Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
Tel- +91-251-2620542/13/44/45/46 E-mail: info@kerone.com, www.kerone.com

Customer :	**M/s Top Anil Maarketing Company, Dindigul, Tamil Nadu**
Process :	**Batch Dehydration Heat Treatment for Drying of Vermicelli**

TEST REPORT No: 47/KRDC/LAB/18 Mum 20/01/2018

Date Sample reception : 20/01/2018
ID : 47/LAB/14

SAMPLE DESCRIPTION:

Sampling : As requested
Sample Condition : Acceptable
Quantity : 2 packets
Sampling date : 20/01/2018
Product : Vermicelli (Maida Semia, before cooling and after cooling)
Requirement : Final product must have 9-10 % moisture content
Start Date test : 20/01/2018
End Date test : 21/01/2018

LABORATORY EXPERIMENTAL SET UP:

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LAB BATCH DEHYDRATION 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 (degree C)	25 degrees C (±5 degrees C)
Humidity (%)	≤ 38 % 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

EQUIPMENTS USED:

Name of Equipment	Picture of Equipment	Specifications
Compact Thermal Imaging Camera		**Model: FLIR E-30** **Resolution: 160 x 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)**

SAMPLE PREPARATION AND METHOD/PROCEDURE:

For each experimental run, given amount of sample from was taken and placed it on perforated tray by spreading throughout the tray and observations are made after every 5 minutes by checking the weight loss on drying. Also, initial weight before drying and final weight after drying was taken.

ANALYTICAL RESULTS:

1. SAMPLE BEFORE COOLING:

Trial No.1:
Initial sample weight: 1000 grams
Initial moisture content: 27%

Sr. No.	Time (minutes)	Temperature (^oC)	Weight noted (grams)	Weight loss (grams)	Remarks, if any
1.	After 5	60	932	68	Drying rate started
2.	After 10	60	890	110	Drying phase continue
3.	After 15	60	853	147	Variant of Drying rate
4.	After 20	60	826	174	Variant of Drying rate
5.	After 25	60	798	202	Phase continue
6.	After 30	60	760	240	Product with required texture

Sample weight after drying: 760 grams
Total weight loss on drying: 240 grams
Final moisture Content: 8.11%

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Trial No.2:

Initial sample weight: 1000 grams

Initial moisture content: 27%

Sr. No.	Time (minutes)	Temperature (°C)	Weight noted (grams)	Weight loss (grams)	Remarks, if any
1.	After 5	70	920	80	Drying rate started
2.	After 10	70	860	140	Drying phase continue
3.	After 15	70	809	191	Variant of Drying rate
4.	After 20	70	780	220	Product with required texture

Sample weight after drying: 780 grams

Total weight loss on drying: 220 grams

Final moisture Content of various samples: 1. 10.4%
2. 5.7%
3. 6.9%
} **Overall final moisture content: 7.67%**

Trial No.3:

Initial sample weight: 965 grams

Initial moisture content: 30% (increased moisture by sprinkling some water)

Sr. No.	Time (minutes)	Temperature (°C)	Weight noted (grams)	Weight loss (grams)	Remarks, if any
1.	After 5	55	897	68	Drying rate started
2.	After 10	55	855	110	Drying phase continue
3.	After 15	55	815	150	Variant of Drying rate
4.	After 20	55	783	182	Variant of Drying rate
5.	After 25	55	753	212	Variant of Drying rate
6.	After 30	55	731	234	Variant of Drying rate
7.	After 35	55	705	260	Product with required texture

Sample weight after drying: 705 grams

Total weight loss on drying: 260 grams

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Final moisture content: 8.4%

2. SAMPLE AFTER COOLING

Trial No.4:

Initial sample weight: 1000 grams

Initial moisture content: 31% (increased moisture by sprinkling some water)

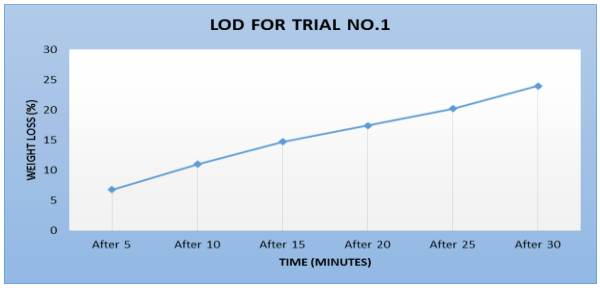
Sr. No.	Time (minutes)	Temperature (°C)	Weight noted (grams)	Weight loss (grams)	Remarks, if any
1.	After 25	50	827	173	Drying rate started
2.	After 35	50	783	217	Drying phase continue
3.	After 45	50	737	263	Product with required texture

