



**KRDC**

Kerone Research &  
Development Center



**KERONE**  
Kerone Engineering Solutions Limited



**48<sup>+</sup>** Year  
Of experience

## Dehydration Treatment For Drying Of Pulp By Conveyorized Microwave Oven



In Association with SVCH-Technologii, Moscow (Russia)  
ISO 9001:2015 | ISO 14001:2015 | EMS 14001 | OHSAS 18001:2007

<b>Customer:</b>	
<b>Process:</b>	<b>Dehydration Treatment for Drying of Pulp by ConveyORIZED Microwave Oven</b>

**Test Report No: 251/KRDC/LAB/17 Mum 23/06/2025**

Date Sample reception : 10 /06/2025

**Description:**

Sampling : As Requested

Sample Condition : Acceptable

Sampling Date : 23/06/2025

Product : Pulp

End Date Test : 23/06/2025

**Laboratory Experimental System –**



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**Address**

Kerone Research & Development Centre (KRDC)  
Plot No K2, Industrial Gala F4A, D-Wing, MGN Properties,  
Opposite Godrej Co., Addl MIDC Anand Nagar,  
Ambernath (E)- 421506 (India) +91-2512620543/44



### **Specifications**

<b>Microwave Power</b>	1.45 kW (CW)
<b>Frequency</b>	2450 MHz $\pm$ 50
<b>Infra-red Power</b>	4 kW
<b>Microwave Exposure Zone (Cavity)</b>	1000 mm length wise
<b>Web width</b>	380mm
<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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### **Laboratory's Environmental Conditions –**

Name of Equipment	Picture of Equipment	Specification
Compact Thermal Imaging Camera		Model: FLIR E-30 Resolutions: 160x120IR Thermal Sensitivity of 0.10°C
Moisture Analyzer		Make: Axis Balance Description: Moisture Range: 1% (sample 0.5/5g), 0.01% (Sample>5g)
Analytical Balances LINB-A10		Capacity: 100g Minimum Weighing: 0.0004g Resolution: 0.0001g Pan size: $\varnothing$ 80 mm
Microscope		Par focal and Centered Strain free optics Optics with multi-layer coating Choice of halogen and LED illumination Easy access for lamp replacement

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## **Procedure of the Experiment –**

- The experiment was performed on Pulp to speed up the heating rate.
- For this experimental run, the given sample was taken and passed in continuous Microwave heating system with suitable parameters.
- After the heating treatment, the sample was analysed.

## **Analytical Results:**

### **Trial 1:**

➤	<b><u>PARAMETERS</u></b>	<b><u>PULP SHEET</u></b>
➤	<b><u>INITIAL MOISTURE</u></b>	<b><u>85.5 %</u></b>
➤	<b><u>FINAL MOISTURE</u></b>	<b><u>17.5%</u></b>
➤	<b><u>BULK DENSITY</u></b>	<b><u>1.12 g/ml</u></b>
➤	<b><u>VISCOCITY (B4 CUP)</u></b>	<b><u>230 secs</u></b>
➤	<b><u>SET TEMP.</u></b>	<b><u>180C</u></b>
➤	<b><u>RESIDENCE TIME</u></b>	<b><u>2.5Hrs.</u></b>
➤	<b><u>PULP</u></b>	<b><u>60 %</u></b>
➤	<b><u>STARCH</u></b>	<b><u>45 %</u></b>
➤	<b><u>CELLULOSE</u></b>	<b><u>45 %</u></b>
➤	<b><u>INITIAL WEIGHT</u></b>	<b><u>120 g</u></b>
➤	<b><u>FINAL WEIGHT</u></b>	<b><u>15 g</u></b>

