PUROTECS

PurOtreat

CONTROL MOLDS, BACTERIA and EXTENDS SHELF LIFE
FDA APPROVED — USDA APPROVED ORGANIC

Fresh product coming from the field is covered with mold spores and bacteria. The mold spores and bacteria generally have not anchored onto the fresh product but the conditions for forming an irreversible biofilm are in place. The PurOtreat system was initially developed to control molds on blueberries but ozone gas treatment was found to be ideal for killing molds and bacteria on blueberries, strawberries, kiwis, oranges, lemons, melons and a variety of other fresh products. Treating fresh produce with the PurOtreat system means reduced fresh produce shrinkage and extended shelf life.

The PurOtreat system uses our standard Purotecs ozone generator. Ozone gas is sent from the generator to a chamber. A conveyer moves fresh produce through the treatment chamber. Fresh produce is treated for approximately 30 to 60 seconds. A continuous ozone monitor provides feedback to the generator for automatic dosage control required for exact treatment. Products are treated as soon as possible after harvest and placed in treated containers and treated storage facilities. A variation of the PurOtreat system is to use a pre-cooler room as a chamber and expose the fresh produce to lower ozone concentrations for longer time periods.

On physically clean and dry cantaloupe, a notoriously difficult product to clean, the PuroTreat resulted in a greater than 4-log reduction in mold, yeast, and bacteria.

Table shows the PurOtreat results on physically clean and dry cantaloupe.

	Aerobic Total Plate Count (cfu/g)	Coliforms (cfu/g)	E. c oli (cfu/g)	Lactic Acid Bacteria (cfu/g)	Mold (cfu/g)	Yeast (cfu/g)
untreated	>6100000*	>6100000*	<10*	>6100000*	>6100000*	107000
untreated	>6100000*	11000	<10*	>6100000*	90000	22000*
PuroTreat-1 minute	940	60*	<10*	210*	<10*	<10*
PuroTreat-5 minutes	480	<10*	<10*	100*	<10*	<10
PuroTreat-5 minutes	<10*	<10*	<10*	10*	<10*	<10*

PUROTECS

PurOtreat

The PurOtreat system uses a standard PurOtecs ozone generator(s). The treatment chamber is designed to meet the production quantity and size of the product being treated. The treatment chamber and the ozone generator can be separated for convenience by up to 200 feet. The generator must be located in a cool clean environment for best long term reliability. The ozone monitor continuously displays the ozone treatment level and provides a signal to the ozone generator for automatic control. All excess ozone is vented to the outside or to an ozone destruct using the vent blower.

SPECIFICATIONS

Treatment: Ozone gas
Ozone Source: 3400 PurOtecs ozone generator
Ozone: 1,000 to 50,000 ppm (4 to 16 lbs/day)
Ozone Control: Monitor feed back to 3400 ozone generator for setpoint control
Ozone Monitor: UV 0 to 10% (0 to 100,000 ppmv)
Ozone Connection: ½" Stainless tube @30 psi minimum
Water Flow: 0.5gpm max
Treatment Time: 30 to 120 seconds
Belt Width: 2 to 6 feet
Belt Length: 4 to 20 feet
Belt Speed: Variable
Vent: Forced air blower to outside or ozone destruct
Power: 208V 3 Phase 15 Amp

Patent applied for

PUROTECS

PurOtreat

The National Food Laboratory, Inc.
6363 CLARK AVENUE. DUBl.IN. CALIFORNIA 94568-3097
(5tO) 82B-I440 • Fax (510) 833-8795

Client:

Analytical Report No.: MH4960
Report Data: 08/23/99
Submittal Data: 08/12/99

Contact:

The NFL Sample #: AA13447 Sample Code: Cantaloupes 8/12 Untreated

Analysis Name	Result	Units
Aerobic Total Plate Count	>6100000*	cfu/g
Coliforms	>6100000*	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	>6100000*	cfu/g
Mold	>6100000*	cfu/g
Yeast	107000	cfu/g

The NFL Sample 11: Sample Code: Cantaloupes 8/12 Untreated

Analysis Name	Result	Units
Aerobic Total Plate Count	>6100000*	cfu/g
Coliforms	11000	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	>6100000*	cfu/g
Mold	90000	cfu/g
Yeast	22000*	cfu/g

The NFL Sample 1#: AA73449 Sample Code: Cantaloupes 8112 Untreated

Analysis Name	Result	Units
Aerobic Total Plate Count	>6100000*	cfu/g
Coliforms	3000*	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	>6100000*	cfu/g
Mold	2000*	cfu/g
Yeast	>6100000*	cfu/g

