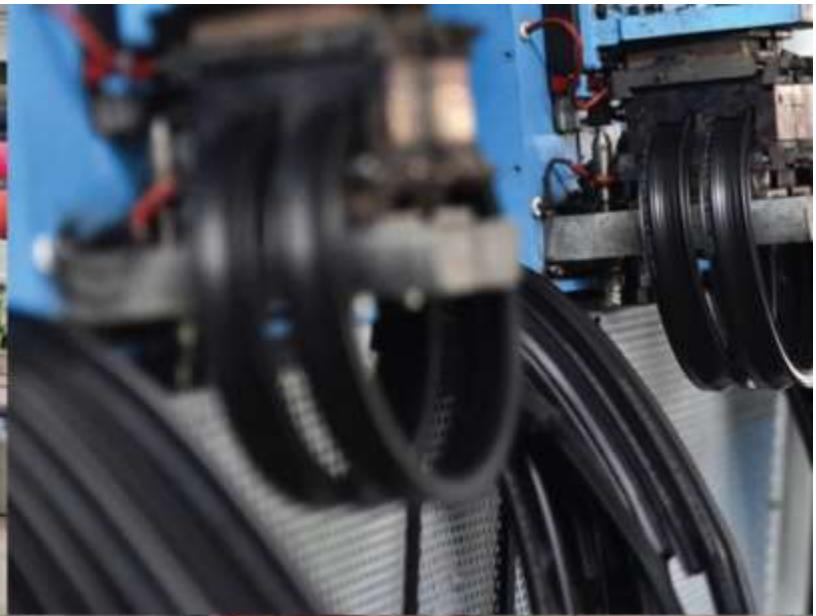


Kerone Research & Development Centre (KRDC)
B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
Tel- +91-251-2620542/13/44/45/46, Email-info@kerone.com, www.kerone.com



**Spray Drying Heat Treatment of
Tamarind Slurry**



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 : | M/s. Jin Mata Food Processors LLP |
| Process : | Spray Drying Heat Treatment of Tamarind Slurry |

Test Report No: 218/KRDC/LAB/17 Mum 12/06/2023

Date Sample reception : 08/06/2023
ID : KRDC/R&D/23-24/06/10

Sample Description:

Sampling : As Requested
Sample Condition : Acceptable
Sampling date : 10/12/2023
Product : Tamarind Slurry
Start Date test : 10/05/2023
End Date test : 10/05/2023

Laboratory Experimental System –









ELECTRO & MAGNETIC Interference Solutions

Kerone Research & Development Centre (KRDC)

B/47, Addl. MIDC. Anand Nagar, Ambarnath (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 |
|-----------------------------|---|--|
| Thermo Hygrometer |  | <p>Model No: HTC-2</p> <p>Temperature accuracy: $\pm^{\circ}\text{C}$ (1.8°F)</p> <p>Temperature resolution: 0.1°C (0.2°F)</p> <p>Humidity range: 10%~99% RH</p> <p>Humidity accuracy: $\pm 5\%$ RH</p> <p>Humidity resolution: 1% RH</p> |
| Moisture Analyzer |  | <p>Make: Axis Balance</p> <p>Description:</p> <p>Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)</p> |
| Analytical Weighing Balance |  | <p>Make: AVI</p> <p>Max: 200g</p> <p>Min: 40mg</p> <p>Class: II</p> <p>e: 2mg</p> <p>d: 0.001g</p> <p>Sr. No.: 2324003</p> |
| Viscosity Apparatus |  | <p>Manual flow meter in terms of time</p> <p>I.S. No.: 39944</p> <p>Cup: B4</p> |

Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.



ELNCTRO E UAGNETTO Jomacchione Soc/consorzio



A CRISIL-NSIC RATED COMPANY
ISO-9001-2008 COMPANY

Kerone Research & Development Centre (KRDC)

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

| | | |
|--|---|---|
| Digital Karl Fisher titration apparatus |  | Make: DBK Sr. No.: 220789 Type: 10KFT04 Volts: 230V ~ |
| Weighing Balance |  | Make: Gill Description: ISO 9001: 2008 Model- PEWT – X Max- 10/20 Kg Min- 20g e. 1/2 g |
| Bulk Density Apparatus |  | Make: AVI Model No.: AVI-83 Sr. No.: 2324003 |
| Thermal Imaging Camera |  | Model: FLIR E-30 Resolution: 160 x 120 IR Thermal sensitivity of 0.10°C |



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 Specification -

| | |
|--------------------------------|---------------|
| Drying chamber Installed Power | 4.5 KW |
| Drying chamber Heat Load | 250°C maximum |
| Pneumatic Air Pressure | 6 bar |
| Dosing pump | 6-7 rpm min. |

Laboratory's Environmental Conditions –

| | |
|-------------------------|---------------|
| Temperature (degree C) | 29.4°C (±5°C) |
| Humidity (%) | ≤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

Procedure of the Experiment -

- The experiment was performed on Tamarind Slurry to speed up the heating rate.
- For this experimental run, the solution was passed through the dosing pump at a particular rpm into the heating chamber.
- The drying of the sample was achieved by monitoring and controlling parameters like temperature, feed pump, compressed air pressure, etc.
- The dried sample was collected from the cyclone and analyzed.



