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In Association With



Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com



Continuous Microwave+Convection Heat Treatment for Sterilization of Cinnamon Powder

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

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Customer:	M/s. CMC Engineering Export GmbH, Colombo
Process:	Continuous Microwave+Convection Heat Treatment for Sterilization of Cinnamon
	Powder

TEST REPORT No: 47/KRDC/LAB/17 Mum 02/03/2021

Date Sample reception	: 02/03/2021
ID	: 47/LAB/189

SAMPLE DESCRIPTION:

Sampling	: As Requested
Sample Condition	: Acceptable
Quantity	: 25 kg
Sampling date	: 10/03/2021
Product	: Cinnamon Powder
Requirement	: Sterilization
Start Date test	: 10/03/2021
End Date test	: 10/03/2021

FAT TRIAL EXPERIMENTAL SET UP:



Format: F/R&D/01





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CONTINUOUS MICROWAVE+CONVECTION HEATING SYSTEM SPECIFICATIONS:

8.7kW	
2450 ± 50 MHz	
2.5 kW	
3000 mm length wise	
Max. 120 deg cells	
500mm	
Variable 0.2 to 4MPM	
1 HP AC Induction with VFD	
1100mm	
1100 mm	
1.5 HP	

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	35°C (±5°C)	
Humidity (%)	≤30% RH	
Pressure (kN/m2 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
Moisture Analyzer		Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)
Thermo Hygrometer		Model No: HTC-2 Temperature accuracy: ± (1.8°F) Temperature resolution: 0.1°C (0.2°F) Humidity range: 10%~99% RH Humidity accuracy: ±5% RH Humidity resolution: 1% RH

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on given sample of cinnamon powder to speed up the heating rate for sterilization treatment. For this experimental run, two types of trials have been taken, one with open treatment to sample and second in sealed packed bags, for that given sample has been sealed packed in microwave transparent bags and placed in microwave+convection heating system for different setting parameters to achieve sterilization treatment. Then, the observations are made for on the basis of temperature on product and any damage to sample and bags during microwave exposure.

Format: F/R&D/01





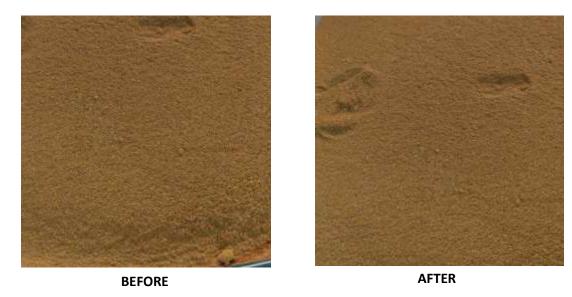
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ANALYTICAL RESULTS:

	Trial No. 1	Trial No. 2
Trial Type	Open	In bags
Microwave Power (kW)	5	5
Setting Temperature (°C)	100	100
Exposure Time (minutes)	6	6
Temperature on Product (°C)	75-80	90-100
Initial moisture Content (%)	7-8	7-8
Final moisture Content (%)	4-5	Not taken
Remarks, if any	No change in color	No change in color

BEFORE AND AFTER PICTURES OF TREATED SPCIMEN SAMPLE:

1. Open Trial:



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2. Bags Trial:



BEFORE



AFTER

OBSERVATIONS:

The heating behavior of Cinnamon powder has been investigated under the microwave irradiation mode dryer for sterilization treatment. As per physical investigation, it has been observed that there is no color change and no damage in any of the sample with required temperature on product.

The samples are being sent to Bombay Test House for Microbiological analysis to get further test reports.

Miss. Komal Bhoite Tested By

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