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Kerone Research & Development Centre (KRDC)
B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
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Batch Microwave Heat Treatment for Drying/ Roasting of Poha

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Customer :	**M/s. Girnar Food & Beverages Pvt. Ltd**
Process :	**Batch Microwave Heat Treatment for Drying/Roasting of Poha**

Test Report No*: *179/KRDC/LAB/17 Mum 23/01/2023

Date Sample reception : 21/01/2023
ID : 179/LAB/23

***Sample Description*:**

Sampling : As Requested
Sample Condition : Acceptable
Sampling date : 21/01/2023
Product : Poha
Requirement : Roasted Poha with desired Moisture content 3-4%
Start Date test : 21/01/2023
End Date test : 21/01/2023

Laboratory Experimental System -

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System Specifications -

Microwave Power	2 KW (CW)
Frequency	2450 MHz ± 50
Convective Power	3.5 KW (airflow 350 I/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	1 HP
Tray size (width*height*depth)	450*950*50 mm

Laboratory's Environmental Conditions –

Temperature (degree C)	29.4ºC (±5ºC)
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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Equipment 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)**

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Procedure of the Experiment -

- The experiment was performed on Poha to speed up the heating rate.
- For this experimental run, the given sample was taken in the glass tray and placed in the MW heating system with suitable parameters.
- After the heating treatment, the sample was analyzed.

Analytical Results:

Trials 1 –

Initial Weight- 250g
Initial Moisture- 8.4%

Cycles	Cycle time (mins.)	Specifications of Microwave	Moisture Content (%)	On product Temperature (˚C)	Remark
1	After 5 mins.	Magnetron Power: 1 Kw; Set temp.-70˚C	5.5	(89-90)	Drying Started
2	After 10 mins.	Magnetron Power: 1 Kw; Set temp.-70˚C	5.1	(90-93)	Drying Continuous
3	After 15 mins.	Magnetron Power: 1 Kw; Set temp.-70˚C	2.9	(100-110)	Roasted as desired

Final Weight- 227g
Final Moisture- 2.9%

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Trials 2 –

Initial Weight- 250g
Initial Moisture- 8.4%

Cycles	Cycle time (mins.)	Specifications of Microwave	Moisture Content (%)	On product Temperature (˚C)	Remark
1	After 12 mins.	Magnetron Power: 1 Kw; Set temp.-70˚C	2.7	(110-112)	Roasted as desired

Final Weight- 230g
Final Moisture- 2.7%

Trials 3 –

Initial Weight- 250g
Initial Moisture- 8.4%

Cycles	Cycle time (mins.)	Specifications of Microwave	Moisture Content (%)	On product Temperature (˚C)	Remark
1	After 8 mins.	Magnetron Power: 1 Kw; Set temp.-70˚C	3.5	(95-110)	Roasted as desired

Final Weight- 237g
Final Moisture- 3.5%

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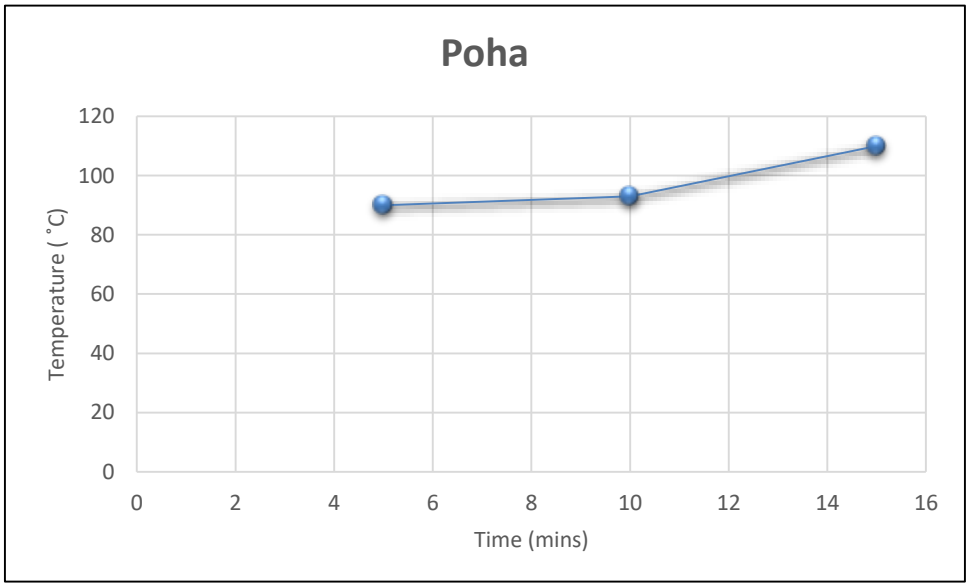
Trials 4 –

Initial Weight- 250g
Initial Moisture- 8.4%

Cycles	Cycle time (mins.)	Specifications of Microwave	Moisture Content (%)	On product Temperature (˚C)	Remark
1	After 5 mins.	Magnetron Power: 1.5 Kw; Set temp.-70˚C	3.9	(90-110)	Roasted as desired

