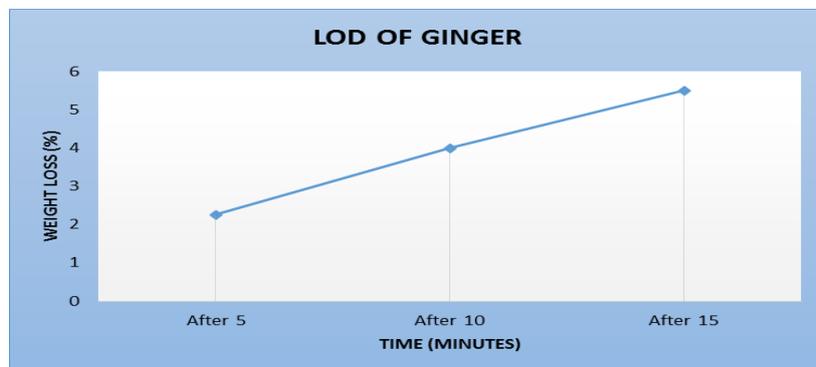
Initial Moisture Content: 11.18%

Sr. No.	Time (minutes)	Intensity (%)	Weight noted (grams)	Weight loss (grams)	Remarks, if any
1.	After 10	80	588	12	Drying rate started
2.	After 20	80	571	29	Required drying rate

Sample weight after drying: 571 grams

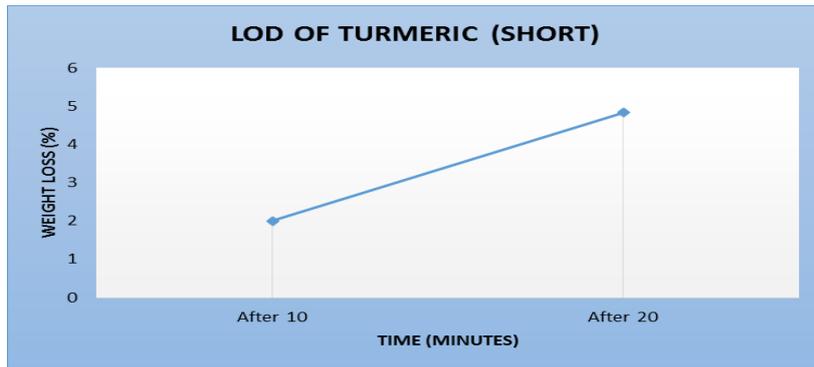
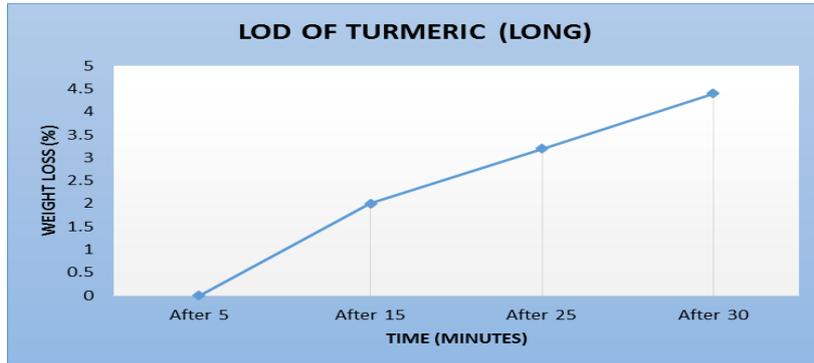
Total weight loss on drying: 29 grams

GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:



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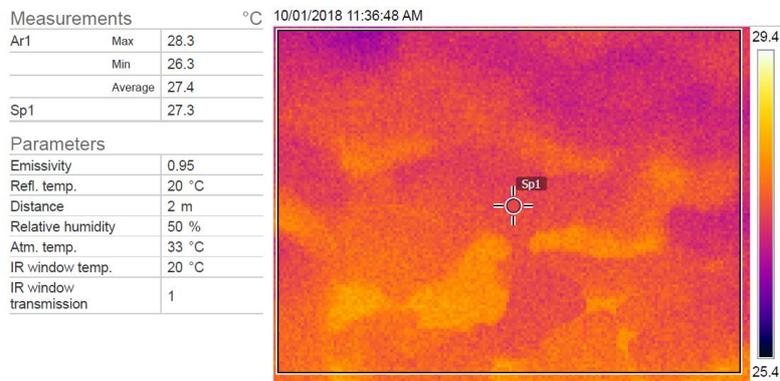
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THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. Ginger

