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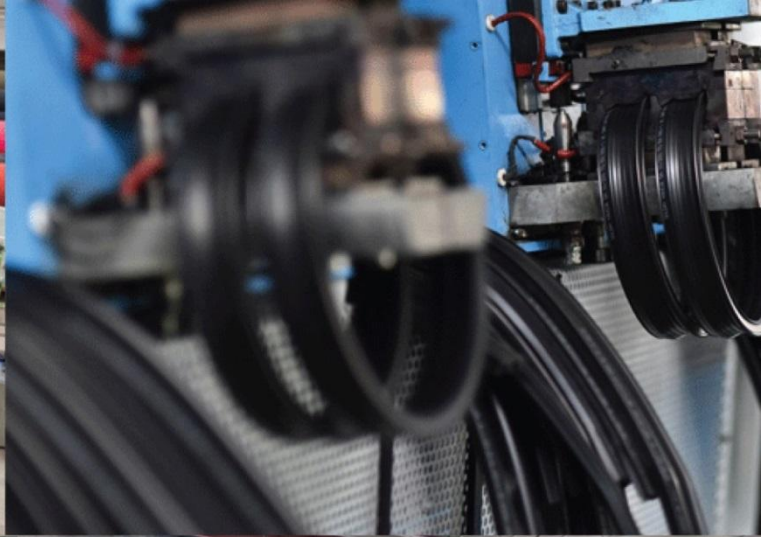
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In Association With



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



**Continuous Microwave Heat Treatment
for Sterilization of Spices & Snacks**

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



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Customer :	M/s. Anil & Company
Process :	Continuous Microwave Heat Treatment for Sterilization of Spices & Snacks

TEST REPORT No: 47/KRDC/LAB/17 Mum 08/01/2020

Date Sample reception : 08/01/2020
ID : 47/LAB/153

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 1 kg & 0.5 kg bags of spices & snacks
Sampling date : 08/01/2020
Product : Spices (Turmeric & Chilli powder) & Snacks (Samosa & Mix bhel)
Requirement : Sterilization
Start Date test : 08/01/2020
End Date test : 08/01/2020

LABORATORY EXPERIMENTAL SET UP:



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LAB CONTINUOUS 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)	32°C (\pm 5°C)
Humidity (%)	\leq 38% 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



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EQUIPMENTS USED:

Name of Equipment	Picture of Equipment	Specifications
Compact Thermal Imaging Camera		Model: FLIR E-30 Resolution: 160x 120 IR 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 and Snacks bags to speed up the heating rate for sterilization. For this experimental run, given packed bag has been placed in Continuous Microwave Heating System and microwave exposure has been given with suitable parameters. Observations have been made on the basis of surface and core temperature of sample.

ANALYTICAL RESULTS:

Microwave Power used: 1.45kW

Type of Bag: Polybag

Sr. No.	Name of Sample	Quantity (kg)	Cycle Time (minutes)	Surface Temperature (°C)	Core Temperature (°C)
1.	Turmeric Powder	1	6	80-90	NA
2.	Turmeric Powder	2	5.5	60-65	NA
3.	Chilli Powder	0.5	4	65-70	68

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4.	Samosa	0.5	6.5	85-90	98
5.	Bhel Mix	0.5	6.5	85-90	87

BEFORE AND AFTER PICTURES OF TREATED SPCIMEN SAMPLE:

1. Turmeric Powder:



2. Chilli Powder:



3. Samosa:



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4. Bhel Mix:



OBSRVATIONS:

The heating behavior of Spices has been investigated under the Continuous Microwave 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