Final Weight- 234g
Final Moisture- 3.9%

Time Temperature Profile:



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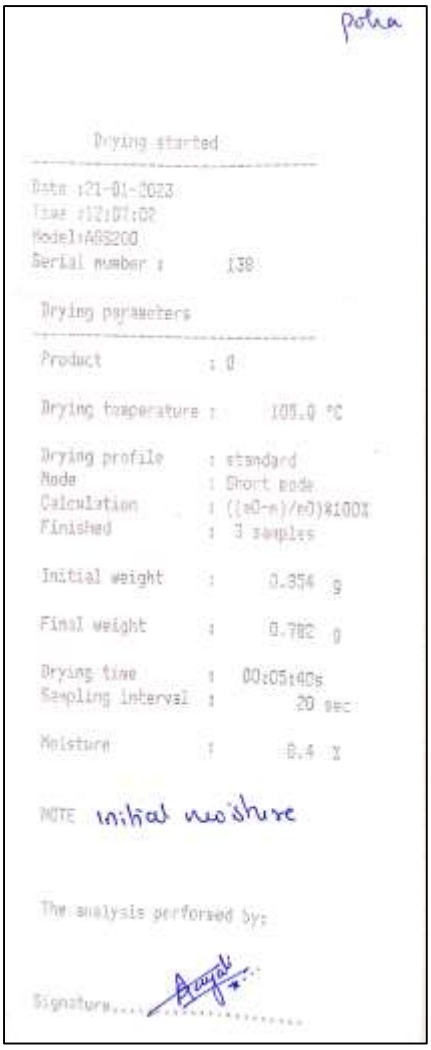
Moisture Analysis Report:



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Drying started

Date :21-01-2023
Time :12:07:02
Model:AGS200
Serial number : 138

Drying parameters

Product : 0

Drying temperature : 105.0 °C

Drying profile : standard
Mode : Short mode
Calculation : ((mO-m)/mO)*100%
Finished : 3 samples

Initial weight : 0.354 g

Final weight : 0.782 g

Drying time : 00:05:40s
Sampling interval : 20 sec

Moisture : 0.4 %

NOTE Initial moisture

The analysis performed by:

Signature.....

Trial 1 -

Drying started

Date :21-01-2023
Time :12:31:58
Model:AGS200
Serial number : 138

Drying parameters

Product : 0

Drying temperature : 105.0 °C

Drying profile : standard
Mode : Short mode
Calculation : ((mO-m)/mO)*100%
Finished : 3 samples

Initial weight : 0.513 g

Final weight : 0.490 g

Drying time : 00:02:40s
Sampling interval : 20 sec

Moisture : 2.9 %

NOTE Final moisture

The analysis performed by:

Signature.....

Trial 2-

Drying started

Date :21-01-2023
Time :12:56:02
Model:AGS200
Serial number : 138

Drying parameters

Product : 0

Drying temperature : 105.0 °C

Drying profile : standard
Mode : Short mode
Calculation : ((mO-m)/mO)*100%
Finished : 3 samples

Initial weight : 0.517 g

Final weight : 0.503 g

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

Moisture : 2.7 %

NOTE Final moisture

The analysis performed by:

Signature.....

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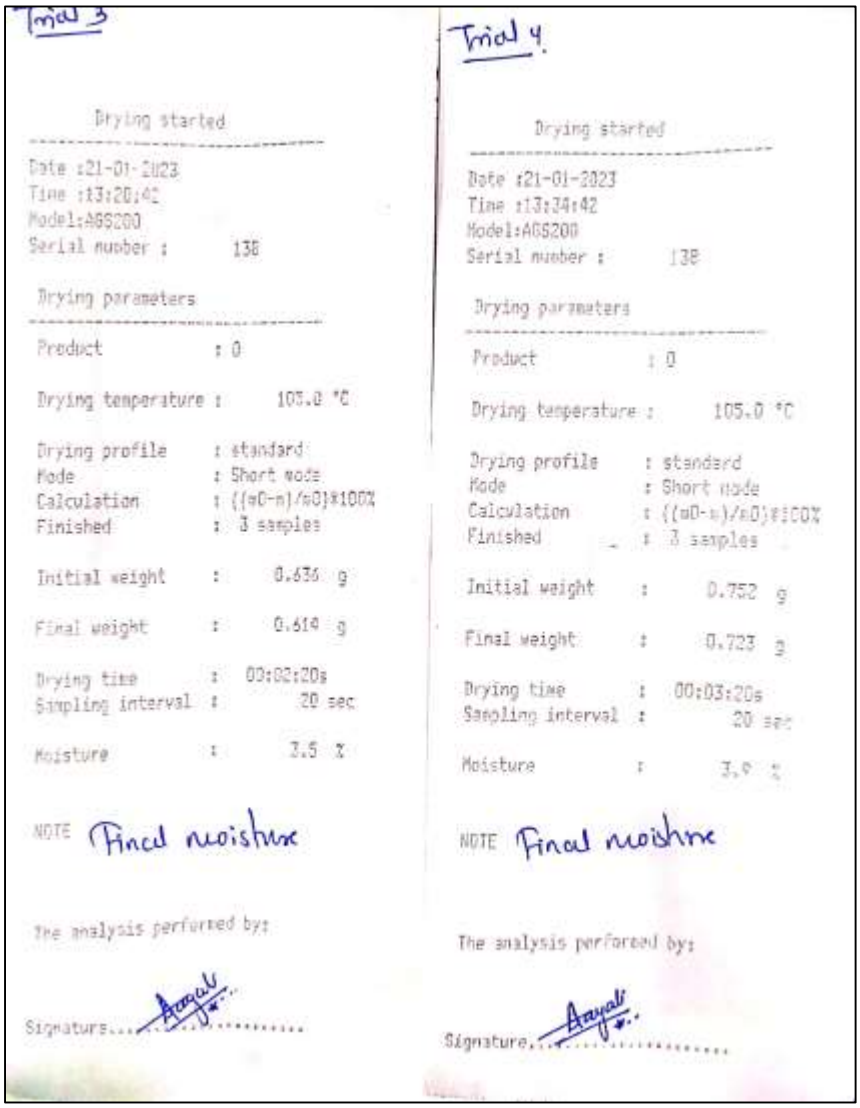

