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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

Batch Microwave+Convection Heat Treatment for Drying of Coconut Coir Pith

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

MEMBER OF A.M.P.E.R.E (EUROPE)
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Customer :	**M/s. Kohinoor Organic Farm Company**
Process :	**Batch Microwave+Convection Heat Treatment for Drying of Coconut Coir Pith**

TEST REPORT No: 47/KRDC/LAB/17 Mum 09/07/2019

Date Sample reception : 09/07/2019
ID : 47/LAB/121

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 1 bag
Sampling date : 13/07/2019
Product : Coconut Coir Pith
Requirement : Final product must have moisture content between 15 to 20%
Start Date test : 13/07/2019
End Date test : 13/07/2019

LABORATORY EXPERIMENTAL SET UP:

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LAB BATCH MICROWAVE+CONVECTION HEATING SYSTEM SPECIFICATIONS:

Microwave Power	2 kW(CW)
Frequency	2450 MHz ± 50
Convective Power	3.5 kW (air flow 350 l/min at 20°C)
Microwave Exposure Zone (cavity)	1 cubic meter
Mode Stirrer	One
Thermal Monitoring System	Single Channel Fiber Optic: Range -40 to 250°C
Exhaust Power	1HP
Tray Size	450x950x50 mm

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	28°C (±5°C)
Humidity (%)	≤90% 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 120 IR 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: ±°C (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 Coconut Coir Pith with adding water to speed up the drying rate. For this experimental run, 100 grams of given sample has been taken and 100 ml of water has been added to increase the moisture content upto 50%. Then this sample has been taken in tray with uniform thickness of 20 mm and heating treatment has been given. Observations are made after every 5 minutes by using LOD method. Also, initial and final moisture content has been taken.

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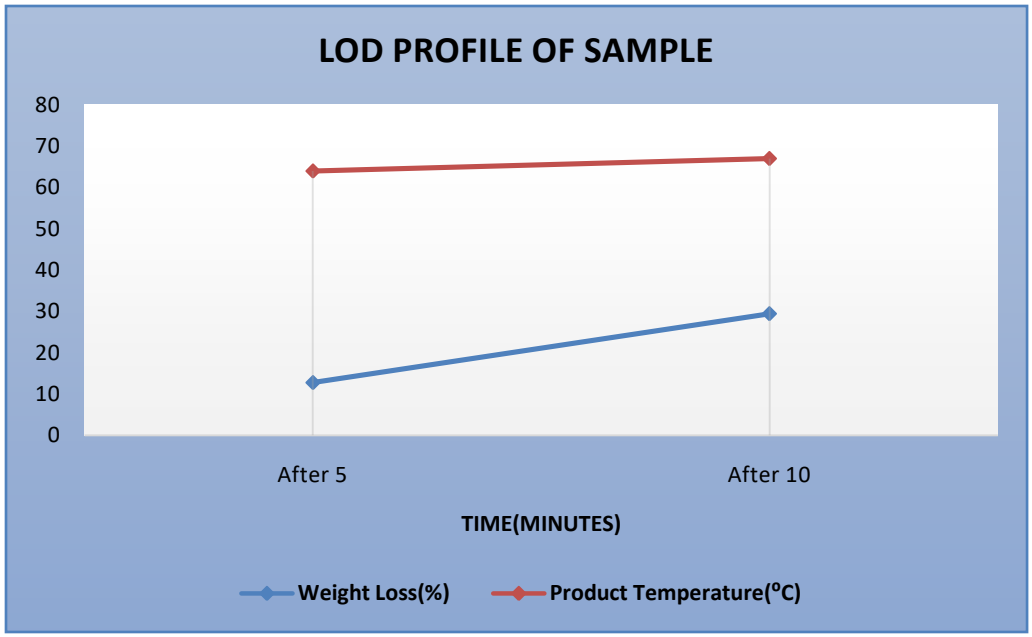
ANALYTICAL RESULTS:

Microwave Power: 1 kW
Setting Temperature: 55°C
Initial Moisture Content: 10%
Initial weight: 100 grams
Moisture Content after adding water: 51.3%
Weight after adding water: 180 grams

Sr. No.	Time (minutes)	Weight noted (grams)	Total weight loss (%)	Temperature on sample(°C)	Remarks, if any
1.	After 5	157	12.78	64	Drying rate started
2.	After 10	127	29.44	67	Required Drying rate

Sample weight after drying: 127 grams
Total weight loss on drying: 29.44%
Final Moisture Content: 19.4%

GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:



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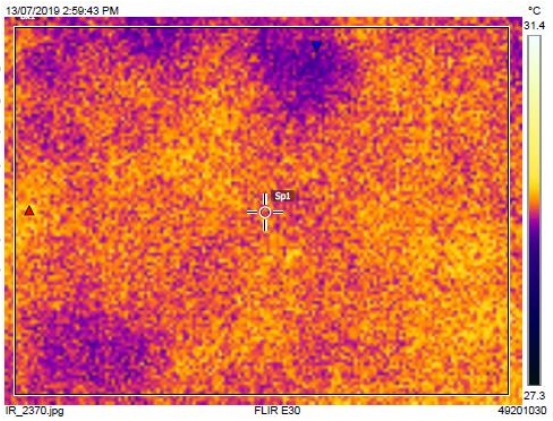
THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. **Before Heat Treatment:**

