

APPLICATION OF 1-MCP TO YOUR FRUIT: OPTIONS FOR TREATMENT AND IMPACT ON AROMA

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SUGIMOTO



1-MCP OPTIONS

SmartFresh™ (2002-present). *SmartFresh (3.3% a.i.) is a formulation of 1-MCP that is encapsulated in a material known as alpha cyclodextrin. In this formulation, the 1-MCP is lodged in the center of a ring of linked sugar molecules that permits the handling of the gaseous 1-MCP as a powder. This formulation is extremely stable, although it has to be protected from water. Upon the addition of water, the cyclodextrin dissolves and the 1-MCP is liberated as a gas. Powdered SmartFresh is contained in dissolvable pouches that are added to canisters holding a few gallons of water. After 5 minutes or so, the pouches dissolve and the water gains access to the SmartFresh and 1-MCP is liberated. The transfer of the 1-MCP molecule into the air of the treatment chamber is facilitated by air pumps that bubble air through the solution in which the SmartFresh is being dissolved, or, more recently, through the use of effervescent tablets. The amount of 1-MCP is controlled by the size and number of sachets or tablets used. There are several additional 1-MCP technologies available from AgroFresh Solutions including Harvista, Invisa, ProTabs, InBox, and SmartTabs. SmartFresh tablets and water-dissolvable sachets are handled in a protective sealed foil pouch.*

Source: AgroFresh, Claudia Arkesteyn (616) 307-1563 and Kyle Friedenstab (248) 894-3640

1-MCP APPLICATION



1-MCP OPTIONS

Fysium™ (2015 - 2021). *Fysium (100% a.i.) is a version of 1-MCP from Pace International LLC that is supplied as a gas, rather than as a powdered formulation. A module that contains the chemical precursors to the 1-MCP molecule is used to carry out a chemical reaction to generate the gas. The amount of 1-MCP is controlled by the amount of chemical reactants and the number of modules. These modules need to be recharged for reuse. Fysium is introduced from the exterior of the room, usually through a port in the door or wall, so it can be applied after the room is sealed, which is sometimes desirable to accommodate fruit handling needs.*

Source: Not currently available. May be picked up by Decco.



1-MCP OPTIONS

***TruPick**[®] (2016 - 2017, no longer available). TruPick (2% a.i.) was a 1-MCP formulation developed by Essentiv[™] and marketed by Decco, but following a dispute with AgroFresh Solutions, became the property of the latter in 2017. TruPick used a material called a metal organic framework (MOF), which has the capacity to 'adsorb' (i.e., cling very tightly) 1-MCP and other gases. Adsorbents like MOFs are crystalline powders and do not encapsulate the gas, but can temporarily hold onto the gas, often in very high quantities; in the case of 1-MCP, the holding capacity of the MOF was near 10%. MOFs tend to be extremely sensitive to water and water vapor, such that exposure to high humidity can induce the release of the adsorbed 1-MCP. To protect the TruPick MOF from losing 1-MCP, the MOF particles were sealed in a water-soluble gel. Like SmartFresh, this allowed the material to be handled as a powder that released the 1-MCP upon dissolving in water. TruPick water-dissolvable sachets are handled in a protective sealed foil pouch.*

Source: Not available

1-MCP OPTIONS

Easyfresh™ (2018 - present). *Easyfresh (3.3% a.i.) is a 1-MCP formulation from Fine Americas, Inc. Easyfresh is a cyclodextrin-based 1-MCP formulation, much like SmartFresh. Also like SmartFresh, it is handled in dissolvable pouches that require dissolution in water. Agitation of the water in the dispensing canister is a combination of air bubbler and submersible water pump that uses rechargeable batteries for reuse. Easyfresh is applied by local distributors of agricultural chemicals, but with training, has the potential for self-application. Self-application reduces the amount of coordination needed for treatment and improves flexibility at the level of the storage operation. Easyfresh water-dissolvable sachets are handled in a protective sealed foil pouch.*

*Source: Fine Americas, John Rasch, Sparta, MI;
(616)293-8815; jrasch@wilburellis.com*

62097-52-82917_Easyfresh_20181010_29_82917_.pdf



A postharvest tool for counteracting undesirable effects of both internal and external sources of ethylene on harvested fruit and vegetables.

ACTIVE INGREDIENT: 1-Methylcyclopropene	3.3%
OTHER INGREDIENTS:	96.7%
TOTAL:	100.0%

FOR THE TREATMENT OF APPLES, MELONS, TOMATOES, PEARS, AVOCADOS, KIWIFRUIT, PEACHES, NECTARINES, PLUMS, APRICOTS, PLUMCOTS, ASIAN PEARS, BANANAS, BROCCOLI, AND PERSIMMONS

Net Contents: 0.17 ounces (4.9 grams)

EPA Reg. No. 62097-52-82917

EPA Est. No. 93837-POL-1

KEEP OUT OF REACH OF CHILDREN

CAUTION

Refer to main label for additional Precautionary Statements, First Aid, and Directions For Use.


