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ELECTRO MAGNETIC innovative technologies

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

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

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Customer :	**M/s. Natural Wools Lab Pvt Ltd**
Process :	**Continuous Rotary Infrared Heat Treatment for Drying of Ground Nuts**

TEST REPORT No: 47/KRDC/LAB/17 Mum 15/06/2021

Date Sample reception : 18/03/2021
ID : 47/LAB/168

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 10 kg
Sampling date : 15/06/2021
Product : Ground Nuts
Requirement : Drying & Roasting
Start Date test : 15/06/2021
End Date test : 15/06/2021

LABORATORY EXPERIMENTAL SET UP:

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LAB CONTINUOUS IR HEATING SYSTEM SPECIFICATIONS:

Infrared Power	5 kW
Type of Infrared Emitters	Quartz Infrared
Rotary Drum Size	Φ324 mm x 800 mm long x 3mm Thk.
Thermal Monitoring System	Single Channel Fiber Optic: Range -40 to 250^{o}C
Exhaust	Exhaust port with manual damper
Air Circulation Fan	Radial Fan FHP 0.5HP

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	30^{o}C (±5^{o}C)
Humidity (%)	≤75% 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 120IR Thermal sensitivity of 0.10°C
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
Moisture Analyzer		Make: Axis Balance Description: Moisture range: 1% (sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on given sample of ground nuts to speed up the heating rate for drying & roasting treatment. For this experimental run, given sample dip in boiled water for 3 mins. After boiling water treatment, ground nuts passed through continuous rotary IR heating system for setting parameters with multiple passes to achieve required drying rate. The observations are made on the basis of temperature on product, total moisture loss and any damage to product samples.

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ANALYTICAL RESULTS:

1. **Drying Treatment**

IR Set Temperature: 50°C
Initial Moisture Content: 1.2%
Moisture content after boiling water treatment: 17.7%
Initial Weight: 2kg

Sr. No.	Cycle Time (minutes)	Surface Temp. (°C)	Remarks
1.	After 20	40-45°C	Drying Completed

Final Moisture Content: 5.1%.

2. **Roasting Treatment**

IR Set Temperature: 100°C
Initial Moisture Content: 5.1%

Sr. No.	Cycle Time (min)	Surface Temp. (°C)	Remarks
1.	After 20	60-65°C	Roasting Completed

Final Moisture Content: 1.0%.