Key: cfu = Colony Forming Units
= Estimate

The National Food Laboratory, Inc.
6363 CLARK AVENUE. DUBl.IN. CALIFORNIA 94568-3097
(5tO) 82B-I440 • Fax (510) 833-8795

Client:

Analytical Report No.: MH4960
Report Data: 08/23/99
Submittal Data: 08/12/99

Contact:

The NFL Sample #: AA13447 Sample Code: Cantaloupes 8/12
Ozone @ 2ppm 1 Minute Wash

Analysis Name	Result	Units
Aerobic Total Plate Count	>6100000*	cfu/g
Coliforms	18000*	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	254000*	cfu/g
Mold	1350	cfu/g
Yeast	4000*	cfu/g

The NFL Sample 11: Sample Code: Cantaloupes 8/12
Ozone @ 2ppm 5 Minute Wash

Analysis Name	Result	Units
Aerobic Total Plate Count	188000	cfu/g
Coliforms	40*	cfu/g
E. coli	<18*	cfu/g
Lactic Acid Bacteria	73000	cfu/g
Mold	20*	cfu/g
Yeast	10*	cfu/g

The NFL Sample 1#: AA73449 Sample Code: Cantaloupes 8112
Ozone @ 2ppm 5 Minute Wash

Analysis Name	Result	Units
Aerobic Total Plate Count	>6100000*	cfu/g
Coliforms	28000*	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	>6100000*	cfu/g
Mold	890	cfu/g
Yeast	15000*	cfu/g

Key: cfu = Colony Forming Units
= Estimate

The National Food Laboratory, Inc.
6363 CLARK AVENUE. DUBl.IN. CALIFORNIA 94568-3097
(5tO) 82B-I440 • Fax (510) 833-8795

Client:

Analytical Report No.: MH4960
Report Data: 08/23/99
Submittal Data: 08/12/99

Contact:

The NFL Sample #: AA13447 Sample Code: Cantaloupes 8/12
Ozone @ 2ppm 10 Minute Wash

Analysis Name	Result	Units
Aerobic Total Plate Count	116000	cfu/g
Coliforms	190*	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	111000*	cfu/g
Mold	230*	cfu/g
Yeast	2230	cfu/g

The NFL Sample 11: Sample Code: Cantaloupes 8/12
Ozone @ 2ppm 10 Minute Wash

Analysis Name	Result	Units
Aerobic Total Plate Count	48000	cfu/g
Coliforms	50*	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	45000	cfu/g
Mold	20*	cfu/g
Yeast	110	cfu/g

The NFL Sample 1#: AA73449 Sample Code: Cantaloupes 8112
Ozone @ 2ppm 1 Hour Gas Exposure

Analysis Name	Result	Units
Aerobic Total Plate Count	940	cfu/g
Coliforms	60*	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	210*	cfu/g
Mold	<10*	cfu/g
Yeast	<10*	cfu/g

Key: cfu = Colony Forming Units
* = Estimate

The National Food Laboratory, Inc.
6363 CLARK AVENUE. DUBl.IN. CALIFORNIA 94568-3097
(5tO) 82B-I440 • Fax (510) 833-8795

Client:

Analytical Report No.: MH4960
Report Data: 08/23/99
Submittal Data: 08/12/99

Contact:

The NFL Sample #: AA13447 Sample Code: Cantaloupes 8/12
Ozone @ 2ppm 1 Hour Gas Exposure

Analysis Name	Result	Units
Aerobic Total Plate Count	480	cfu/g
Coliforms	<10*	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	100*	cfu/g
Mold	<10*	cfu/g
Yeast	<10	cfu/g

The NFL Sample 11: Sample Code: Cantaloupes 8/12
Ozone @ 2ppm 1 Hour Gas Exposure

Analysis Name	Result	Units
Aerobic Total Plate Count	<10*	cfu/g
Coliforms	<10*	cfu/g
E. coli	<10*	cfu/g
Lactic Acid Bacteria	10*	cfu/g
Mold	<10*	cfu/g
Yeast	<10*	cfu/g

Your samples will be retained for a period of 7 days from the date of this report, at which time, unless we are notified to the contrary, they will be discarded.

Thank you for using the services of the National Food Laboratory.

Rebecca Holmgren

Cc: Mary Jo Smith – NFL Accounting

Key: cfu = Colony Forming Units
* = Estimate