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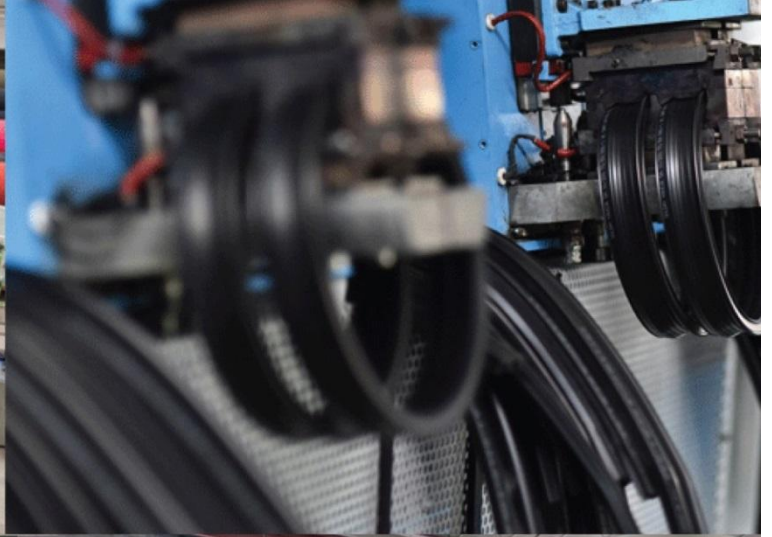
A.M.P.E.R.E (EUROPE)

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
Dehydration of Apple**



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Customer :	Laboratory Experimental Analysis
Process :	Batch Convection Heat Treatment for Dehydration of Apple

TEST REPORT No: 47/KRDC/LAB/17 Mum 01/09/2020

Date Sample reception : 01/09/2020

ID : 47/LAB/176

SAMPLE DESCRIPTION:

Sampling : As Requested

Sample Condition : Acceptable

Quantity : 1 No.

Sampling date : 01/09/2020

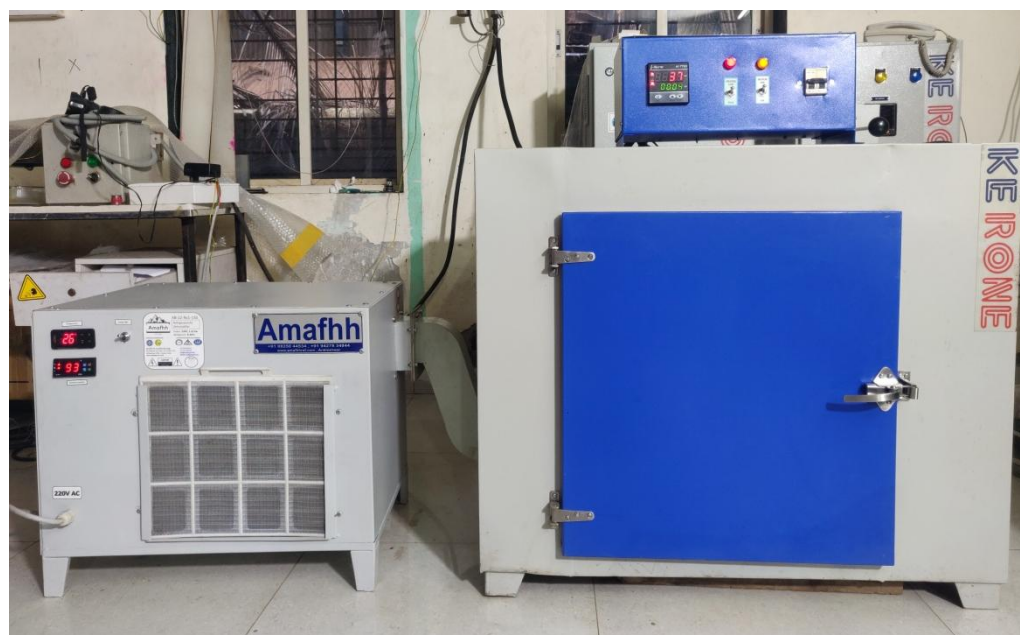
Product : Red Apple

Requirement : Final Moisture should be less than 10%

Start Date test : 01/09/2020

End Date test : 01/09/2020

LABORATORY EXPERIMENTAL SET UP:



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LAB BATCH CONVECTION HEATING SYSTEM SPECIFICATIONS:

