KERONE

A CRISIL-NSIC RATED COMPANY
ISO-9001-2008COMPANY

MemberOf

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

In AssociationWith

EMitech
ELECTRO MAGNETIC Innovative Technologies

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

Batch Convection Heat Treatment on Marigold petals

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

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

Customer :	**M/s. DARSHAN INTERNATIONAL**
Process :	**Batch Convection Heat Treatment on Marigold petals**

TEST REPORT No: 47/KRDC/LAB/17 Mum 30/07/2021

Date Sample reception : 30/07/2021
ID : 47/LAB/15

SAMPLE DESCRIPTION:

Sampling : As Requested
Sample Condition : Acceptable
Quantity : 200g
Samples opening date : 30/07/2021
Product : Fresh Marigold flower
StartDatetest : 30/07/2021
EndDatetest : 30/07/2021

LABORATORY EXPERIMENTAL SETUP:

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

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
No. of trays	6
Tray size (width*height*depth)	560 x 435 x25
Centrifugal Exhaust Blower	1440 rpm

ENVIRONMENT-LABORATORY AMBIENT CONDITIONS:

Temperature (^oC)	27.5^oC (±5^oC)
Humidity (%)	≤70% 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

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

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)
Thermo Hygrometer		Model No: HTC-2 Temperature accuracy: ±°C (1.8°F) Temperature resolution: 0.1°C (0.2°F) Humidity range: 10%~99% RH Humidity accuracy: ±5%RH Humidity resolution: 1%RH

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

SAMPLE PREPARATION AND METHOD/PROCEDURE:

The experiment has been performed on Marigold petals to speed up the drying rate. For this experimental run, given sample has been placed on a perforated tray and then placed in Horizontal Batch Convection Oven at certain decided temperature and time cycle. Observations are made on the final moisture content of sample, weight and appearance of product.

ANALYTICAL RESULTS:

Initial Wt. - 200g

Initial moisture – 87.6%

Setting Temperature: 60°C

Sr. No	Cycle Time (mins.)	Process Temp. (°C)	Product Temp. (°C)	Remarks, if any
1	After 20mins	55°C	(40-45)°C	Drying started
2	After 50mins	60°C	(50-55)°C	Drying continues
3	After 1Hr. 20 mins	60°C	(50-55)°C	Dried as desired

Final Weight: 9 g

Final Weight loss in %: 95.5%

Final Moisture content: 11 %

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

AFTER PICTURES OF TREATED SPECIMEN SAMPLE:

a) **UNTREATED**

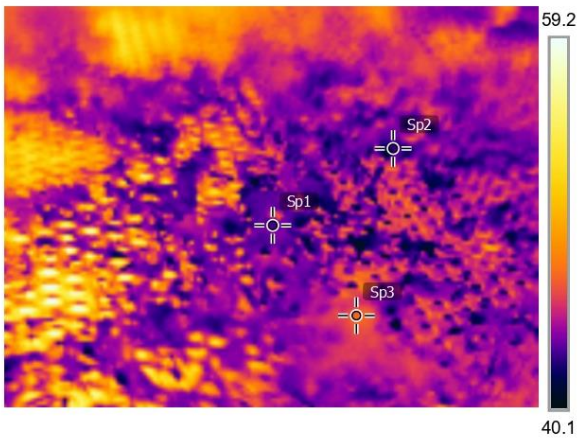
b) **TREATED**

THERMAL ANALYSIS REPORTS :

During Cycle-1:

Measurements	
Sp1	43.0 °C
Sp2	42.6 °C
Sp3	47.2 °C

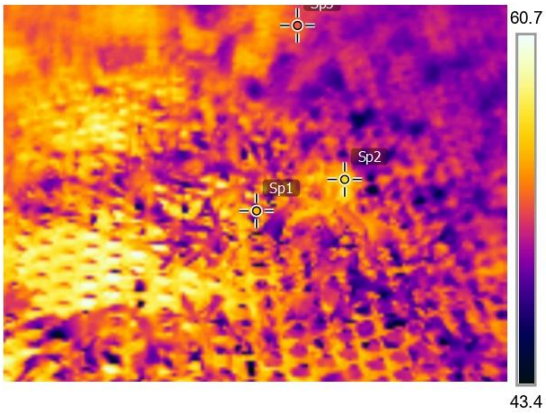
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