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## **Trial 2:**

➤	<u><b>PARAMETERS</b></u>	<u><b>PULP SHEET</b></u>
➤	<u><b>INITIAL MOISTURE</b></u>	<u><b>85.5 %</b></u>
➤	<u><b>FINAL MOISTURE</b></u>	<u><b>24.1 %</b></u>
➤	<u><b>BULK DENSITY</b></u>	<u><b>1.12 g/ml</b></u>
➤	<u><b>VISCOCITY (B4 CUP)</b></u>	<u><b>230 secs</b></u>
➤	<u><b>SET TEMP.</b></u>	<u><b>180C</b></u>
➤	<u><b>RESIDENCE TIME</b></u>	<u><b>3 Hrs.</b></u>
➤	<u><b>PULP</b></u>	<u><b>120 %</b></u>
➤	<u><b>STARCH</b></u>	<u><b>80 %</b></u>
➤	<u><b>CELLULOSE</b></u>	<u><b>80 %</b></u>
➤	<u><b>INITIAL WEIGHT</b></u>	<u><b>150 g</b></u>
➤	<u><b>FINAL WEIGHT</b></u>	<u><b>32 g</b></u>

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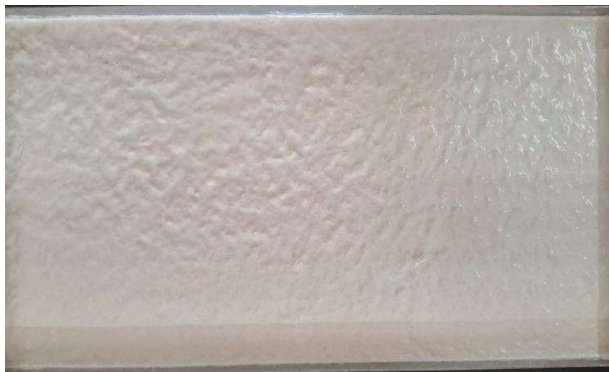
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## **Images During Trials:**

### **Trial 1:**

#### **Initial**



#### **Final**



### **Trial 2:**

#### **Initial**



#### **Final**



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## **Moisture Analysis Report:**

### **Trial 1:**

#### **Initial**

Time : 22:34:51  
Model: AGS200  
Serial number : 139

Drying parameters

Product : 0

Drying temperature : 105.0 °C

Drying profile : standard  
Mode : Short mode  
Calculation :  $((m_0 - m) / m_0) * 100\%$   
Finished : 3 samples

Initial weight : 1.091 g  
Final weight : 0.158 g

Drying time : 00:19:00s  
Sampling interval : 20 sec

Moisture : 85.5 %

NOTE

The analysis performed by:

Signature: .....

#### **Final**

Time : 14:39:50  
Model: AGS200  
Serial number : 139

Drying parameters

Product : 0

Drying temperature : 105.0 °C

Drying profile : standard  
Mode : Short mode  
Calculation :  $((m_0 - m) / m_0) * 100\%$   
Finished : 3 samples

Initial weight : 1.355 g  
Final weight : 1.118 g

Drying time : 00:36:00s  
Sampling interval : 20 sec

Moisture : 17.5 %

NOTE

The analysis performed by:

Signature: .....

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## **Trial 2:**

### **Initial**

Time: 22:34:51  
Model: AGS200  
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 : 1.091 g  
Final weight : 0.158 g

Drying time : 00:19:00s  
Sampling interval : 20 sec

Moisture : 85.5 %

NOTE

The analysis performed by:

Signature: .....

### **Final**

Model: AGS200  
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 : 1.099 g  
Final weight : 0.834 g

Drying time : 00:03:20s  
Sampling interval : 20 sec

Moisture : 24.1 %

NOTE

The analysis performed by:

Signature: .....

