



KRDC
Kerone Research &
Development Center



48⁺ Year
Of experience

CONVEYORIZED IR HEAT-TREATMENT OF UREA FOR TEMPERATURE BOOSTING.



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

Customer:	
Process:	CONVEYORIZED IR HEAT TREATMENT OF UREA FOR TEMPERATURE BOOSTING.

Test Report No: 251/KRDC/LAB/17 Mum 13/03/2024

Date Sample reception : 30/03/2024

ID : 182/LAB/24

Sample Description:

Sampling : As Requested,

Sample Condition : Acceptable

Sampling Date : 12/03/2024

Product : UREA (Diammonium phosphate)

End Date Test : 30/03/2024

Laboratory Experimental System –



Format: F/R&D/01

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Address

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

Specifications –

Infrared Power	6 kW
Temperature	150 – 200 °C
Convective Power Heater	3.5 KW

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.


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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		Parfocal 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 Urea (Diammonium phosphate) to achieve the required temperature.
- For this experimental run, the gives sample was taken and passed in ConveyORIZED IR Oven.
- After the heating treatment, the sample was analyzed.

Analytical Results:

Trial 1

Initial weight: 4.1 kg.

Initial Moisture: 1.3%

Bulk density – 0.769g/ml

Frequency = 9.9 hz

Final Moisture: 0.6%

Cycle no.	Time (min)	Initial Temperature °C	Final Temperature °C		Observations
			Top	Bottom	
1	2	36	56	45	No gradual change
2	2	42	72	61	No gradual change
3	2	45	73	62	No gradual change

Trial 2

Initial weight: 4 kg.

Initial Moisture: 1.3%

Frequency = 6.6 hz

Final Moisture: 0.9%

Cycle no.	Time (min)	Initial Temperature °C	Final Temperature °C		Observations
			Top	Bottom	
1	3	36	56	48	No gradual change
2	3	44	57	48	No gradual change
3	3	47	72.5	65	No gradual change

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Trial 3

Initial weight: 4.1 kg.

Initial Moisture: 1.3%

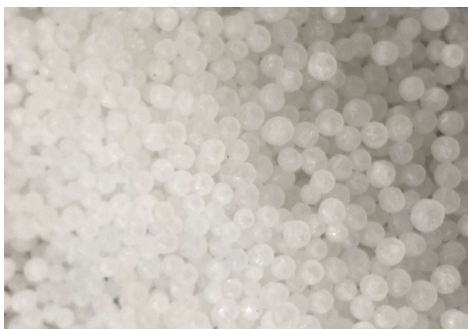
Frequency = 4.8 hz

Final Moisture: 0.4%

Cycle no.	Time (min)	Initial Temperature °C	Final Temperature °C		Observations
			Top	Bottom	
1	5.5	35	75	62	No gradual change
2	5.5	53	82	71	Upper layer became sticky

Images During Trials:

Initial Image



Final Image (T1)



Final Image (T2)



Final Image (T3)



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Moisture Analysis Report:

Drying started

Date :30-03-2024
Time :15:01:34
Model:ABS200
Serial number : 138

Drying parameters

Product : 0
Drying temperature : 120.0 °C
Drying profile : standard
Mode : Short mode
Calculation : $((m0-s)/m0)*100\%$
Finished : 3 samples

Initial weight : 1.088 g
Final weight : 1.074 g
Drying time : 00:02:40s
Sampling interval : 20 sec
Moisture : 1.3 %

NOTE *Final*

The analysis performed by:

Signature... *Panay*

Initial

Drying started

Date :30-03-2024
Time :14:51:10
Model:ABS200
Serial number : 138

Drying parameters

Product : 0
Drying temperature : 120.0 °C
Drying profile : standard
Mode : Short mode
Calculation : $((m0-s)/m0)*100\%$
Finished : 3 samples

Initial weight : 1.487 g
Final weight : 1.480 g
Drying time : 00:02:20s
Sampling interval : 20 sec
Moisture : 0.4 %

NOTE *Final*

The analysis performed by:

