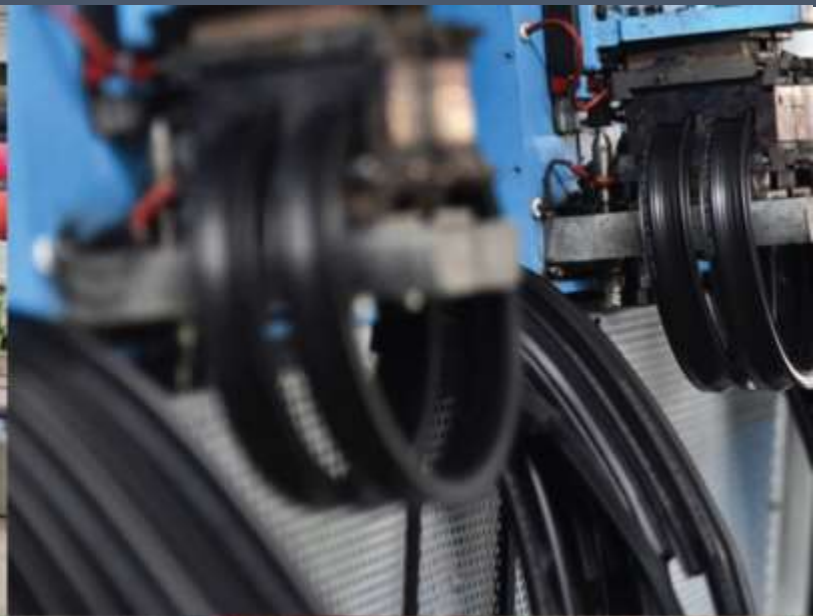


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**Batch Convection Heat Treatment
for Dehydration of Fish**

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Customer :	M/s. M. S. Seafood Supplier
Process :	Batch Convection Heat Treatment for Dehydration of Fish

Test Report No: 219/KRDC/LAB/17 Mum 15/06/2023

Date Sample reception : 14/06/2023
ID : KRDC/R&D/23-24/06/15

Sample Description:

Sampling : As Requested
Sample Condition : Acceptable
Sampling date : 14/06/2023
Product : Fish
Start Date test : 14/06/2023
End Date test : 15/06/2023

Laboratory Experimental System -



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System Specifications -

Heating Zone (width*height*depth)	510*480*410 mm
No. of Heaters	6
Total Heater Power	6 kW
Motor	0.5 HP
No. of trays	6
Tray size (width*height*depth)	560 x 435 x25
Centrifugal Exhaust Blower	1440 rpm

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
Thermo Hygrometer		Model No: HTC-2 Temperature accuracy: $\pm^{\circ}\text{C}$ (1.8°F) Temperature resolution: 0.1°C (0.2°F) Humidity range: 10%~99% RH Humidity accuracy: $\pm 5\%$ 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)
Weighing Balance		Make: Gill Description: ISO 9001: 2008 Model- PEWT – X Max- 10/20 Kg Min- 20g e. $\frac{1}{2}$ g
Compact Thermal Imaging Camera		Model: FLIR E-30 Resolution: 160x 120IR Thermal sensitivity of 0.10°C

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Procedure of the Experiment -

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

Analytical Results:

Trial 1 – Prawns Without Skin

Initial Weight – 175g

After Blanching – 182g

Initial Moisture – 70.7%

Trial	Cycle time (hours.)	Specifications of Microwave	On product Temperature (°C)	Remark
1	3	Set temp.-70°C	(60-66)	Drying started
2	4	Set temp.-75°C	(65-70)	Drying continuous
3	6	Set temp.-80°C	(70-75)	Dried as desired

Final Weight – 37g

Final Moisture – 2.1%

Total Cycle Time – 6 hours

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Trials 2 – Prawns with Skin

Initial Weight – 402g
After Blanching – 412g
Initial Moisture – 74.8%

Trials	Cycle time (hours.)	Specifications of Microwave	On product Temperature (°C)	Remark
1	3	Set temp.-70°C	(60-65)	Drying started
2	4	Set temp.-75°C	(65-75)	Drying continuous
3	8	Set temp.-80°C	(75-84)	Dried as desired

Final Weight – 84g
Final Moisture – 6.9%
Total Cycle Time – 8 hours

Trials 3 – Chopped Indian basa

Initial Weight – 452g
After Blanching – 457g
Initial Moisture – 74.8%

Trials	Cycle time (hours.)	Specifications of Microwave	On product Temperature (°C)	Remark
1	3	Set temp.-70°C	(60-65)	Drying started
2	4	Set temp.-75°C	(65-70)	Drying continuous
3	10	Set temp.-80°C	(70-75)	Dried as desired

Final Weight – 128g
Final Moisture – 9.5%
Total Cycle Time – 10 hours

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Images during trials:



Untreated Sample Prawns



Untreated Sample Indian Basa



Prawns with Skin Blanching (60-65) °C



Prawns without Skin Blanching (60-65) °C



Indian Basa Blanching (60-65) °C



Prawns with Skin (During drying process)

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Prawns without Skin (During drying process)



Indian Basa (During drying process)



Final Treated Prawns with Skin Sample



Final Treated Prawns without Skin Sample



Final Treated Indian Basa Sample

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Moisture Analysis Report:

