





Kerone Research & Development Centre (KRDC)

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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

Bumping	. The 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 Experimente	al System -



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System Specifications -

Microwave Power	2 KW (CW)
Frequency	$2450 \text{ MHz} \pm 50$
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)	29.4°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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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	and a state	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	Specifications of	Moisture	On product	
	time	Microwave	Content	Temperature	Remark
	(mins.)		(%)	(°C)	
1	After 5	Magnetron Power: 1 Kw;	5.5	(89-90)	Drying Started
	mins.	Set temp70°C			
2	After 10	Magnetron Power: 1 Kw;	5.1	(90-93)	Drying Continuous
	mins.	Set temp70°C			
3	After 15	Magnetron Power: 1 Kw;	2.9	(100-110)	Roasted as desired
	mins.	Set temp70°C			

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 temp70°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 temp70°C	3.5	(95-110)	Roasted as desired

Final Weight- 237g Final Moisture- 3.5%

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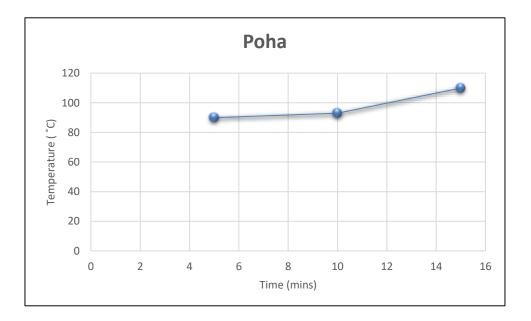
Trials 4 -

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 temp70°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:

	pola	Trial 1 -		Trial 2		
		Drying star	ted	Drying sta	rteif	
ted		Date +21-01-2023		Date :21-01-2023	Proved Barrier	
		Modeli405200 Serial humber :	136	Model:A65200	138	
		Drying paramaters		Drying parameters		
		Pendact	: 0	Product	± 0	
		Brying temperature	e ; 105.0 °C	Drying temperatur	a : 105.0	10
1 standard 1 Dhort pode 1 (1s0-s)/s01	-	Rode Calculation Finished	: Skort Rode : ((aD=n)/aD)#100% : 3 samples	Drying profile Node Calculation Finished	: standard : Short mode : ((00-m)/m0) : 3 semples	
: 0.354	9	Tinal weight	: 0.470 g			
4 日,712	9	Trying time	T 00:02:40s			
1 00:05:40:	62-	DOT SERVICES.	10.000	Sapling interval		
			11 10 10 10 10 10 10 10 10 10 10 10 10 1	Hoisture		
wishire		Trees of		NOTE Final M	woishne	
med by:		The analysis perfo	raed by:		roed by:	
	: 0 : 105.0 : standard : Dhort ede : ((=D-e)/e0) : 3 samples : 0.354 : 0.782 : 00:05:405 : 20	red 1 0 1 105.0 °C 1 standard 1 000051405 1 0.354 9 1 0.00051405 2 0.960 1 0.00051405 1 0.00051405 1 0.4 X 0.00051405	ted Dits 121-01-2023 Time (12:3):50 Social number x 138 Drying parameters 238 Drying parameters 238 Drying parameters 238 Drying parameters 238 Drying parameters 238 Drying parameters 238 Drying parameters 240 Drying temperature 240 Drying temperature 250 Drying profile 260 Drying profile 260 Drying profile 260 Drying profile 260 Drying profile 260 Drying temperature 260 Drying profile 260 Drying profile 260 Drying temperature 260 Drying	Ind Ind 1 ind Diff started Diff started Diff started Diff started <td>Image: Standard Drying started 138 Dite : 12-31:38 138 Drying parameters 138 Drying parameters 138 Drying parameters 139 Drying parameters 130 Drying parameters 131 Drying parameters 132 Drying parameters 133 Drying parameters 134 Drying parameters 135 Drying parameters 136 Drying parameters 137 Drying parameters 138 Drying parameters 139 Drying parameters 139 Drying parameters 139 Drying parameters 139 Drying profile 139 Dritial weight 100:05:405 Drying time 1 Drying time 1 Drying time 1 Drying time <td< td=""><td>Image: Second system Image: Second system Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 129 Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system <t< td=""></t<></td></td<></td>	Image: Standard Drying started 138 Dite : 12-31:38 138 Drying parameters 138 Drying parameters 138 Drying parameters 139 Drying parameters 130 Drying parameters 131 Drying parameters 132 Drying parameters 133 Drying parameters 134 Drying parameters 135 Drying parameters 136 Drying parameters 137 Drying parameters 138 Drying parameters 139 Drying parameters 139 Drying parameters 139 Drying parameters 139 Drying profile 139 Dritial weight 100:05:405 Drying time 1 Drying time 1 Drying time 1 Drying time <td< td=""><td>Image: Second system Image: Second system Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 129 Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system <t< td=""></t<></td></td<>	Image: Second system Image: Second system Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 138 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 128 Image: Second system Image: Second system 139 Image: Second system 129 Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system 139 Image: Second system Image: Second system Image: Second system Image: Second system <t< td=""></t<>

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Trial 4.
Drying started
Bate :21-01-2023 Time :13:34:42 Model:A65200 Serial mumber : 138 Drying parameters
Product 1.0
Drying temperature : 105.0 °C
Drying profile : standard Node : Short node Calculation : {(uD-u)/xD)#iCOX Finished : 3 samples
Initial weight : 0.752 g
Final weight : 0.723 g
Drying time : 00:03:20s Sampling interval : 20 sam
Moisture r 3.0 %
NOTE Final moishing
The analysis performed by:
Amyoli.
Signature.

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Images during trials:



Untreated Sample



Treated Sample (Trial 1, Trial 2)

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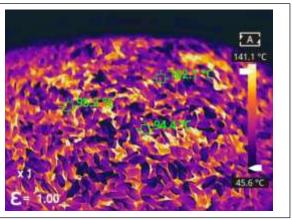
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Treated Sample (Trial 3, Trial 4)

Thermal Images:

Sp1	102.1°C
Sp2	99.2°C
Sp3	94.4°C
Parameters	
Emissivity	1.00
Temp.	141.1°C



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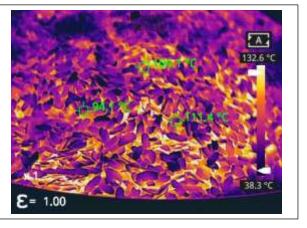
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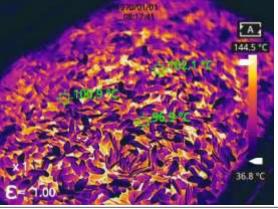
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Sp1	104.1°C
Sp2	94.1°C
Sp3	111.4°C
Parameters	
Emissivity	1.00
Temp.	132.6°C



Sp1	102.1°C	
Sp2	100.9°C	165
Sp3	89.9°C	
Parameters		503
Emissivity	1.00	10.00
Temp.	96.9°C	1000



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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