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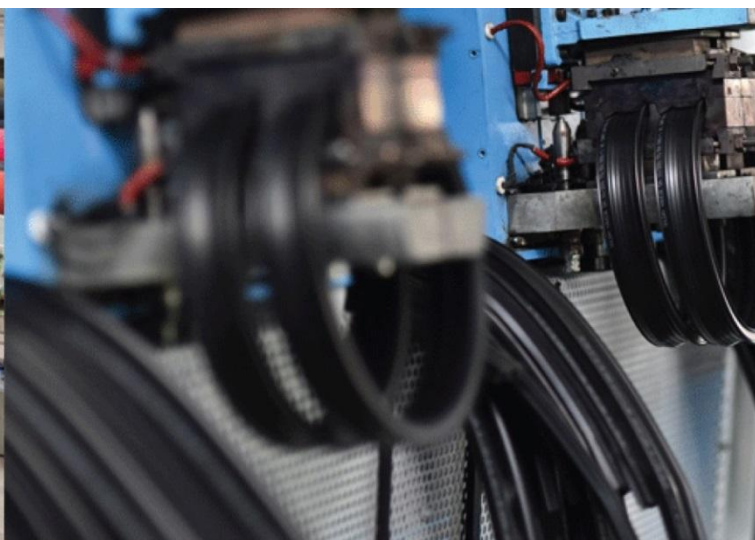
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In Association With



ELECTRO MAGNETIC innovative technologies

Kerone Research & Development Centre (KRDC),
B/47, Addl. MIDC. Anand Nagar, Ambarnath (East), Thane- 421 506, India
Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com



**Batch Convection Heat Treatment for
Drying of Bombay Duck**

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



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Customer :	M/s. Al-Taiba Dry Fish
Process :	Batch Convection Heat Treatment for Drying of Bombay Duck

TEST REPORT No: 47/KRDC/LAB/17 Mum 01/11/2019

Date Sample reception : 01/11/2019

ID : 47/LAB/138

SAMPLE DESCRIPTION:

Sampling : As Requested

Sample Condition : Acceptable

Quantity : 1 kg

Sampling date : 02/11/2019

Product : Bombay Duck

Requirement : Final product must have least moisture content

Start Date test : 02/11/2019

End Date test : 04/11/2019

LABORATORY EXPERIMENTAL SET UP:



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LAB BATCH CONVECTION HEATING SYSTEM SPECIFICATIONS:


Heating Zone (width*height*depth)	510*480*410 mm
No. of Heaters	6
Total Heater Power	6 kW
Motor	0.5 HP
Centrifugal Exhaust Blower	1440 rpm
No. of trays	6
Tray size (width*height*depth)	560*25*435 mm

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (°C)	34°C (±5°C)
Humidity (%)	≤59% RH
Pressure (kN/m ² 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

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

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Moisture Analyzer		Make: Axis Balance Description: Moisture range: 1%(sample 0.02/0.05g), 0.1% (Sample 0.5/5g), 0.01%(Sample>5g)
Thermo Hygrometer		Model No: HTC-2 Temperature accuracy: $\pm^{\circ}\text{C}$ (1.8$^{\circ}\text{F}$) Temperature resolution: 0.1$^{\circ}\text{C}$ (0.2$^{\circ}\text{F}$) Humidity range: 10%~99% RH Humidity accuracy: $\pm 5\%$ RH Humidity resolution: 1% RH

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on Bombay Duck without adding any additive to speed up the drying rate. For experimental run, given samples of Bombay duck has been hanged in dehydrator system such that there is some space around each one for air to circulate for achieving even drying characteristics and observations are made after every 1 hour by checking the weight loss on drying. Initial weight before drying, final weight after drying, initial moisture content and final moisture content has been taken.

ANALYTICAL RESULTS:

Initial sample weight: 871 grams

Initial Moisture Content: 86.7%

Setting Temperature: 70 $^{\circ}\text{C}$

Sr. No.	Time (hours)	Weight noted (grams)	Weight loss (%)	Temperature on product ($^{\circ}\text{C}$)	Remarks, if any
1.	After 1	635	27.1	55	Drying rate started
2.	After 2	503	42.2	58	Drying phase continue
3.	After 3	398	54.3	61	Variant of Drying rate

