

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

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

TEST REPORT No: 47/KRDC/LAB/18 Mum 09/01/2018

Date Sample reception : 09/01/2018
ID : 47/LAB/08

SAMPLE DESCRIPTION:

Sampling : Laboratory Investigation
Sample Condition : Acceptable
Quantity : 500 grams
Sampling date : 09/01/2018
Product : Red apple
Requirement : Final product must be absolute dry with lowest moisture content
Start Date test : 09/01/2018
End Date test : 10/01/2018

LABORATORY EXPERIMENTAL SET UP:



Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.

Kerone Research & Development Centre (KRDC), B/47, Addl. MIDC. Anand Nagar, Ambarnath (East), Thane- 421 506, India
Tel- +91-251-2620542/13/44/45/46 E-mail: info@kerone.com, www.kerone.com**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 (%)	<80 % 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: 160 x 120 IR Thermal sensitivity of 0.10°C

Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.

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:

The experiment has been performed on apple slices without adding any additive to speed up the drying rate. The apple slices on dehydrator tray has placed 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.

For experimental run, some amount of samples was taken and chopped into slices like chips of thickness about 5 mm by removing seeds and placed it on perforated tray and observations are made after every 1 hour by checking the weight loss on drying. Also, initial weight before drying and final weight after drying was taken.

ANALYTICAL RESULTS:**1. Apple Slices****Initial sample weight: 411 grams**

Sr. No.	Time (hours)	Temperature (°C)	Weight noted (grams)	Weight loss (grams)	Remarks, if any
1.	After 1	60	175	236	Drying rate started
2.	After 2	60	91	320	Drying phase continue
3.	After 3	60	67	344	Variant of Drying rate
4.	After 4	60	65	346	Variant of Drying rate
5.	After 5	60	65	346	Constant drying rate

Sample weight after drying: 65 grams**Total weight loss on drying: 346 grams****Format: F/R&D/01**

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.

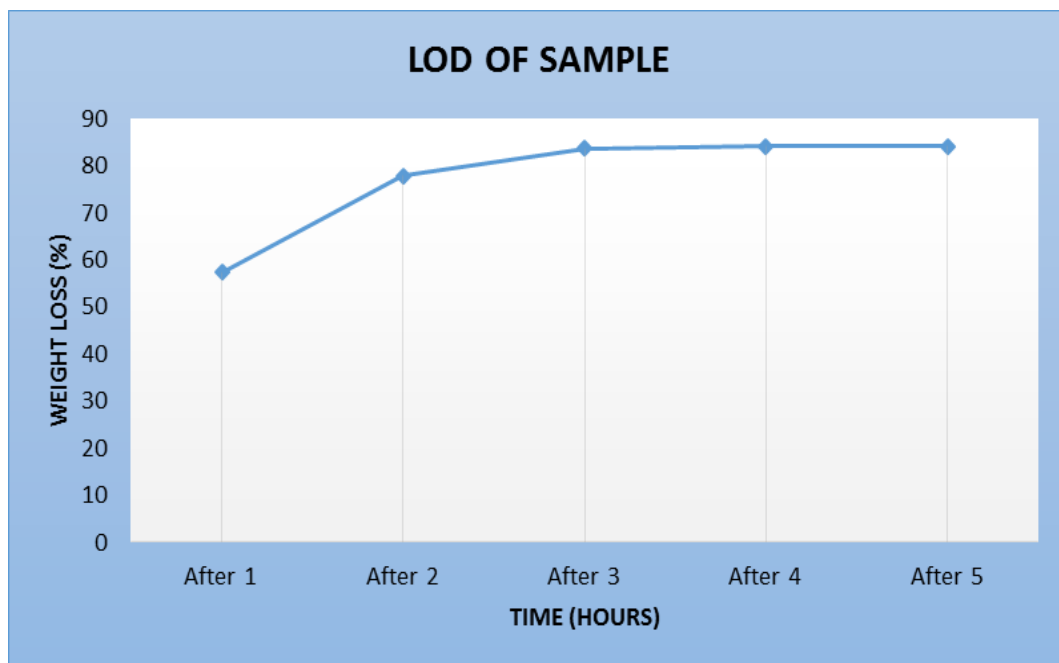
Final Moisture Content: 4.19%

Observation:

The Drying behavior of apple slices has been investigated under the forced convection mode dryer. The drying rate is found to be decreasing 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.

In the processed sample, the fat, fiber, textural and color content has to analyze. As per physical investigation, it has been observed that there is no enzymatic browning (- for data, sample has to gone through colorimeter to get the browning index), solely significant difference in the browning index of the fresh apples and the apple slices.

GRAPHICAL REPRESENTATION OF DRYING PARAMETERS:



Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.

THERMAL IMAGE BEFORE AND AFTER HEAT TREATMENT:

1. Before Heat Treatment

Measurements °C 09/01/2018 3:15:28 PM

Ar1	Max	27.5
	Min	22.4
	Average	25.3
Sp1		25.9

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



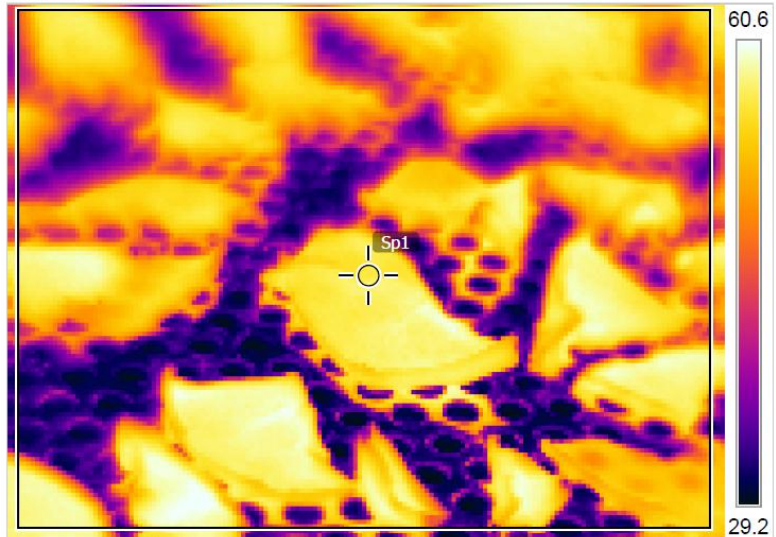
2. After Heat Treatment:

Measurements °C 10/01/2018 11:16:39 AM

Ar1	Max	60.9
	Min	29.1
	Average	47.9
Sp1		56.4

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



Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.

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

BEFORE AND AFTER PICTURES OF TREATED SPECIMEN SAMPLE:



Miss. Komal Bhoite
Tested By



Dr. Uttam K. Goswami
Approved By

Format: F/R&D/01

The value obtained is already corrected for possible recover value stated, if applicable. This document may not be reproduced or disclosed wholly or partly in any part thereof without the written consent of the laboratory management or customer. This document relates only to the specimen samples processed. The processed sample will be kept in this laboratory for 7 days from the date of heat treatment.