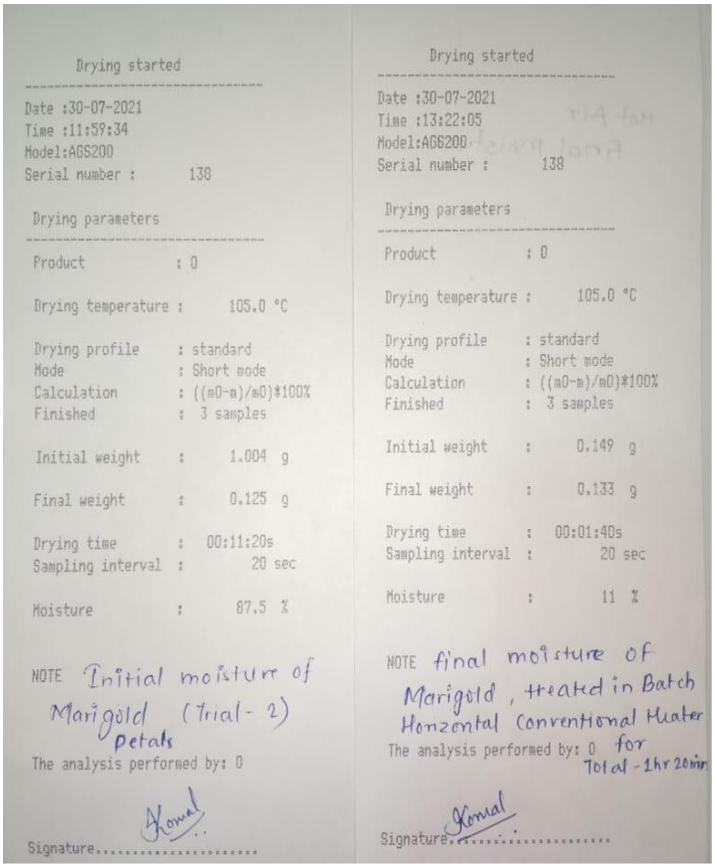
Kerone Research & Development Centre (KRDC)
B/47,Addl. MIDC. Anand Nagar, Ambernath (East), Thane- 421 506, India
Tel- +91-251-2620542/43/44/45/46, Email-info@kerone.com, www.kerone.com

During Cycle-2:

Measurements	
Sp1	55.9 °C
Sp2	56.5 °C
Sp3	52.6 °C
Parameters	
Emissivity	0.95
Refl. temp.	20 °C



MOISTURE ANALYSIS REPORTS:



Drying started

Date :30-07-2021
Time :11:59:34
Model:AGS200
Serial number : 138

Drying parameters

Product : 0

Drying temperature : 105.0 °C

Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples

Initial weight : 1.004 g

Final weight : 0.125 g

Drying time : 00:11:20s
Sampling interval : 20 sec

Moisture : 87.5 %

NOTE Initial moisture of Marigold (Trial- 2) petals

The analysis performed by: 0

Signature.....

Drying started

Date :30-07-2021
Time :13:22:05
Model:AGS200
Serial number : 138

Drying parameters

Product : 0

Drying temperature : 105.0 °C

Drying profile : standard
Mode : Short mode
Calculation : ((m0-m)/m0)*100%
Finished : 3 samples

Initial weight : 0.149 g

Final weight : 0.133 g

Drying time : 00:01:40s
Sampling interval : 20 sec

Moisture : 11 %

NOTE final moisture of Marigold, treated in Batch Horizontal Conventional Heater for Total - 1hr 20min

The analysis performed by: 0

Signature.....

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

OBSERVATIONS:

The Drying behavior of marigold petals has been investigated under the convection heating system. The drying rate is found to be increasing with respect to increasing drying time As per physical investigation,the colour of product is mostly retained and dried as desired without burning.

Ms. Komal Ingle
Tested By