Heating Zone (width*height*depth)	550*650*550 mm
No. of Heaters	4
Total Heater Power	3 kW
Motor	0.5 HP
No. of trays	7
Tray size (width*height*depth)	600500 X 35
Nominal Capacity of Dehumidifier	1 tr each

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Humidity Range of Dehumidifier	20-90%
Max. Ambient Temperature of Dehumidifier	40°C
Water Removal Rate of Dehumidifier	80 lt per day at NTP

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (°C)	28°C (±5°C)
Humidity (%)	≤83% 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: 160x 120 IR Thermal sensitivity of 0.10°C
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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<p>Thermo Hygrometer</p>		<p>Model No: HTC-2</p> <p>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</p>
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SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on an Apple to speed up the drying rate. For this experimental run, given apple sample has been sliced horizontally in 5-6 mm thickness and these slices has been placed in a perforated tray in such a manner that none of the pieces are touching and there is some space around each slice for air to circulate for achieving even drying characteristics. Observations are made after every 15 minutes on LOD basis. Also, initial and final moisture content has been taken.

ANALYTICAL RESULTS:

Setting Temperature: 65 $^{\circ}\text{C}$

Initial Weight: 137 grams

Initial Moisture Content: 80%

Sr. No.	Time (minutes)	Weight noted (grams)	Weight loss (%)	Temperature on sample ($^{\circ}\text{C}$)	Remarks, if any
1.	After 15	97	29.1	41	Drying rate started
2.	After 30	68	50.4	42	Drying phase continue
3.	After 45	43	68.6	43	Variant of Drying rate
4.	After 60	28	79.6	45	Variant of Drying rate
5.	After 75	22	83.9	48	Required Drying rate

Final Weight: 22 grams

Total Weight Loss: 83.9%

Final Moisture Content: 8%

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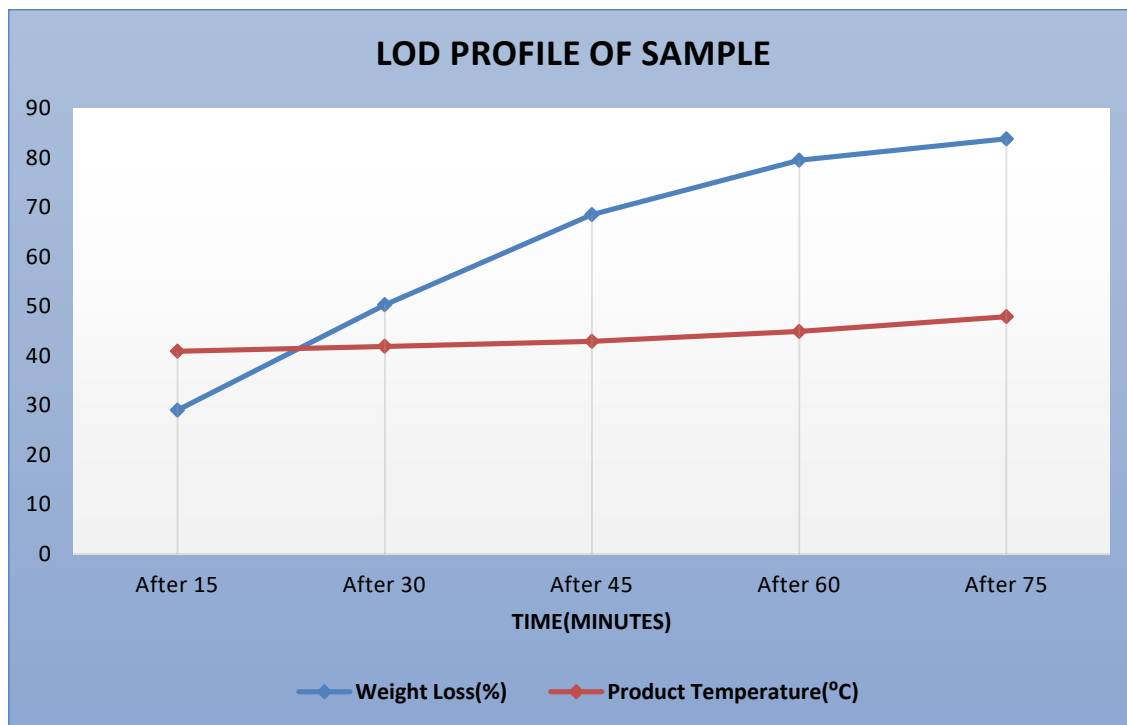