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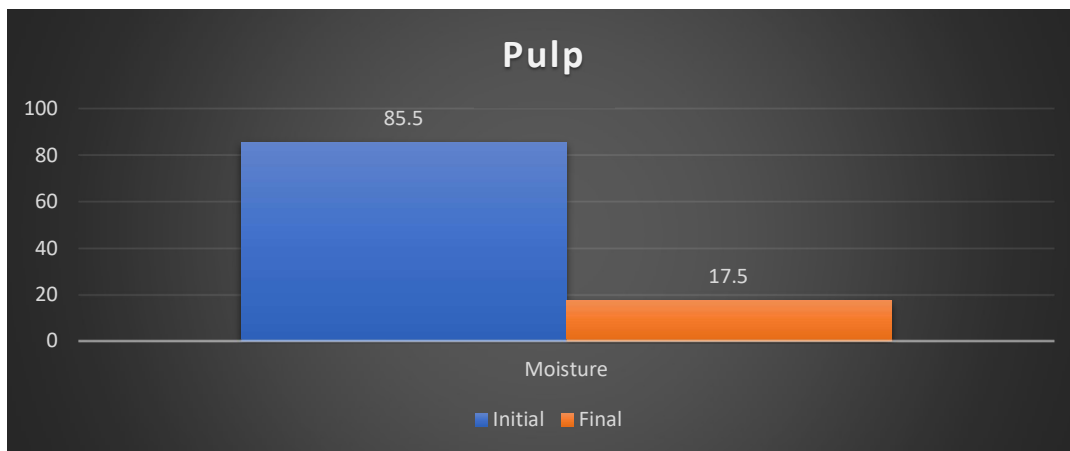
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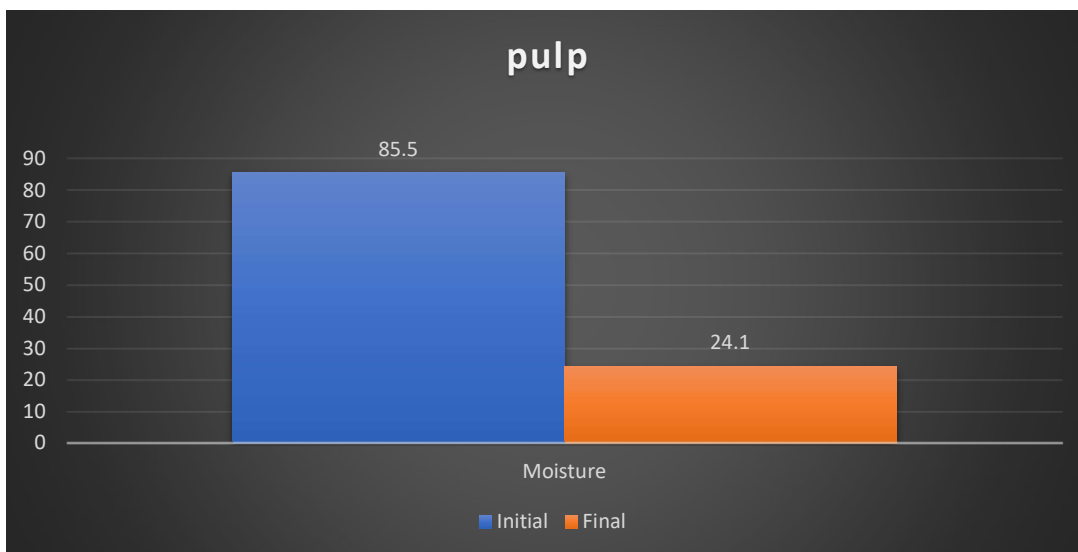