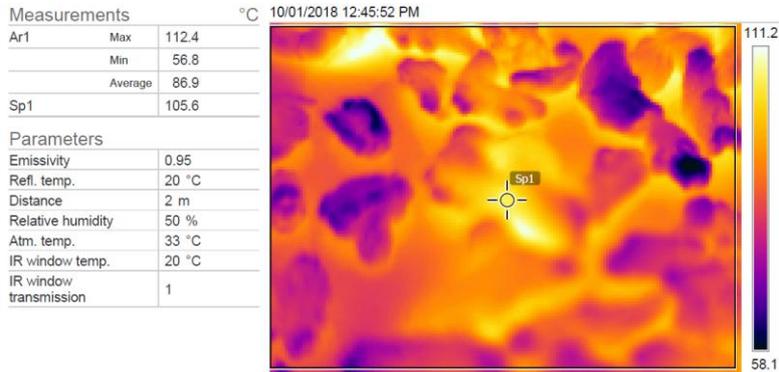
Before Heat Treatment



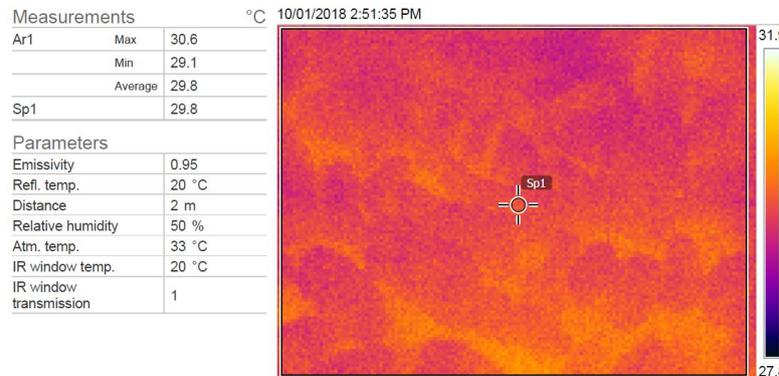
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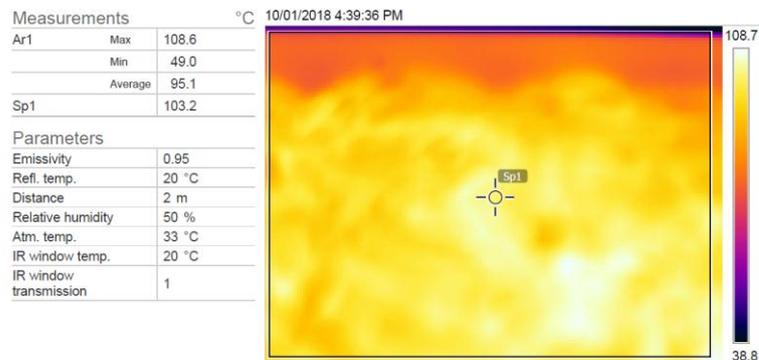
After Heat Treatment:



**2. Turmeric (long)
Before Heat Treatment**



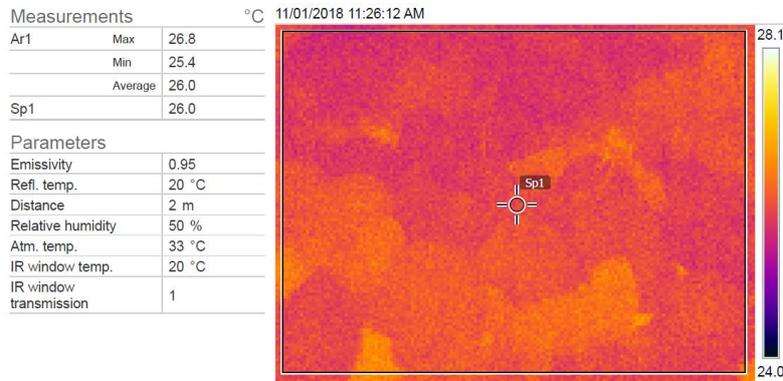
After Heat Treatment:



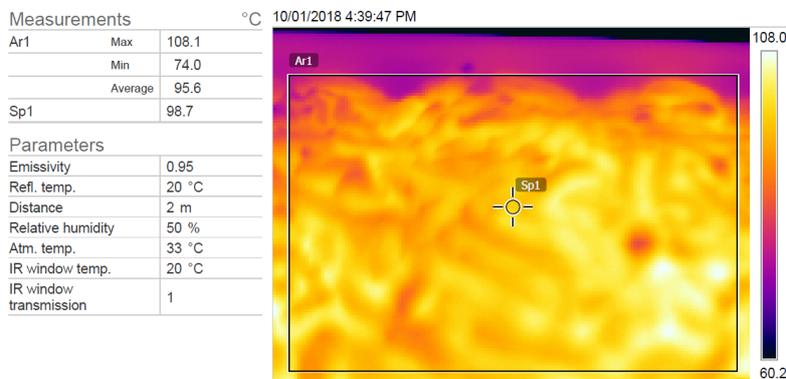
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3. Turmeric (short) Before Heat Treatment



After Heat Treatment



PICTURES OF TREATED SPECIMEN SAMPLE:



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Observation:

The Drying behavior of ginger (*Zingiber officinale*) and turmeric (*Curcuma longa* L) root has been investigated under the exposure of microwave irradiation mode dryer. 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.



Miss. Komal Bhoite
Tested By



Dr. Uttam K. Goswami
Approved By

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