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GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:



THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

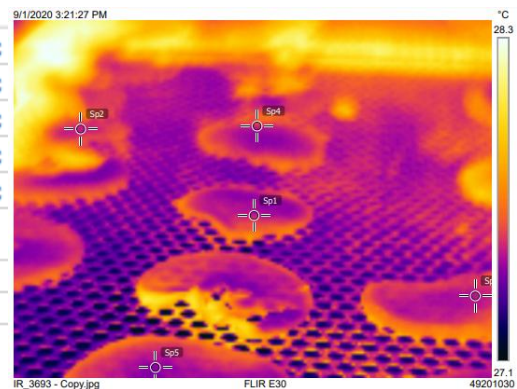
1. Before Heat Treatment:

Measurements

Sp1	28.2 °C
Sp2	28.3 °C
Sp3	27.1 °C
Sp4	28.7 °C
Sp5	27.9 °C

Parameters

Emissivity	0.95
Ref. temp.	20 °C



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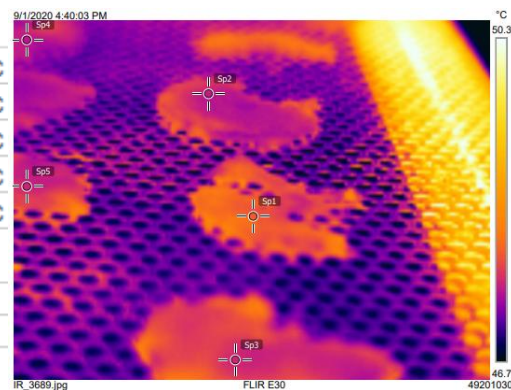
2. After Heat Treatment:

Measurements

Sp1	48.7 °C
Sp2	49.2 °C
Sp3	49.0 °C
Sp4	48.8 °C
Sp5	49.8 °C

Parameters

Emissivity	0.95
Refl. temp.	20 °C



BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:



BEFORE



AFTER

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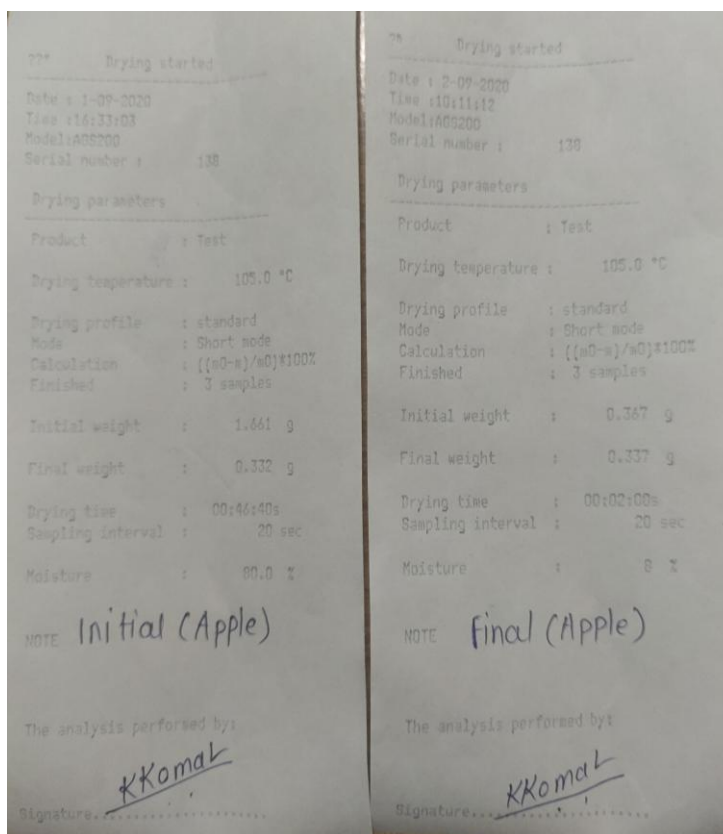
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MOISTURE ANALYSIS REPORTS:



OBSERVATIONS:

The drying behavior of Apple has been investigated under the convection heating system. The drying rate is found to be increasing with respect to increase in time. It has been found that the moisture content on the dry basis (%) decreases with respect to increase in drying time. As per physical investigation, it has been observed that required moisture content has been achieved with little colour change in final product.

KKomal

Miss Komal Bhoite
Tested By

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