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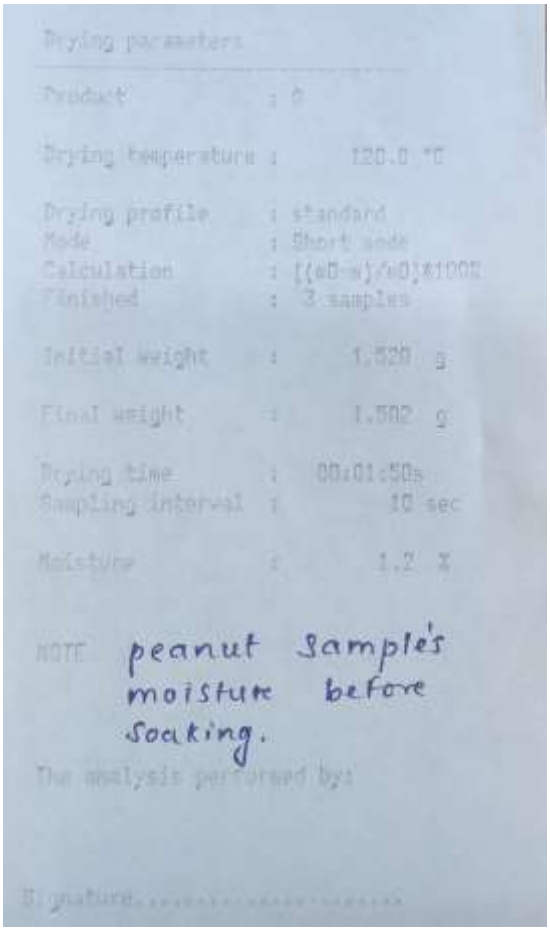
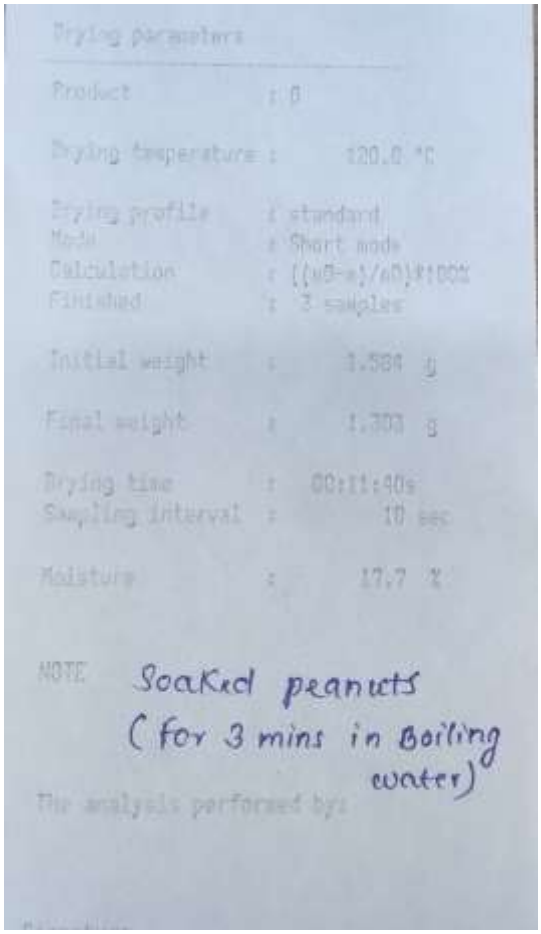
MOISTURE ANALYSIS REPORTS:

Input Moisture Content:



Moisture Content After Boiling Water Treatment:



