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Kerone Research & Development Centre (KRDC),
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Batch Microwave Heat Treatment for Dehydration of Beetroot

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

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Customer :	**Laboratory Experimental Analysis**
Process :	**Batch Microwave+Convection Heat Treatment for Dehydration of Beetroot**

TEST REPORT No: 47/KRDC/LAB/17 Mum 14/08/2020

Date Sample reception :14/08/2020
ID : 47/LAB/163

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 2 nos.
Sampling date : 14/08/2020
Product : Beetroot
Requirement : Drying
Start Date test : 14/08/2020
End Date test : 14/08/2020

LABORATORY EXPERIMENTAL SET UP:

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BATCH MICROWAVE HEATING SYSTEM SPECIFICATIONS:

Microwave Power	3 kW(CW)
Frequency	2450 MHz ± 50
Convective Power	1.5 kW (air flow 350 l/min at 20°C)
Microwave Exposure Zone (Cavity)	650 mm x 650 mm x 400 mm
Thermal Monitoring System	Single Channel Fiber Optic: Range -40 to 250°C
Exhaust Power	1HP
Turntable Size	Ø 550 mm

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (degree C)	31°C (±5°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 120 IR 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 beetroot to speed up the heating rate for drying treatment. For this experimental run, given sample has been placed in batch microwave hybrid heating system for different setting parameters to achieve required drying rate. The observations are made on the basis of temperature on product, total weight loss and any damage to product samples.

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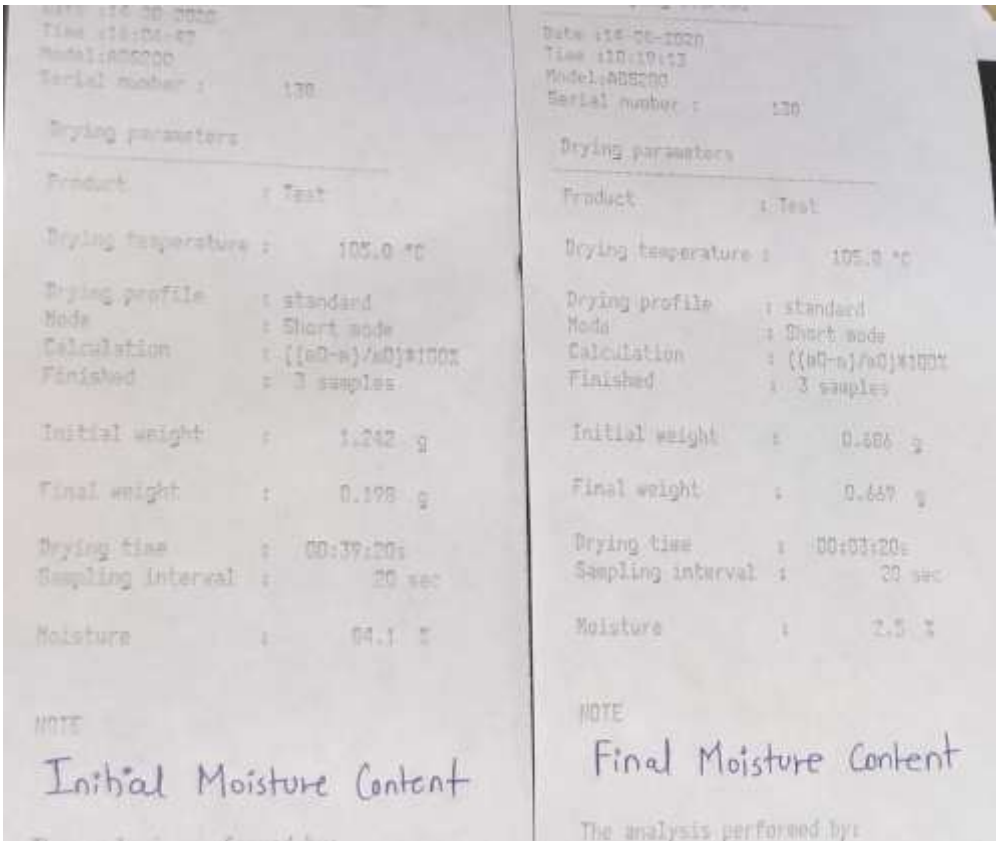
ANALYTICAL RESULTS:

Microwave Power: 1.6 kW
Hot Air Temperature: 70°C
Initial Moisture Content: 84.1%.
Initial Weight: 128 gm.

Cycle time (min)	Final Wt. (gm)	Total Wt. Loss (gm)	Surface Temp. (°C)	Remarks
After 30	17	111	60-65	Dried

Total Wt. Loss: 111 gm.
Final Moisture Content: 2.5%

MOISTURE ANALYSIS REPORTS:



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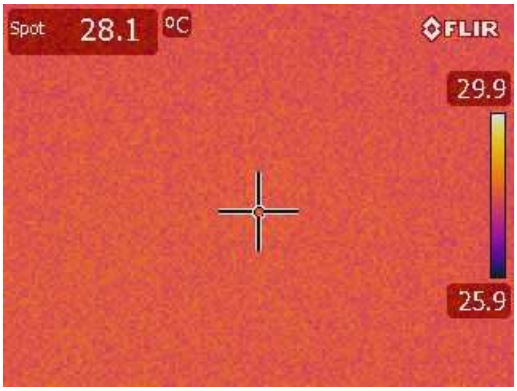
BEFORE AND AFTER PICTURES OF TREATED SPCIMEN SAMPLE:

Before:

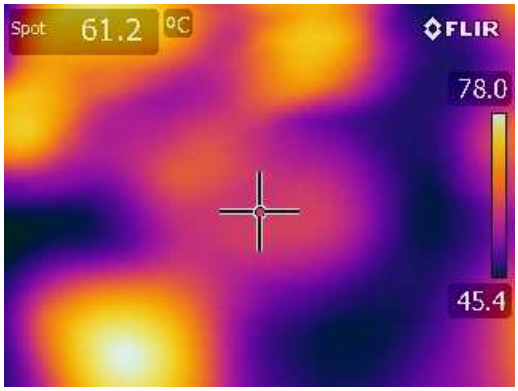
After:

THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

Before Heat Treatment:



After Heat Treatment:



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OBSRVATIONS:

The heating behavior of beetroot slices has been investigated under the microwave+convection heating mode for drying treatment. 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 degradation on sample with required temperature on product.

Miss. Komal Bhoite
Tested By