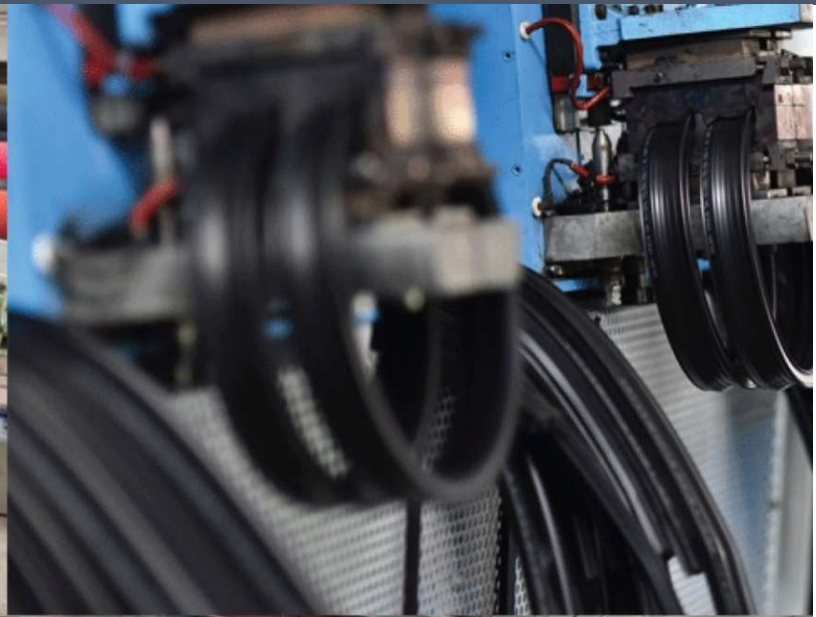


Kerone Research & Development Centre (KRDC)
B/47, Addl. MIDC, Anand Nagar, Ambernath (East), Thane- 421 506, India
Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com



**Continuous Microwave Heat Treatment for
Drying of Larvae**



Kerone Research & Development Centre (KRDC)

B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India

Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com

Customer :	
Process :	Convection Microwave Heat Treatment for Drying of Larvae

Test Report No: 236/KRDC/LAB/17 Mum 02/10/2023

Date Sample reception : 25/09/2023
ID : KRDC/R&D/23-24/02/10

Sample Description:

Sampling : As Requested
Sample Condition : Acceptable
Sampling date : 02/10/2023
Product : Larvae
Requirement : final moisture to be below 3%
Start Date test : 02/10/2023
End Date test : 02/10/2023

Laboratory Experimental System -



Kerone Research & Development Centre (KRDC)

B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India

Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com

System Specifications –

Microwave Power	1.45 kW(CW)
Frequency	2450 \pm 50 MHz
Microwave Exposure Zone (Cavity)	1000 mm length-wise
Product surface temp. range	Max. 120 deg cells
Conveyor width	380mm
Conveyor Speed	Variable 0.2 to 2MPM
Conveyor Motor Drive	0.5HP AC Induction with VFD
Entry Vestibule length	1200mm
Exit Vestibule Length	1200 mm
Exhaust Power	0.5 HP

Laboratory's Environmental Conditions –

Temperature (degree C)	29.4°C (\pm 5°C)
Humidity (%)	\leq 50% 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







Kerone Research & Development Centre (KRDC)

B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India

Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com

Equipment 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: $\pm^{\circ}\text{C}$ (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
Moisture Analyzer		Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample >5g)
Analytical Balances LINB-A10		Capacity : 100 g Minimum weighing : 0.0004 g Resolution : 0.0001 g Pan size : \approx 80 mm



Kerone Research & Development Centre (KRDC)

B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India

Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com

Procedure of the Experiment -

- The experiment was performed on Larvae to speed up the heating rate.
- For this experimental run, the given sample was placed on the conveyor of the MW heating system with suitable parameters.
- After the heating treatment, the sample was analyzed.

Analytical Results:

Trial - 03

Initial Moisture:67.3%**Initial Weight:2000gm**

Cycle	Heating Zone Cycle Time	System Specification	On product temperature (°C)	Remark
C1	15 minutes	MW Intensity:100% Belt Speed:0.8rpm Set temp:70°C	50-58	Dried as desired

Final Moisture:2.8%**Final Weight:583gm**

Before and After images:

Trial -03*Untreated Sample**Treated Sample*



ELECTRO MAGNETIC innovative technologies



KERONE

A CRISIL-NSIC RATED COMPANY

ISO-9001-2008 COMPANY

Kerone Research & Development Centre (KRDC)

B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India

Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com

Moisture Analysis Report:

Trial - 03

Drying started	
Date	27-09-2023
Time	11:02:25
Model	A05200
Serial number	138
Drying parameters	
Product	: 0
Drying temperature	: 105.0 °C
Drying profile	: standard
Mode	: Short mode
Calculation	: $((m_0 - m)/m_0) \times 100\%$
Finished	: 3 samples
Initial weight	: 3.817 g
Final weight	: 1.249 g
Drying time	: 00:32:00s
Sampling interval	: 20 sec
Moisture	: 67.3 %
NOTE Initial Moisture	
The analysis performed by:	
Signature: <i>[Signature]</i>	

Drying started	
Date	2-10-2023
Time	15:33:00
Model	A05200
Serial number	138
Drying parameters	
Product	: 0
Drying temperature	: 105.0 °C
Drying profile	: standard
Mode	: Short mode
Calculation	: $((m_0 - m)/m_0) \times 100\%$
Finished	: 3 samples
Initial weight	: 1.052 g
Final weight	: 1.023 g
Drying time	: 00:02:40s
Sampling interval	: 20 sec
Moisture	: 2.8 %
NOTE Final Moisture	
The analysis performed by:	
Signature: <i>[Signature]</i>	



ELECTRO MAGNETIC innovative technologies



A CRISIL-NSIC RATED COMPANY

ISO-9001-2008 COMPANY

Kerone Research & Development Centre (KRDC)

B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India

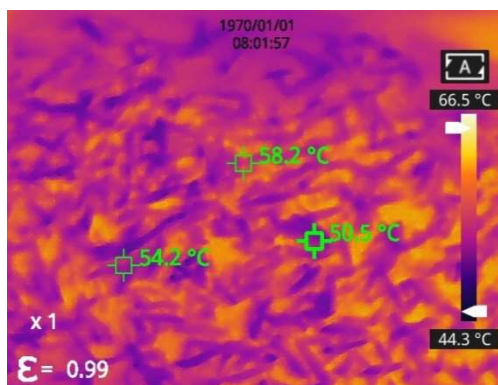
Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com

Thermal images:**Measurements**

Sp1	58.2°C
Sp2	54.2°C
Sp3	50.5°C

Parameters

Emissivity	0.99
Temp.	66.5°C

**Observations:**

The heating behavior of Larvae was investigated under the Microwave heating system. The heating rate was found to be increasing with respect to increasing in time. As per the physical investigation, it was observed that the product was dried as desired without any charring effect.

Mrs. Priya Tayde**(Tested By)**