

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

Customer :	Laboratory Experimental Analysis
Process :	Batch Microwave Heat Treatment for Sterilization Of Spices

### TEST REPORT No: 47/KRDC/LAB/17 Mum 18/06/2018

Date Sample reception : 18/06/2018  
ID : 47/LAB/43

#### SAMPLE DESCRIPTION:

Sampling : As requested  
Sample Condition : Acceptable  
Quantity : 2 boxes  
Sampling date : 21/06/2018  
Product : Spices  
Requirement : Sterilizing of given Spices  
Start Date test : 21/06/2018  
End Date test : 21/06/2018

#### LABORATORY EXPERIMENTAL SET UP:



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#### LAB BATCH MICROWAVE HEATING SYSTEM SPECIFICATIONS:


Microwave Power	2 kW(CW)
Frequency	2450 MHz $\pm$ 50
Convective Power	3.5 kW (air flow 350 l/min at 20°C)
Microwave Exposure Zone (cavity)	1 cubic meter
Mode Stirrer	One
Thermal Monitoring System	Single Channel Fiber Optic: Range -40 to 250°C
Exhaust Power	1HP
Tray Size	450x950x50 mm

#### ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	29°C ( $\pm$ 5°C)
Humidity (%)	$\leq$ 80% 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
Infrared Contact Thermometer		Model: FLUKE 566 Temperature Range: -40°C to 650°C Display Resolution: 0.1°C

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<b>Moisture Analyzer</b>		<b>Make:</b> Axis Balance <b>Description:</b> <b>Moisture range:</b> 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)
<b>Thermo Hygrometer</b>		<b>Model No:</b> HTC-2 <b>Temperature accuracy:</b> $\pm 1^{\circ}\text{C}$ ( $1.8^{\circ}\text{F}$ ) <b>Temperature resolution:</b> $0.1^{\circ}\text{C}$ ( $0.2^{\circ}\text{F}$ ) <b>Humidity range:</b> 10%~99% RH <b>Humidity accuracy:</b> $\pm 5\%$ RH <b>Humidity resolution:</b> 1% RH

#### SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on samples of different types of spices and herbs to speed up the drying rate for sterilization treatment. For this experimental run, after analyzing moisture content of every sample given spices has been seal packed in plastic bags and placed in batch microwave heating system for particular time period. The observations are made on the basis temperature on product after heating treatment and colour change in product.

#### ANALYTICAL RESULTS:

Sr. No.	Name of Spices	Initial Moisture Content (%)	Microwave Power (kW)	Time (minutes)	Surface Temperature ( $^{\circ}\text{C}$ )
1.	Ginger Ground	6.8	1.8	2.5	76.3
			2		86.2
2.	Seasoning Salt	3.1	1.8	2.5	58.2
			2		67.4
3.	Papriko Chilly	6.7	1.8	2.5	73.7
			2		74.2

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4.	Turmeric Ground	7.1	1.8	2.5	77.3
			2		94.2
5.	Coriander Whole	5.9	1.8	2.5	73.2
			2		74.5

## MOISTURE ANALYSIS REPORTS:

<p>Drying started</p> <p>Date :21-06-2018 Time :14:18:07 Model:KMS200 Serial number : 138</p> <p>Drying parameters</p> <p>Product : Test</p> <p>Drying temperature : 105.0 °C</p> <p>Drying profile : standard Mode : Short mode Calculation : <math>((W_0 - W) / W_0) \times 100\%</math> Finished : 3 samples</p> <p>Initial weight : 0.922 g Final weight : 0.859 g</p> <p>Drying time : 00:02:00s Sampling interval : 20 sec</p> <p>Moisture : 6.8 %</p> <p>NOTE: Ginger ground.</p> <p>The analysis performed by: <i>K Komal</i></p> <p>Signature: .....</p>	<p>Drying started</p> <p>Date :21-06-2018 Time :14:18:16 Model:KMS200 Serial number : 138</p> <p>Drying parameters</p> <p>Product : Test</p> <p>Drying temperature : 105.0 °C</p> <p>Drying profile : standard Mode : Short mode Calculation : <math>((W_0 - W) / W_0) \times 100\%</math> Finished : 3 samples</p> <p>Initial weight : 2.175 g Final weight : 2.128 g</p> <p>Drying time : 00:02:20s Sampling interval : 20 sec</p> <p>Moisture : 3.1 %</p> <p>NOTE: Seasoning salt</p> <p>The analysis performed by: <i>K Komal</i></p> <p>Signature: .....</p>	<p>Drying started</p> <p>Date :21-06-2018 Time :14:18:57 Model:KMS200 Serial number : 138</p> <p>Drying parameters</p> <p>Product : Test</p> <p>Drying temperature : 105.0 °C</p> <p>Drying profile : standard Mode : Short mode Calculation : <math>((W_0 - W) / W_0) \times 100\%</math> Finished : 3 samples</p> <p>Initial weight : 1.015 g Final weight : 0.947 g</p> <p>Drying time : 00:03:20s Sampling interval : 20 sec</p> <p>Moisture : 4.7 %</p> <p>NOTE: Paprika chilly</p> <p>The analysis performed by: <i>K Komal</i></p> <p>Signature: .....</p>	<p>Drying started</p> <p>Date :21-06-2018 Time :14:45:27 Model:KMS200 Serial number : 138</p> <p>Drying parameters</p> <p>Product : Test</p> <p>Drying temperature : 105.0 °C</p> <p>Drying profile : standard Mode : Short mode Calculation : <math>((W_0 - W) / W_0) \times 100\%</math> Finished : 3 samples</p> <p>Initial weight : 1.077 g Final weight : 1.000 g</p> <p>Drying time : 00:04:40s Sampling interval : 20 sec</p> <p>Moisture : 7.1 %</p> <p>NOTE: Turmeric ground</p> <p>The analysis performed by: <i>K Komal</i></p> <p>Signature: .....</p>	<p>Drying started</p> <p>Date :21-06-2018 Time :14:32:59 Model:KMS200 Serial number : 138</p> <p>Drying parameters</p> <p>Product : Test</p> <p>Drying temperature : 105.0 °C</p> <p>Drying profile : standard Mode : Short mode Calculation : <math>((W_0 - W) / W_0) \times 100\%</math> Finished : 3 samples</p> <p>Initial weight : 1.203 g Final weight : 1.148 g</p> <p>Drying time : 00:04:20s Sampling interval : 20 sec</p> <p>Moisture : 5.9 %</p> <p>NOTE: Coriander whole</p> <p>The analysis performed by: <i>K Komal</i></p> <p>Signature: .....</p>
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## OBSERVATIONS:

The Drying behavior of spices has been investigated under the microwave irradiation mode dryer for sterilization treatment. As per physical investigation, it has been observed that there is no colour change in any of the sample, no damage to plastic bag also.

*K Komal*  
Miss. Komal Bhoite  
Tested By

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