Drying started	Drying started	Drying started
Date : 14-06-2023	Date : 14-06-2023	Date : 14-06-2023
Time : 11:41:00	Time : 12:50:25	Time : 14:48:57
Model : A05200	Model : A05200	Model : A05200
Serial number : 139	Serial number : 139	Serial number : 139
Drying parameters	Drying parameters	Drying parameters
Product : 0	Product : 0	Product : 0
Drying temperature : 105.0 °C	Drying temperature : 105.0 °C	Drying temperature : 105.0 °C
Drying profile : standard	Drying profile : standard	Drying profile : standard
Mode : Short mode	Mode : Short mode	Mode : Short mode
Calculation : $((m0-m)/m0)*100\%$	Calculation : $((m0-m)/m0)*100\%$	Calculation : $((m0-m)/m0)*100\%$
Finished : 3 samples	Finished : time over	Finished : 3 samples
Initial weight : 1.372 g	Initial weight : 1.535 g	Initial weight : 1.461 g
Final weight : 0.341 g	Final weight : 0.456 g	Final weight : 0.368 g
Drying time : 00:46:00s	Drying time : 01:00:00s	Drying time : 00:52:00s
Sampling interval : 20 sec	Sampling interval : 20 sec	Sampling interval : 20 sec
Moisture : 74.6 %	Moisture : 70.7 %	Moisture : 74.6 %
NOTE Initial moisture Prawns without skin	NOTE Initial Moisture Prawns with skin	NOTE Initial moisture chopped Indian basil
The analysis performed by:	The analysis performed by:	The analysis performed by:
Signature: <i>Anand</i>	Signature: <i>Anand</i>	Signature: <i>Anand</i>



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Drying started		Drying started		Drying started	
Date :	15-06-2023	Date :	15-06-2023	Date :	15-06-2023
Time :	13:37:31	Time :	13:43:46	Time :	13:44:04
Model :	AGS200	Model :	AGS200	Model :	AGS200
Serial number :	138	Serial number :	138	Serial number :	138
Drying parameters		Drying parameters		Drying parameters	
Product :	0	Product :	0	Product :	0
Drying temperature :	105.0 °C	Drying temperature :	105.0 °C	Drying temperature :	105.0 °C
Drying profile :	standard	Drying profile :	standard	Drying profile :	standard
Mode :	Short mode	Mode :	Short mode	Mode :	Short mode
Calculation :	$((w_0 - w) / w_0) \times 100$	Calculation :	$((w_0 - w) / w_0) \times 100$	Calculation :	$((w_0 - w) / w_0) \times 100$
Finished :	3 samples	Finished :	3 samples	Finished :	3 samples
Initial weight :	1.099 g	Initial weight :	1.267 g	Initial weight :	1.331 g
Final weight :	1.076 g	Final weight :	1.180 g	Final weight :	1.204 g
Drying time :	00:03:00s	Drying time :	00:04:20s	Drying time :	00:03:20s
Sampling interval :	20 sec	Sampling interval :	20 sec	Sampling interval :	20 sec
Moisture :	2.1 %	Moisture :	4.9 %	Moisture :	8.3 %
NOTE Final moisture Prawns without skin		NOTE Final moisture Prawns with skin		NOTE Final moisture Chopped Indian bata	
The analysis performed by:		The analysis performed by:		The analysis performed by:	
Signature:		Signature:		Signature:	

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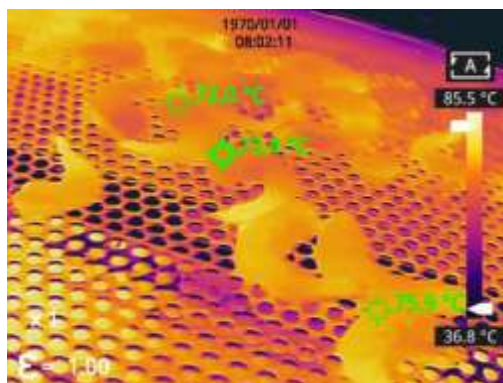
Thermal Images:

Measurements

Sp1	73.0°C
Sp2	73.4°C
Sp3	75.9°C

Parameters

Emissivity	1.00
Temp.	85.5°C

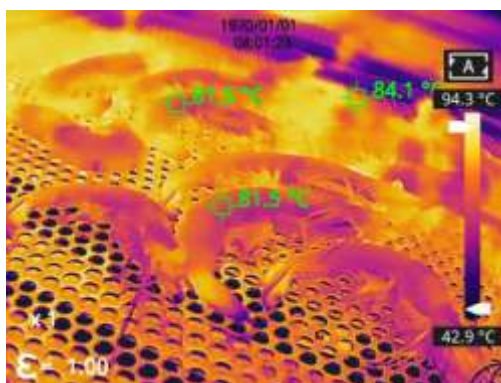


Measurements

Sp1	81.5°C
Sp2	84.1°C
Sp3	81.5°C

Parameters

Emissivity	1.00
Temp.	94.3°C

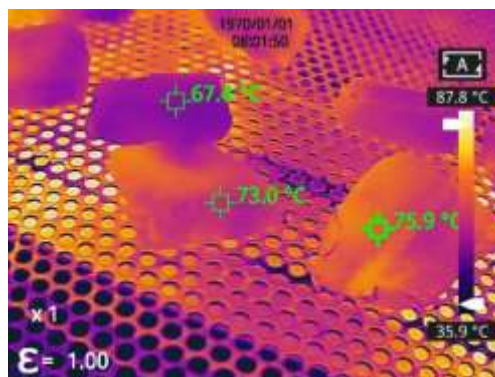


Measurements

Sp1	63.1°C
Sp2	62.2°C
Sp3	59.9°C

Parameters

Emissivity	1.00
Temp.	82.7°C



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Observations:

The heating behavior of Fish was investigated under the Convection 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 product was dried as desired with moisture content below 10%.



Ms. Sayali Asole
(Tested By)