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

Analytical Results:

Trial 1 –

Initial Sample Quantity – 500 ml

| Heater Temperature (°C) | Flow time in B4 Cup (sec) | Chamber Temperature(°C) | Karl Fisher titration Value | Cycle Mode | Dosing Pump (rpm) | Remark |
|-------------------------|---------------------------|-------------------------|-----------------------------|------------|-------------------------------|------------------------------|
| 250°C | 15 | (170-180)°C | 2.73ml | Continuous | 10 Flow rate- 20ml/min. | Sample recovered as observed |

Final sample recovered – 93g

Final Moisture by LOD– 5.5%

Final Moisture by Karl Fisher Titration– 6.7%

Bulk Density of recovered sample- 0.003 kg/cm3

Karl Fisher Titration Value:



Images during Trials:



Untreated Sample



Treated Sample



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 Report:

#75- Drying started

Date :10-04-2023
Time :17:37:08
Model:AB8200
Serial number : 133

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 : 1.007 g

Final weight : 0.954 g

Drying time : 00:02:00s
Sampling interval : 20 sec

Moisture : 5.5 %

NOTE *Final Moisture*

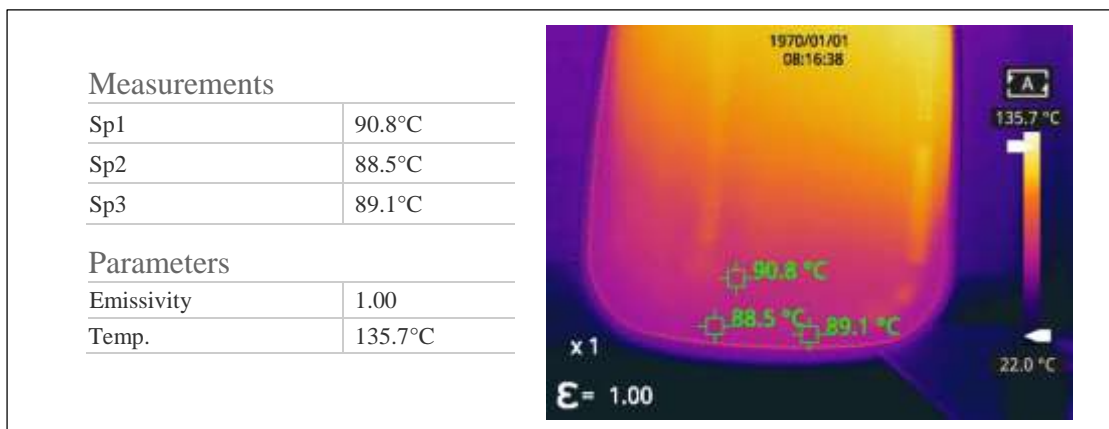
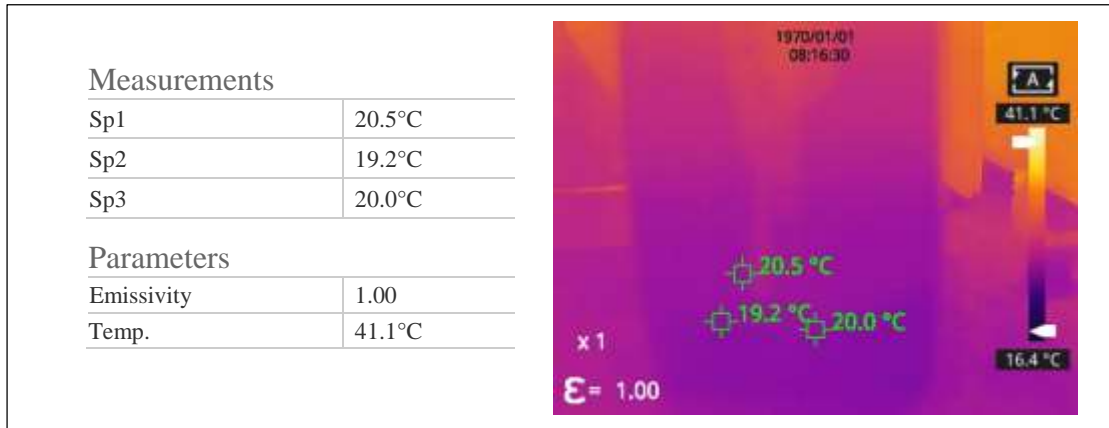
The analysis performed by:

Signature..... *Angel*.....

Kerone Research & Development Centre (KRDC)

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

Thermal Images:



Observations:

The heating behavior of the Tamarind Slurry was investigated under the Spray Drying heating system. The heating rate was found to be increasing with respect to the increase in time. As per the physical investigation, the sample was spray-dried and the dried powder was recovered. The inlet temperature was ambient, passing through a drying Chamber temperature of hot air circulation was (170-180) °C, and the outlet temperature when a sample was collected (80-90) °C was observed.

Aasali

Ms. Sayali Asole
(Tested By)

Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.