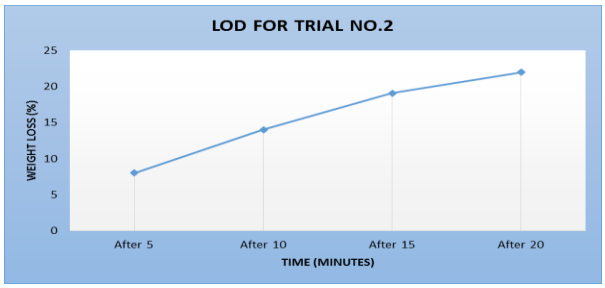
Sample weight after drying: 737 grams

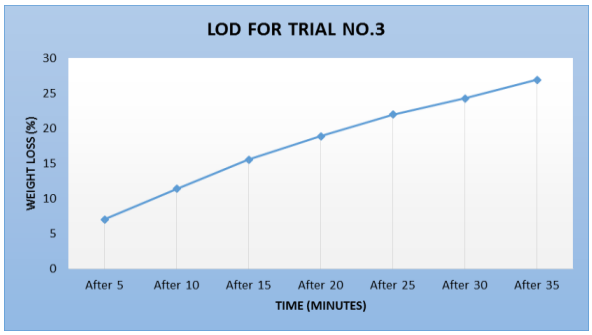
Total weight loss on drying: 263 grams

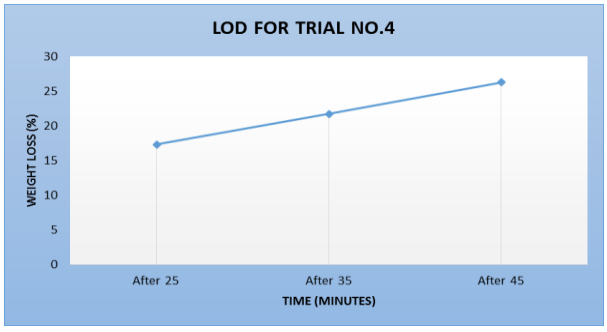
Final moisture content: 6.7%

GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:









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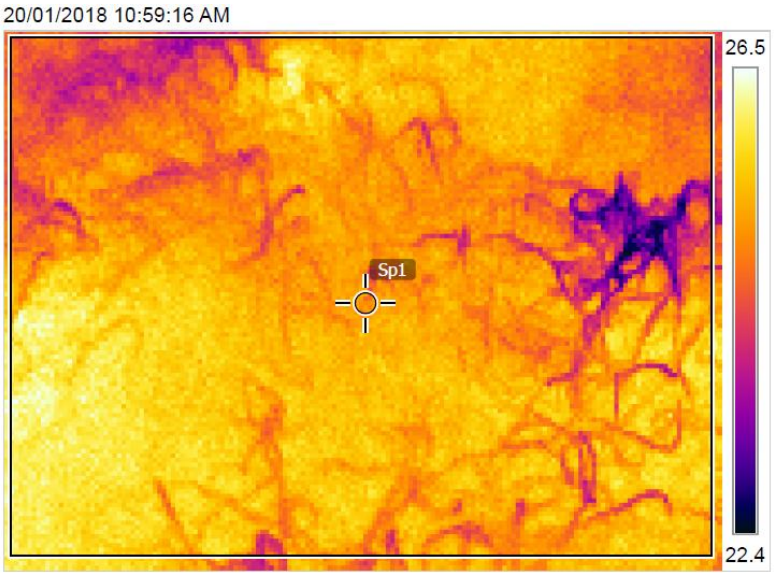
THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. Before Heat Treatment