Signature... *Panay*

Trial 1

Drying started

Date :30-03-2024
Time :14:55:21
Model:ABS200
Serial number : 138

Drying parameters

Product : 0
Drying temperature : 120.0 °C
Drying profile : standard
Mode : Short mode
Calculation : $((m0-s)/m0)*100\%$
Finished : 3 samples

Initial weight : 1.057 g
Final weight : 1.047 g
Drying time : 00:02:20s
Sampling interval : 20 sec
Moisture : 0.9 %

NOTE *Final*

The analysis performed by:

Signature... *Panay*

Trial 2

Drying started

Date :30-03-2024
Time :15:44:24
Model:ABS200
Serial number : 138

Drying parameters

Product : 0
Drying temperature : 105.0 °C
Drying profile : standard
Mode : Short mode
Calculation : $((m0-s)/m0)*100\%$
Finished : 3 samples

Initial weight : 1.471 g
Final weight : 1.445 g
Drying time : 00:01:40s
Sampling interval : 20 sec
Moisture : 0.4 %

NOTE *Final*

The analysis performed by:

Signature... *Panay*

Trial 3

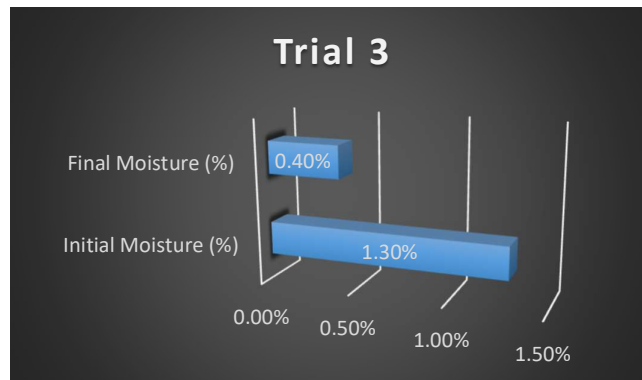
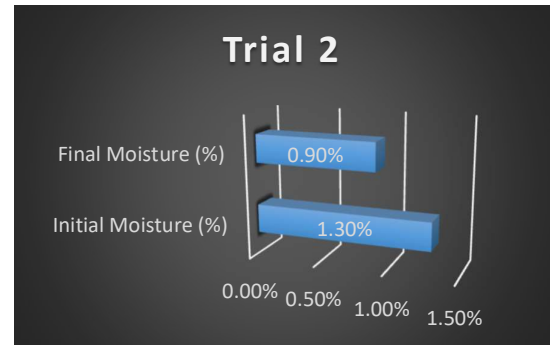
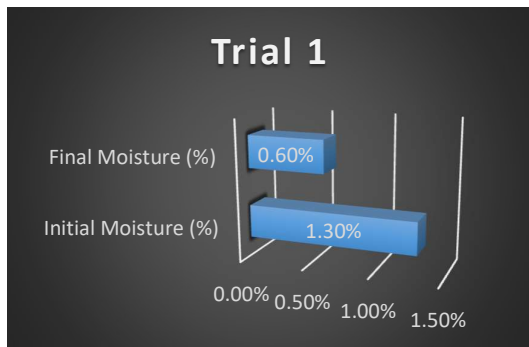
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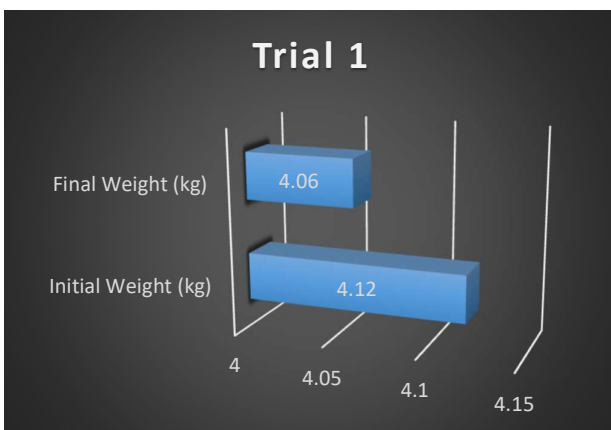
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LOD of Moisture in %:



LOD of Weight in (gm):



