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AIMCAL (USA)



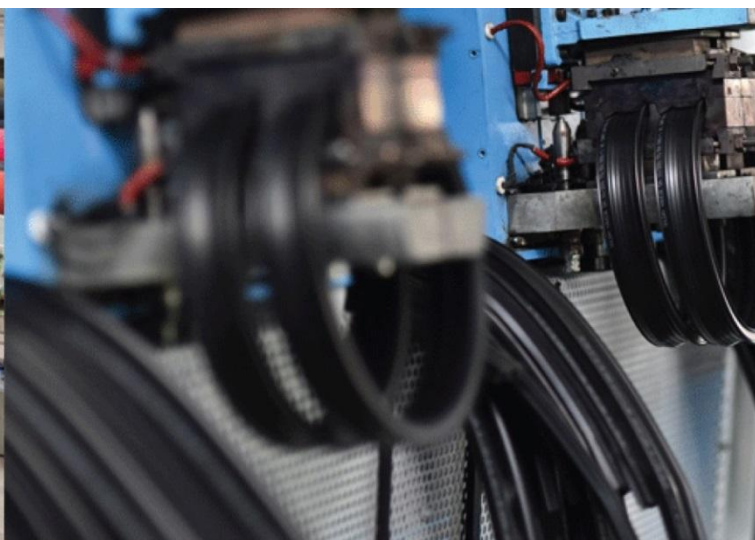
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In Association With



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 Microwave+Convection Heat  
Treatment for Sterilization of Spices**

ISO 9001-2008 | ISO 9001-2015 | EMS 14001 | OHSAS 18001  
In Association with SVCH-Technologii, Moscow (Russia)



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Customer :	M/s. G. A. Foods, Surat
Process :	Batch Microwave+Convection Heat Treatment for Sterilization of Spices

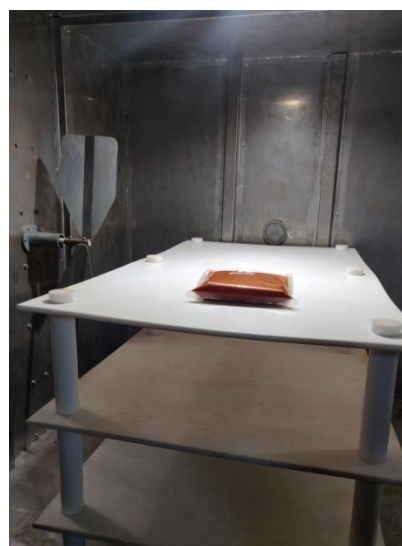
### TEST REPORT No: 47/KRDC/LAB/17 Mum 09/01/2020

Date Sample reception : 09/01/2020  
ID : 47/LAB/154

### SAMPLE DESCRIPTION:

Sampling : As Requested  
Sample Condition : Acceptable  
Quantity : 4 kg  
Sampling date : 09/01/2020  
Product : Spices (Coriander powder & Chilli powder)  
Requirement : Sterilization  
Start Date test : 09/01/2020  
End Date test : 09/01/2020

### LABORATORY EXPERIMENTAL SET UP:



Format: F/R&D/01



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#### LAB BATCH MICROWAVE+CONVECTION 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)	34°C ( $\pm$ 5°C)
Humidity (%)	$\leq$ 40% 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







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### EQUIPMENTS USED:

Name of Equipment	Picture of Equipment	Specifications
Compact Thermal Imaging Camera		Model :FLIR E-30 Resolution: 160x 120IR Thermal sensitivity of 0.10°C
Thermo Hygrometer		Model No: HTC-2 Temperature accuracy: $\pm 1^\circ\text{C}$ (1.8°F) Temperature resolution: 0.1°C (0.2°F) Humidity range: 10%~99% RH Humidity accuracy: $\pm 5\%$ RH Humidity resolution: 1% RH

### SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on Spices bags to speed up the heating rate for sterilization. For this experimental run, given packed bag has been placed in Batch Microwave Heating System and microwave exposure has been given with suitable parameters. Observations have been made on the basis of surface temperature of sample.

### ANALYTICAL RESULTS:

Sr. No.	Sample Name	Quantity (grams)	MW Powder (kW)	Hot Air Temp. (°C)	Cycle Time (minutes)	Surface Temp. (°C)
1.	Chilli Powder	500	1	60	7	60-70
2.			1.3		5	60-70
3.	Chilli Powder+Salt	500+90	1		7	65-75
4.			1.3		5	65-75
5.	Coriander Powder	500	1		7	60-70
6.			1.3		5	60-70
7.	Coriander Powder+Salt	500+180	1		7	65-75
8.			1.5		4	60-70

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## BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:

### 1. Chilli Powder:



### 2. Chilli Powder+Salt:



### 3. Coriander Powder:



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4. Coriander  
Powder+Salt:



**OBSRVATIONS:**

The heating behavior of Spices has been investigated under the Batch Microwave+Covection Heating System. The heating rate is found to be increasing with respect to increasing heating time. As per physical investigation, it has been observed that there is no colour change or burning effect on processed sample and also, no damage to bag.

*K Komal*

Miss Komal Bhoite  
Tested By