Measurements		
Bx1	Max	29.9 °C
	Min	28.9 °C
	Average	29.4 °C
Sp1		29.3 °C

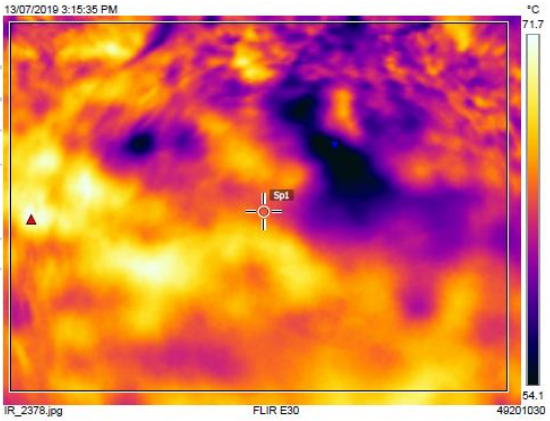
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



2. **After Heat Treatment:**

Measurements		
Bx1	Max	72.3 °C
	Min	52.7 °C
	Average	63.8 °C
Sp1		64.0 °C

Parameters	
Emissivity	0.95
Refl. temp.	20 °C



BEFORE AND AFTER PICTURES OF TREATED SPCIMEN SAMPLE:

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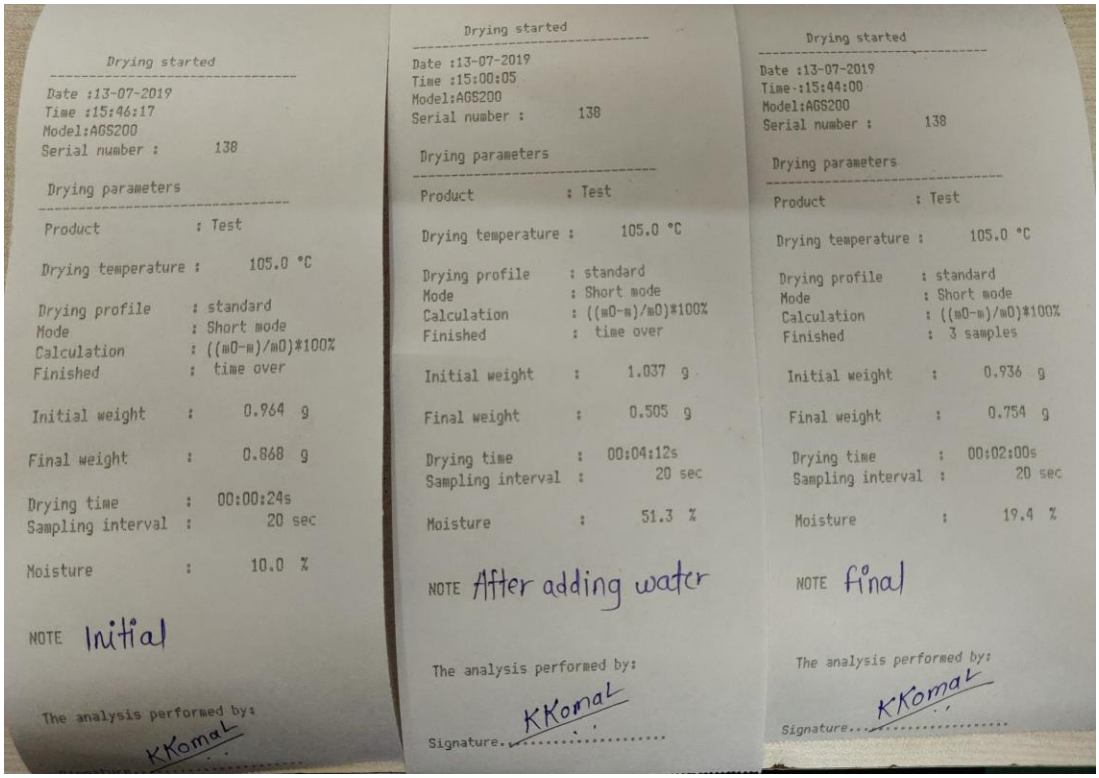
MOISTURE ANALYSIS REPORTS:



Drying started

Date :13-07-2019
Time :15:46:17
Model:AGS200
Serial number : 138

Drying parameters

Product : Test
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : time over
Initial weight : 0.964 g
Final weight : 0.868 g
Drying time : 00:00:24s
Sampling interval : 20 sec
Moisture : 10.0 %
NOTE Initial
The analysis performed by:
KKomal

Drying started

Date :13-07-2019
Time :15:00:05
Model:AGS200
Serial number : 138

Drying parameters

Product : Test
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : time over
Initial weight : 1.037 g
Final weight : 0.505 g
Drying time : 00:04:12s
Sampling interval : 20 sec
Moisture : 51.3 %
NOTE After adding water
The analysis performed by:
KKomal
Signature.....

Drying started

Date :13-07-2019
Time :15:44:00
Model:AGS200
Serial number : 138

Drying parameters

Product : Test
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples
Initial weight : 0.936 g
Final weight : 0.754 g
Drying time : 00:02:00s
Sampling interval : 20 sec
Moisture : 19.4 %
NOTE final
The analysis performed by:
KKomal
Signature.....

OBSRVATIONS:

The Drying behavior of Coconut Coir Pith has been investigated under Microwave+Convection Heating System. The drying rate is found to be increasing with respect to increasing drying time. It has been found that the moisture content on the dry basis (%) decreases with respect to increase drying time.
As per physical investigation, it has been observed that there is no colour change and no burning effect with desired moisture content.

KKomal

Miss. Komal Bhoite
Tested By

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