## **LOD of Moisture in %:**

### **Trial 1:**



### **Trial 2:**



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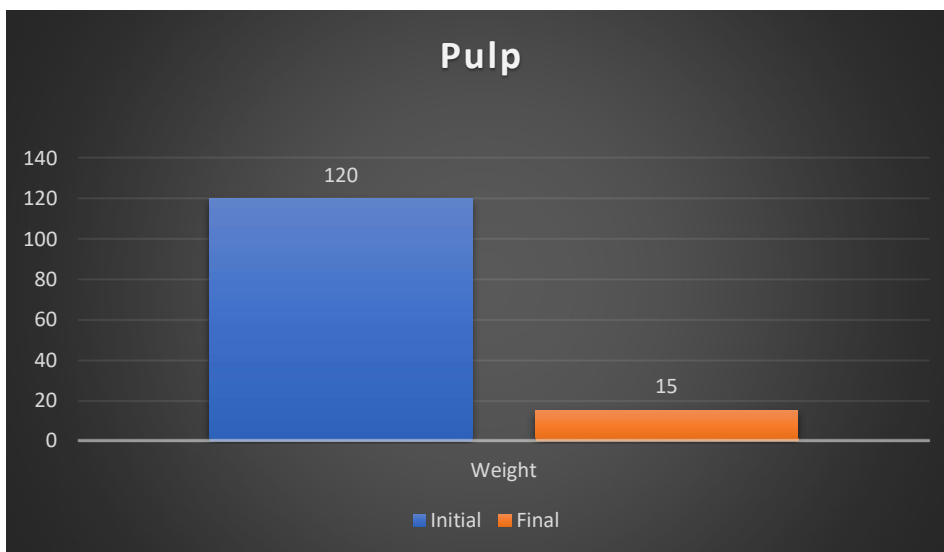
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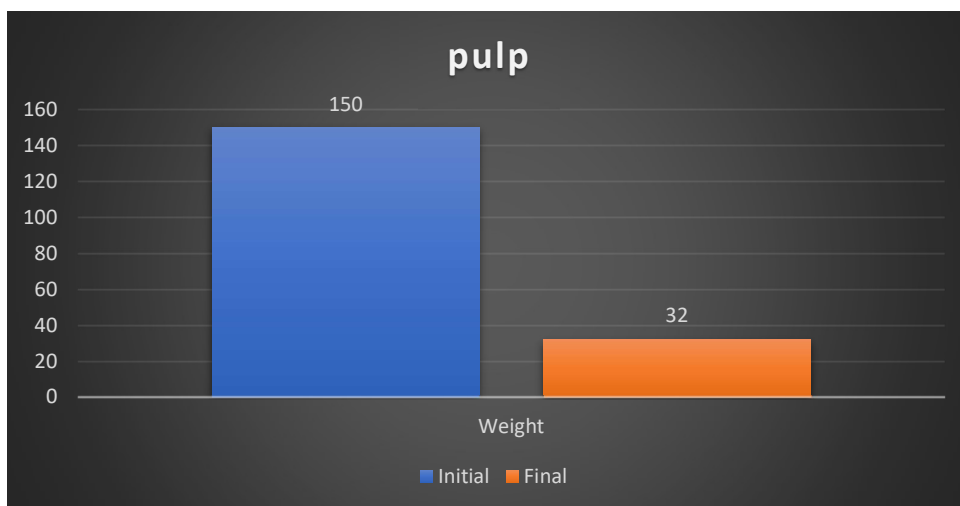


## **LOD Weight in (gm):**

### **Trial 1:**



### **Trial 2:**



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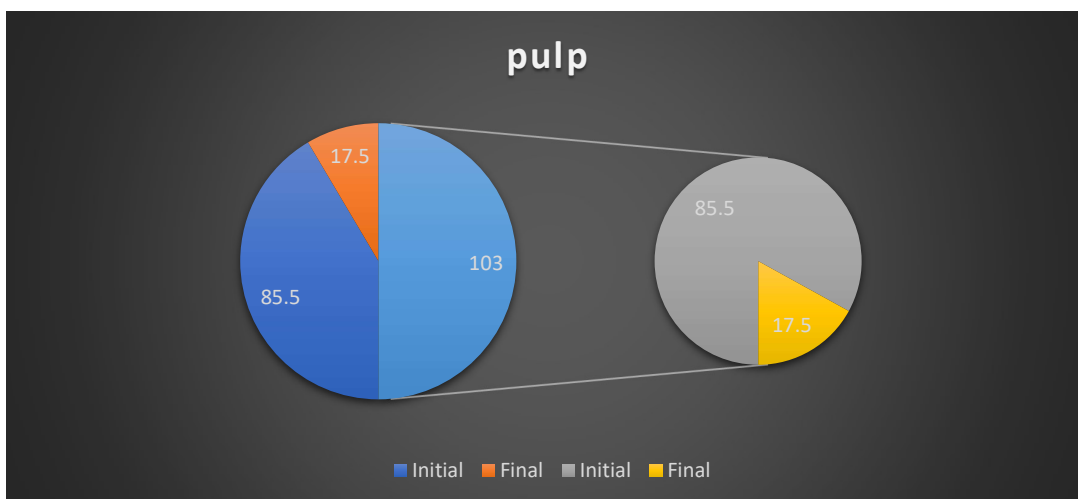
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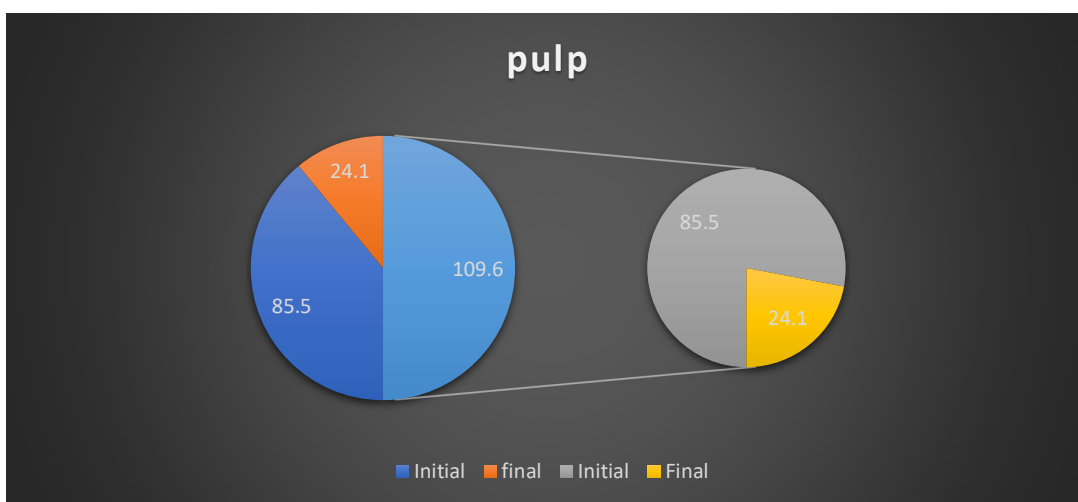


