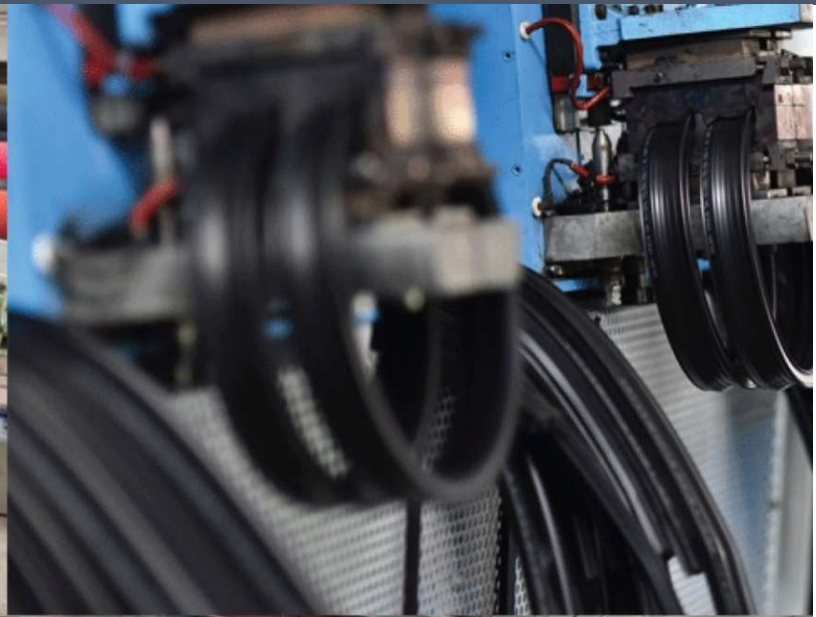


Kerone Research & Development Centre (KRDC)  
B/47, Addl. MIDC, Anand Nagar, Ambernath (East), Thane- 421 506, India  
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**Continuous Microwave Heat Treatment for  
Drying of Larvae**



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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 -**





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### System Specifications –

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

### Laboratory's Environmental Conditions –

<b>Temperature (degree C)</b>	29.4°C ( $\pm$ 5°C)
<b>Humidity (%)</b>	$\leq$ 50% RH
<b>Pressure (kN/m<sup>2</sup> or kPa)</b>	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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**Equipment Used –**

Name of Equipment	Picture of Equipment	Specifications
<b>Compact Thermal Imaging Camera</b>		<b>Model: FLIR E-30</b> <b>Resolution: 160x 120IR Thermal sensitivity of 0.10°C</b>
<b>Thermo Hygrometer</b>		<b>Model No: HTC-2</b> <b>Temperature accuracy: <math>\pm^{\circ}\text{C}</math> (1.8°F)</b> <b>Temperature resolution: 0.1°C (0.2°F)</b>  <b>Humidity range: 10%~99% RH</b> <b>Humidity accuracy: <math>\pm 5\%</math> RH</b> <b>Humidity resolution: 1% RH</b>
<b>Moisture Analyzer</b>		<b>Make: Axis Balance Description:</b> <b>Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample &gt;5g)</b>
<b>Analytical Balances LINB-A10</b>		<b>Capacity : 100 g</b> <b>Minimum weighing : 0.0004 g</b> <b>Resolution : 0.0001 g</b> <b>Pan size : <math>\approx</math> 80 mm</b>



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### 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*



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## 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	: $((m0-m)/m0)*100\%$
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	: $((m0-m)/m0)*100\%$
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>	



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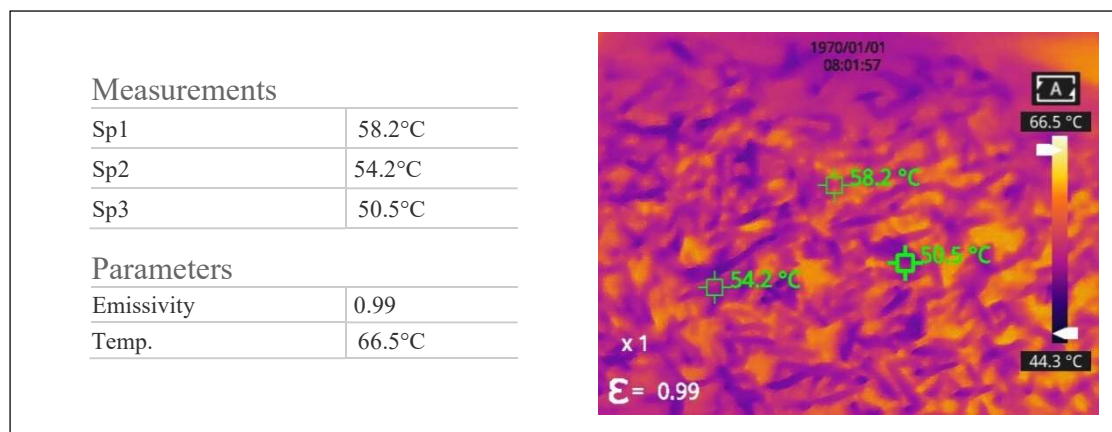
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**Thermal images:****Observations:**

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)**