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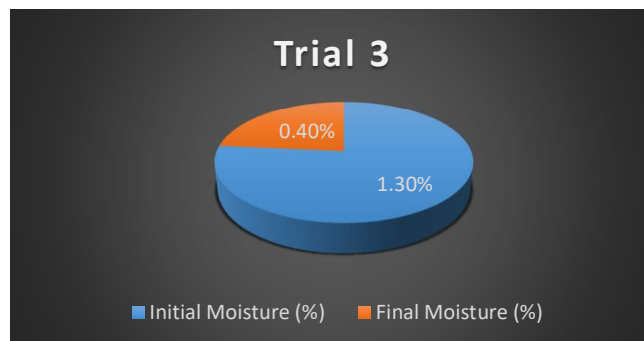
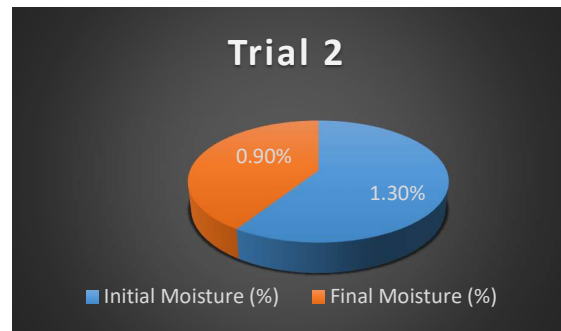
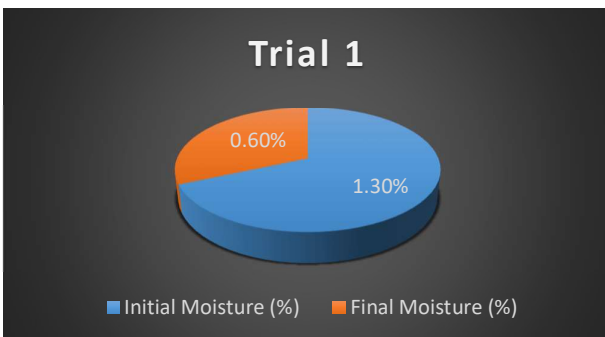
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Pie Chart of Moisture %



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Address

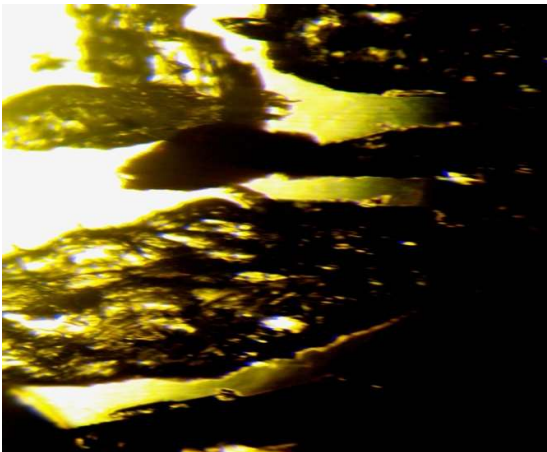
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Pie Chart of Weight (gm)

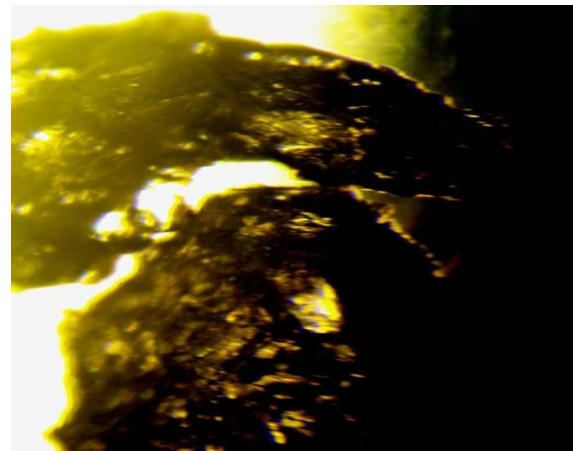
Initial weight and Final weight



Microscopic Images



Initial Image



Final Image

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Observations:

The heating behavior of Urea was investigated under the Conveyorized IR Heat Treatment. 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 dried to desired moisture content.

Mr. Pranay Yerunkar
(Tested by)

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