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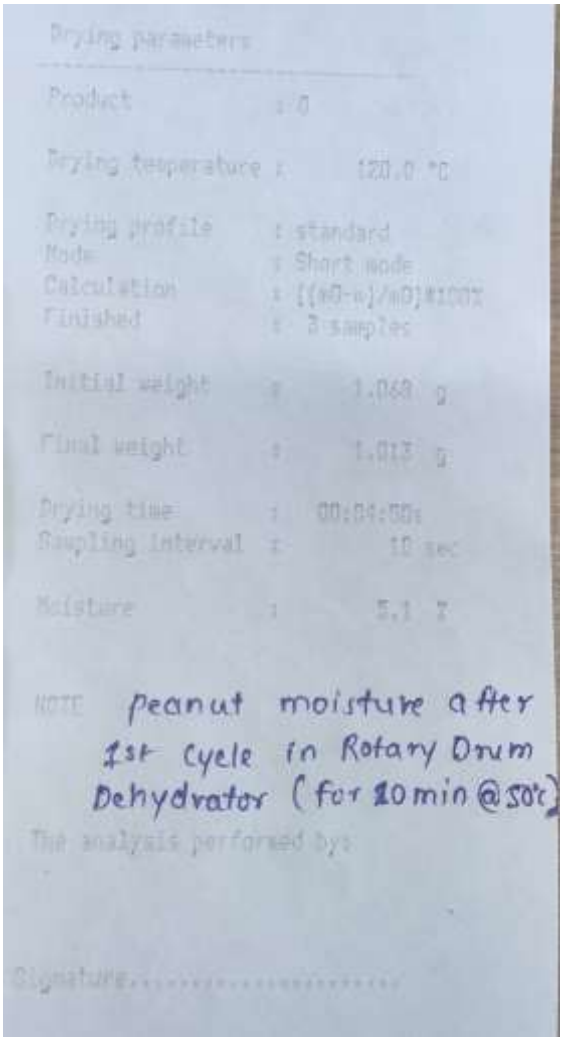
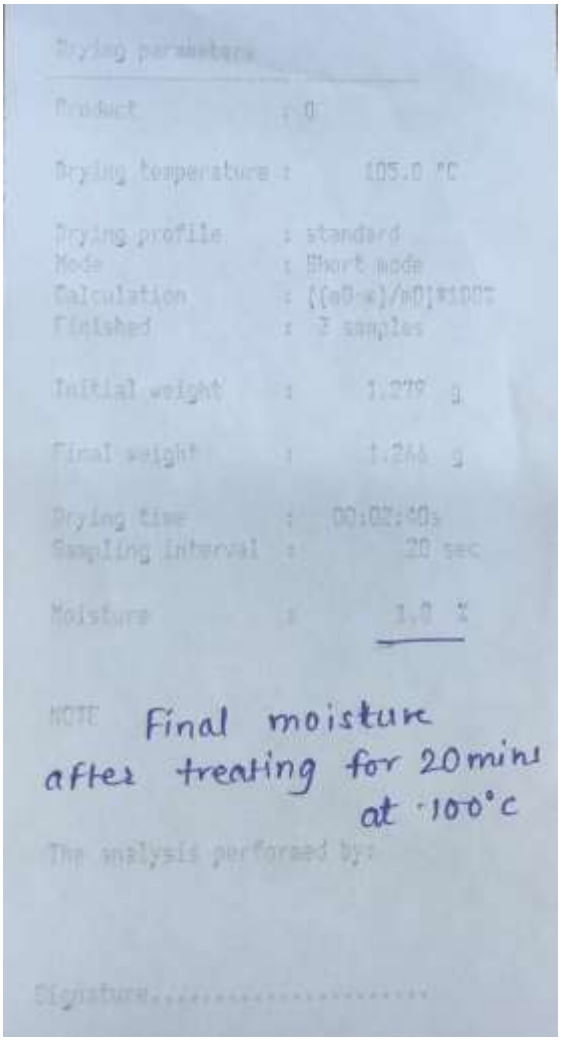
Moisture Content After Drying Treatment:



Moisture Content After Roasting Treatment:



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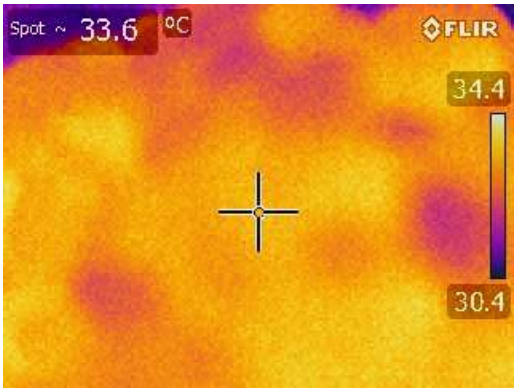
BEFORE AND AFTER PICTURES OF TREATED SPCIMEN SAMPLE:

After Boiling Water Treatment

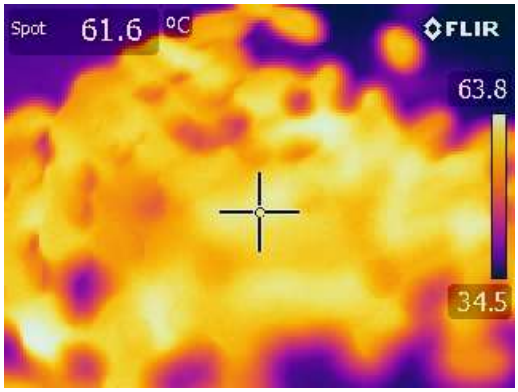
Untreated & Treated Samples

THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

Before Heat Treatment:



After Heat Treatment:



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OBSRVATIONS:

The drying & roasting behavior of ground nut has been investigated under the Rotary IR 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. In the processed sample, as per physical investigation, it has been observed that there is no colour change on sample with required temperature on product.

Miss. Komal Ingale
Tested By