## **Pie Chart of Moisture %**

### **Trial 1:**



### **Trial 2:**



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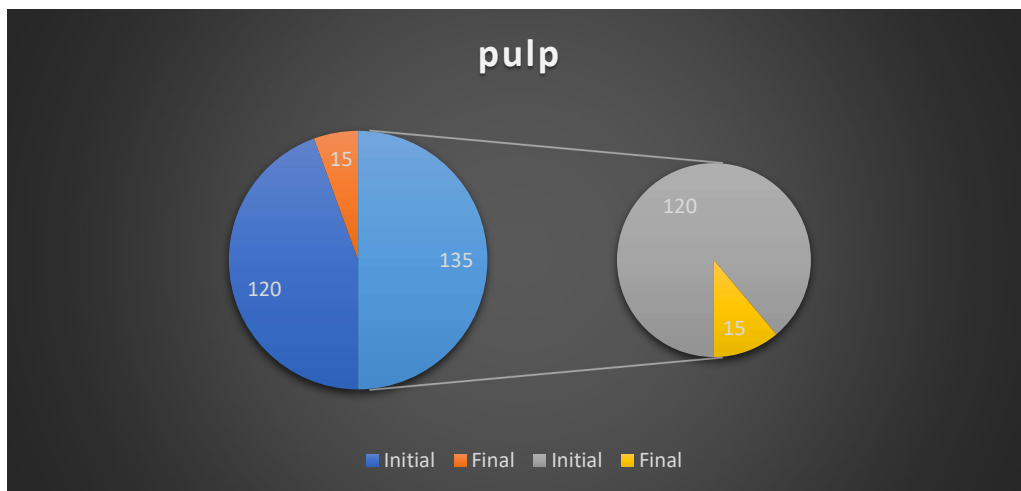
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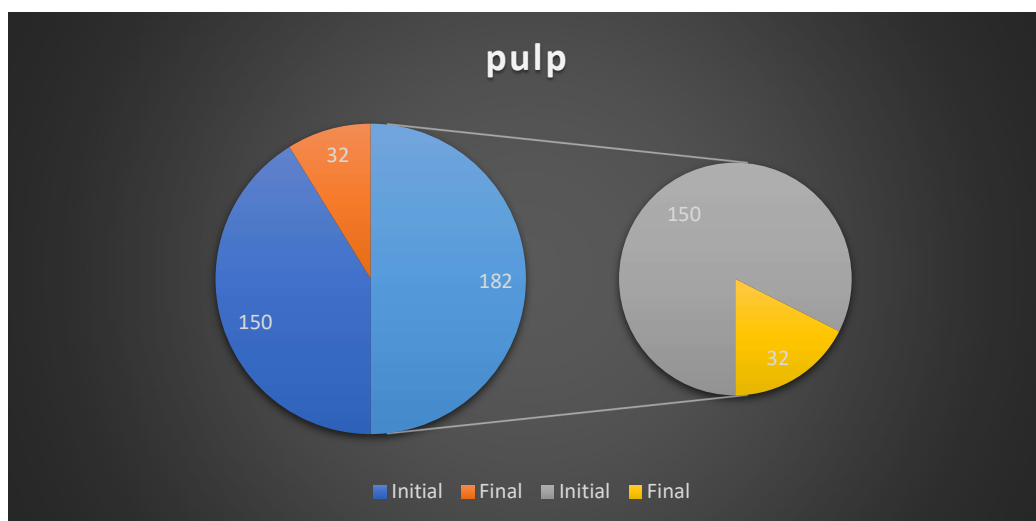