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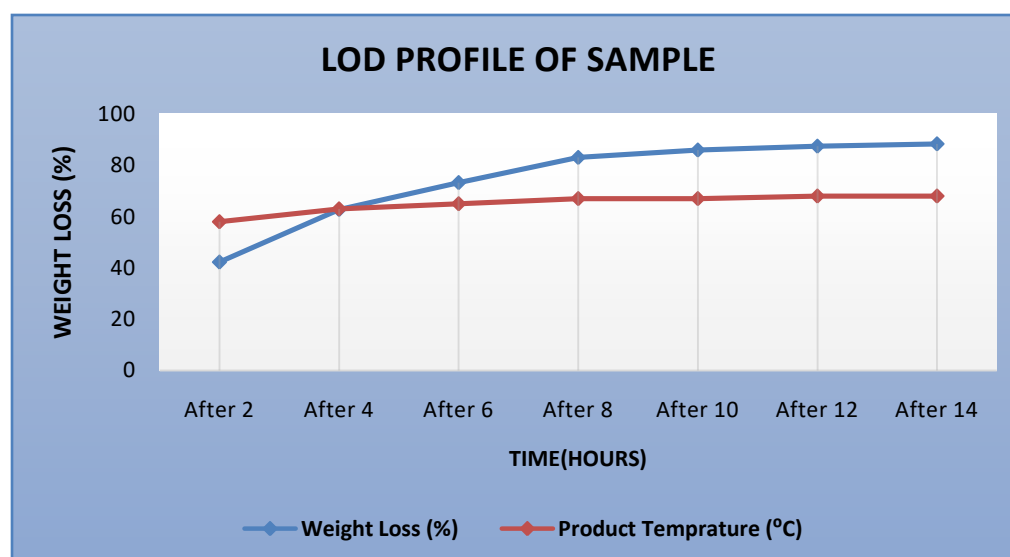
4.	After 4	325	62.7	63	Variant of Drying rate
5.	After 5	273	68.7	63	Variant of Drying rate
6.	After 6	233	73.2	65	Variant of Drying rate
7.	After 7	197	77.4	65	Variant of Drying rate
8.	After 8	148	83	67	Variant of Drying rate
9.	After 9	131	84.9	67	Variant of Drying rate
10.	After 10	123	85.9	67	Variant of Drying rate
11.	After 11	114	86.9	68	Variant of Drying rate
12.	After 12	110	87.4	68	Variant of Drying rate
13.	After 13	106	87.8	68	Variant of Drying rate
14.	After 14	102	88.3	68	Required Drying rate

Sample weight after drying: 102grams

Total weight loss on drying: 88.3%

Final moisture Content: %

GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:



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THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

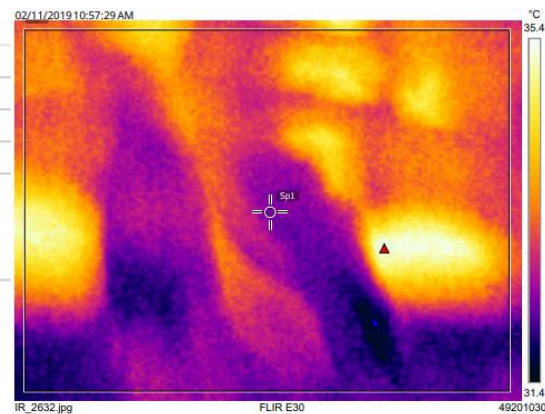
1. Before Heat Treatment:

Measurements

Bx1	Max	35.5 °C
	Min	31.3 °C
	Average	33.0 °C
Sp1		32.3 °C

Parameters

Emissivity	0.95
Refl. temp.	20 °C



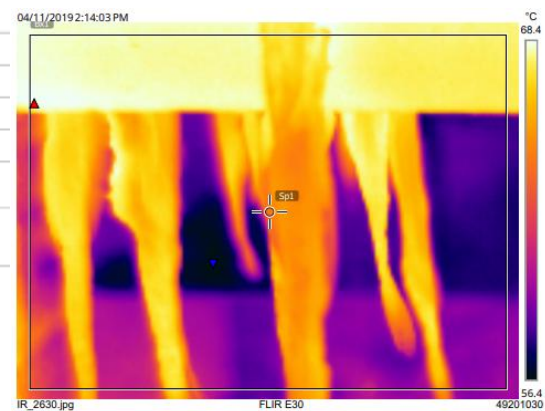
2. After Heat Treatment:

Measurements

Bx1	Max	68.5 °C
	Min	56.3 °C
	Average	62.4 °C
Sp1		64.5 °C

Parameters

Emissivity	0.95
Refl. temp.	20 °C



BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:



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MOISTURE ANALYSIS REPORTS:

Drying started		Drying started	
Date : 2-11-2019		Date : 5-11-2019	
Time : 11:14:33		Time : 11:15:29	
Model: AGS200		Model: AGS200	
Serial number : 138		Serial number : 138	
Drying parameters		Drying parameters	
Product : Test		Product : Test	
Drying temperature : 105.0 °C		Drying temperature : 105.0 °C	
Drying profile : standard		Drying profile : standard	
Mode : Short mode		Mode : Short mode	
Calculation : $((m_0 - m)/m_0) \times 100\%$		Calculation : $((m_0 - m)/m_0) \times 100\%$	
Finished : 3 samples		Finished : 3 samples	
Initial weight : 1.146 g		Initial weight : 0.507 g	
Final weight : 0.152 g		Final weight : 0.490 g	
Drying time : 00:44:20s		Drying time : 00:02:20s	
Sampling interval : 20 sec		Sampling interval : 20 sec	
Moisture : 86.7 %		Moisture : 3.4 %	
NOTE Initial		NOTE Final	
The analysis performed by:		The analysis performed by:	
Signature <i>KKomal</i>		Signature <i>KKomal</i>	

OBSERVATIONS:

The Drying behavior Bombay Duck has been investigated under the convection 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. As per physical investigation, it has been observed that there is colour change with crunchy texture and there is no enzymatic browning.

KKomal

Miss Komal Bhoite
Tested By

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