Measurements		°C
Ar1	Max	26.5
	Min	22.4
	Average	25.2
Sp1		25.0

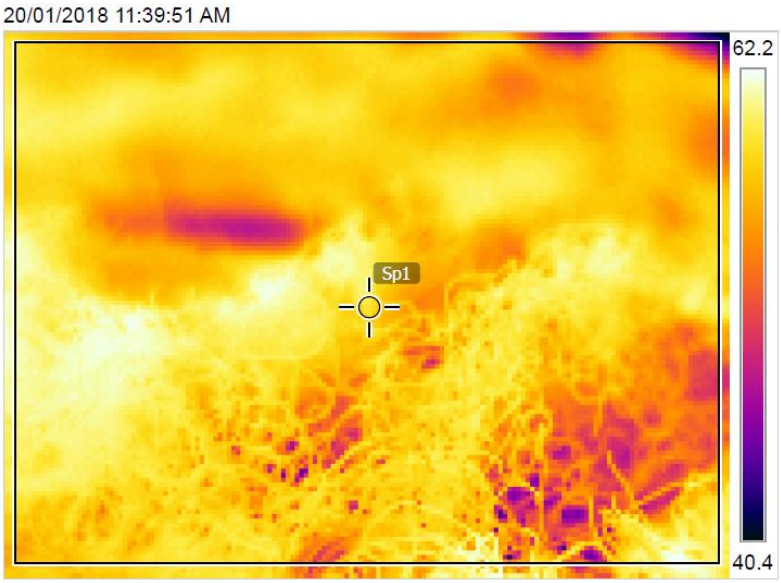
Parameters	
Emissivity	0.95
Refl. temp.	20 °C
Distance	2 m
Relative humidity	50 %
Atm. temp.	33 °C
IR window temp.	20 °C
IR window transmission	1



2. After Heat Treatment of Trial No. 1

Measurements		°C
Ar1	Max	62.9
	Min	42.0
	Average	57.2
Sp1		59.2

Parameters	
Emissivity	0.95
Refl. temp.	20 °C
Distance	2 m
Relative humidity	50 %
Atm. temp.	33 °C
IR window temp.	20 °C
IR window transmission	1



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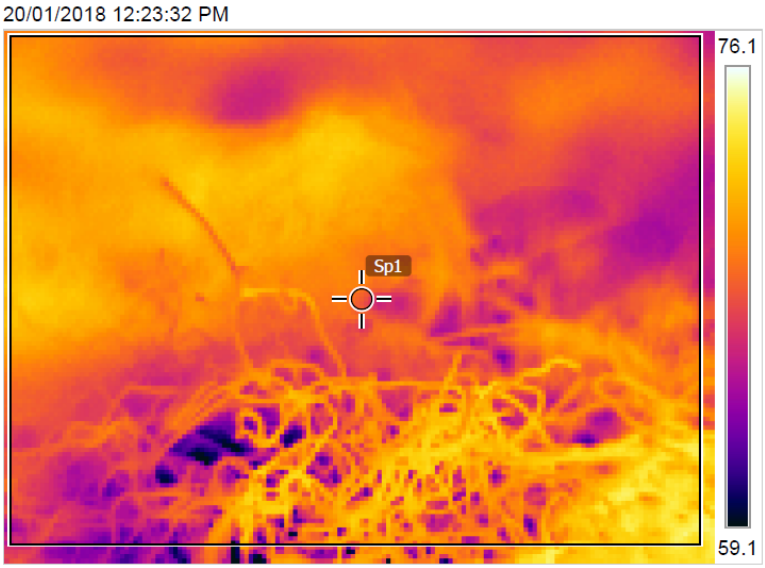
3. After Heat Treatment of Trial No. 2

Measurements		°C
Ar1	Max	74.7
	Min	58.2
	Average	68.7
Sp1		68.0

Parameters	
Emissivity	0.95
Refl. temp.	20 °C
Distance	2 m
Relative humidity	50 %
Atm. temp.	33 °C
IR window temp.	20 °C
IR window transmission	1



BEFORE AND AFTER PICTURES OF SPECIMEN SAMPLE:

COOKING TEST:

For cooking test, 50 grams of treated sample, 150 ml of water and 1 tablespoon of refined oil was taken. Refined oil was heated and water was added to boil for about 3-4 minutes and then treated sample was added to boiling water and kept in it for 1-2 minutes for cooking. Then observations were made by tasting the cooking sample.

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COOKING TEST PICTURES:

OBSERVATION MADE BY THE REPRESENTATIVE:

As per physical investigation, the cooked vermicelli sample at 55 degree C with moisture content 8.11%, time cycle 30 minutes is quite satisfactorily as compare to master sample. The observed parameter was examined that each strand of vermicelli must not stick to others or in lesser form.

Miss. Komal Bhoite
Tested By

Dr. Uttam K. Goswami
Approved By

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