## **Pie Chart of Weight:**

### **Trial 1:**



### **Trial 2:**



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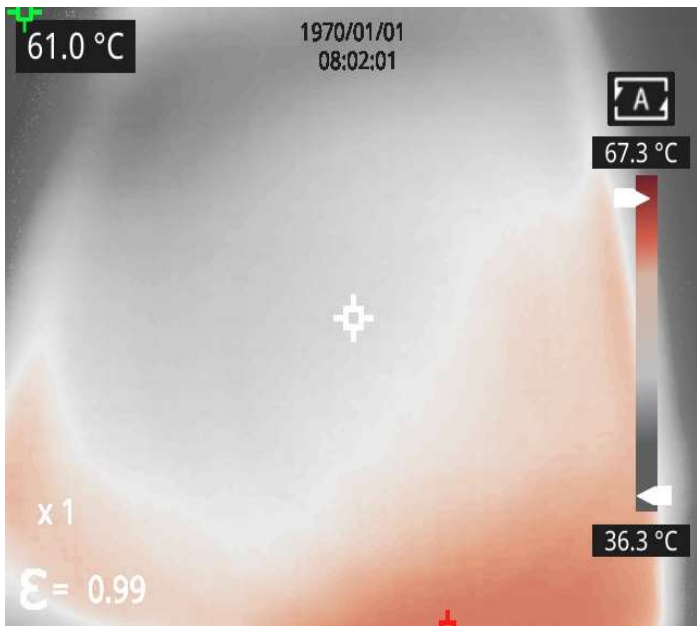
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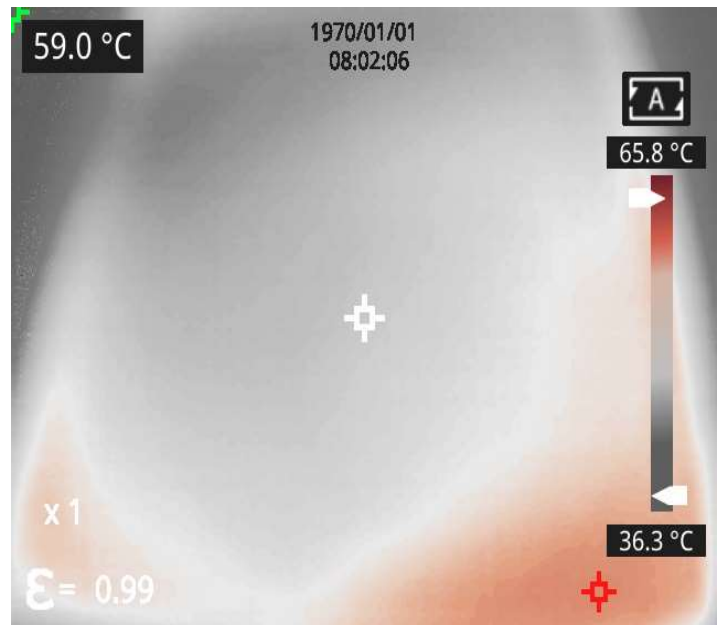
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## **Thermal Image:**

### **Trial 1**



### **Trial 2**



## **Observations:**

The heating behaviour of Pulp was investigated under the continuous Conveyorized Microwave heating system. The heating rate was found to be increasing with respect to the increase in time. As per the physical investigation it was observed that the product was dries to desired moisture content.

Mr. Pranay Yerunkar  
(Tested by)

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