Trial 3

Drying started

Date :21-01-2023
Time :13:20:42
Model:AGS200
Serial number : 138

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 : 0.636 g
Final weight : 0.614 g
Drying time : 00:02:20s
Sampling interval : 20 sec
Moisture : 3.5 %

NOTE Final moisture

The analysis performed by:

Signature.....

Trial 4.

Drying started

Date :21-01-2023
Time :13:34:42
Model:AGS200
Serial number : 138

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 : 0.752 g
Final weight : 0.723 g
Drying time : 00:03:20s
Sampling interval : 20 sec
Moisture : 3.9 %

NOTE Final moisture

The analysis performed by:

Signature.....

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Images during trials:

Untreated Sample

Treated Sample (Trial 1, Trial 2)

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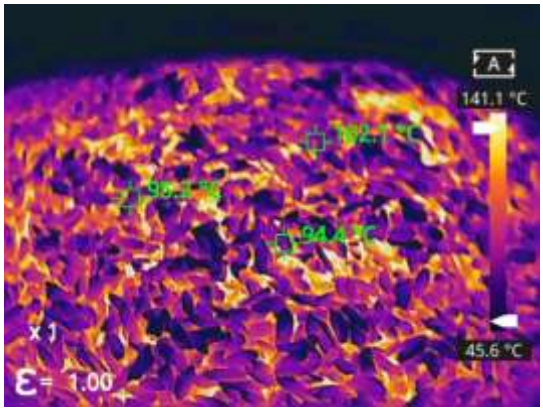
Treated Sample (Trial 3, Trial 4)

Thermal Images:

Measurements	
Sp1	102.1°C
Sp2	99.2°C
Sp3	94.4°C

Parameters	
Emissivity	1.00
Temp.	141.1°C



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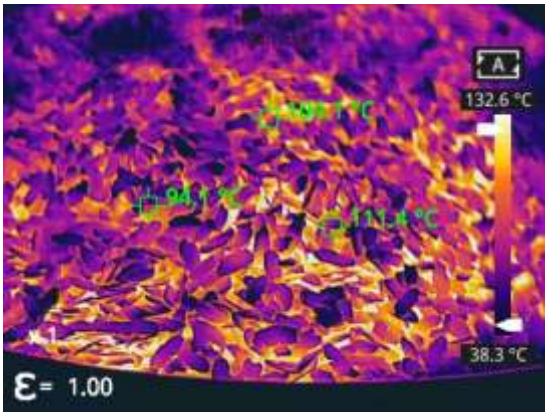
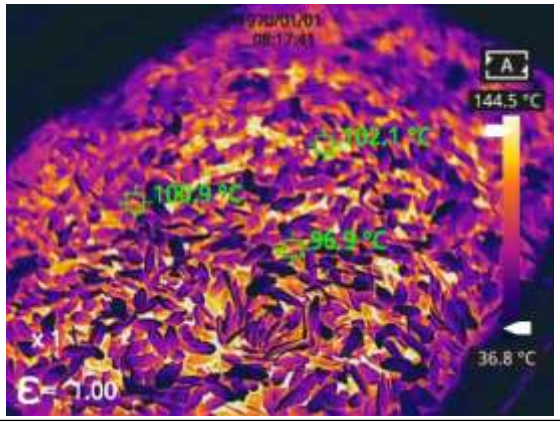
Measurements	
Sp1	104.1°C
Sp2	94.1°C
Sp3	111.4°C
Parameters	
Emissivity	1.00
Temp.	132.6°C



Measurements	
Sp1	102.1°C
Sp2	100.9°C
Sp3	89.9°C
Parameters	
Emissivity	1.00
Temp.	96.9°C



Observations:

The heating behavior of Poha was investigated under the Microwave heating system. 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 Poha was not shrinking after Microwave heat treatment. Also, the taste and aroma were retained and the roasting of the product was achieved without any Charring effect.

Ms. Sayali Asole
(Tested By)

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