Distributed by: Fine Americas, Inc.
Tel: 925-932-8800 www.fine-americas.com

Easyfresh™ is a trademark of Fine Agrochemicals, Ltd.
SAL 8/1/18 EFR/4.9G/US/18

1-MCP OPTIONS

FirmConfirm® (2020 - present). FirmConfirm (3.3% a.i.) is a 1-MCP formulation from MirTech, Inc. FirmConfirm is a cyclodextrin-based 1-MCP formulation, much like SmartFresh. Also like SmartFresh, it is handled in dissolvable pouches and requires dissolution in water. Agitation of the water in the dispensing canister is by a rotary paddle. FirmConfirm is intended to be self-applied; the storage operator or grower can apply FirmConfirm following a training session. FirmConfirm water-dissolvable sachets are handled in a protective sealed foil pouch.

Source: MirTech, Dr. Xi Chen,
Belle Mead, NJ; (732)853-2613;
chenxince4@gmail.com

	U.S. ENVIRONMENTAL PROTECTION AGENCY Office of Pesticide Programs Biopesticides and Pollution Prevention Division (7511P) 1200 Pennsylvania Ave., N.W. Washington, D.C. 20460		EPA Reg. Number: 92261-1	Date of Issuance: 3/10/2020
	NOTICE OF PESTICIDE: <input checked="" type="checkbox"/> Registration <input type="checkbox"/> Reregistration (under FIFRA, as amended)		Term of Issuance: Unconditional	
	Name and Address of Registrant (include ZIP Code): MirTech, Inc. 30 Valley Wood Drive Somerset, NJ 08873		Name of Pesticide Product: FirmConfirm	

1-MCP OPTIONS

FreshVue™ (2022 - present). *FreshVue (3.3% a.i.) is a 1-MCP formulation from Pace Int. FreshVue is a cyclodextrin-based 1-MCP formulation, much like SmartFresh, Easyfresh, or FirmConfirm. Also, like SmartFresh, it is handled in dissolvable pouches (2 sizes) that require dissolution in water in a FreshVue Generator system. The mechanism for agitation of the water is TBD. FreshVue application is can be self-applied or by arrangement with Pace's application team. Delivery can be from either inside the room or outside the room. FreshVue water-dissolvable sachets are likely handled in a protective sealed foil pouch.*

*Source: Pace, David Felicetti, Wapato, WA
Ph: ☎(925) 357-6780, (800) 936-6750
E-mail: davidf@paceint.com*

Pace EXC 5500 EPA Reg. No. 64864-TI	Master Label (version 1), dated July 28, 2022
Pace EXC 5500	
[Alternate Brand Name: FreshVue™ Pods] [Alternate Brand Name: FreshVue™ Pods Mini]	
[A postharvest ethylene management tool to extent shelf life of fruits and vegetables] [A postharvest tool for counteracting internal and external sources of ethylene on harvested fruit and vegetables.]	
Active Ingredient:	
1-Methylcyclopropene.....	3.3%
Other Ingredients	96.7%
Total.....	100.0%
EPA REGISTRATION NO. 64864-TI	EPA EST. NO.

ACCEPTED
07/29/2022

Under the Federal Insecticide, Fungicide and Rodenticide Act as amended, for the pesticide registered under EPA Reg. No. 64864-78

1-MCP OPTIONS

Hazel® (2019 – 2024). Hazel is a 1-MCP formulation developed by Hazel Technologies. It is an activated carbon sorbent, behaving much like the MOFs used for TruPick. Like all adsorbents, it will readily desorb the contained gas. To prevent this, Hazel is held under freezing temperatures in a hermetic pouch prior to use. Hazel CA™ (2% a.i.) is fast-releasing version of the technology applied via a dispenser that uses a fan to run room air over the adsorbent. In this system, the hermetic pouch is opened and the chilled material is added to the canister. In response to the higher humidity and higher temperature of the storage room, the 1-MCP escapes the adsorbent and the fan delivers the released gas to the room. The Hazel technology is also applied as a "time-release" sachet (Hazel 100™, 3% a.i.) that is placed on the top of each bin in a room (or, using a smaller sachet, in a box) without requiring room sealing. The sachet version is self-applied. Hazel adsorbents and sachets are handled in a protective sealed foil pouch.

Source: No longer available following bankruptcy of Hazel Technologies



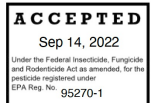
1-MCP OPTIONS

AnsiP®-G (2022 - present). *AnsiP is a 1-MCP formulation developed by Lytone Enterprise, Inc. New Taipei, Taiwan. AnsiP-G is a cyclodextrin-based 1-MCP formulation, much like SmartFresh and Easyfresh. The products are available as effervescent tablets, water sensitive sheets, and as stickers. Agitation of the water in the dispensing canister is by effervescence. AnsiP-G is applied by self-application, which reduces the amount of coordination needed for treatment and improves flexibility at the level of the storage operation. AnsiP-G tablets are in available in plastic bottles; other products are handled in a protective sealed foil pouch.*

Source: Lytone, William T Chang, President

Tel: +886-2-26940885

E-mail: wtc@lytone.com



Master Label

AnsiP®-G

Post-harvest treatment of listed fruits and vegetables for improved quality after shipping, storage or handling.

ACTIVE INGREDIENT:

1-Methylcyclopropene 0.18%

OTHER INGREDIENTS: 99.82%

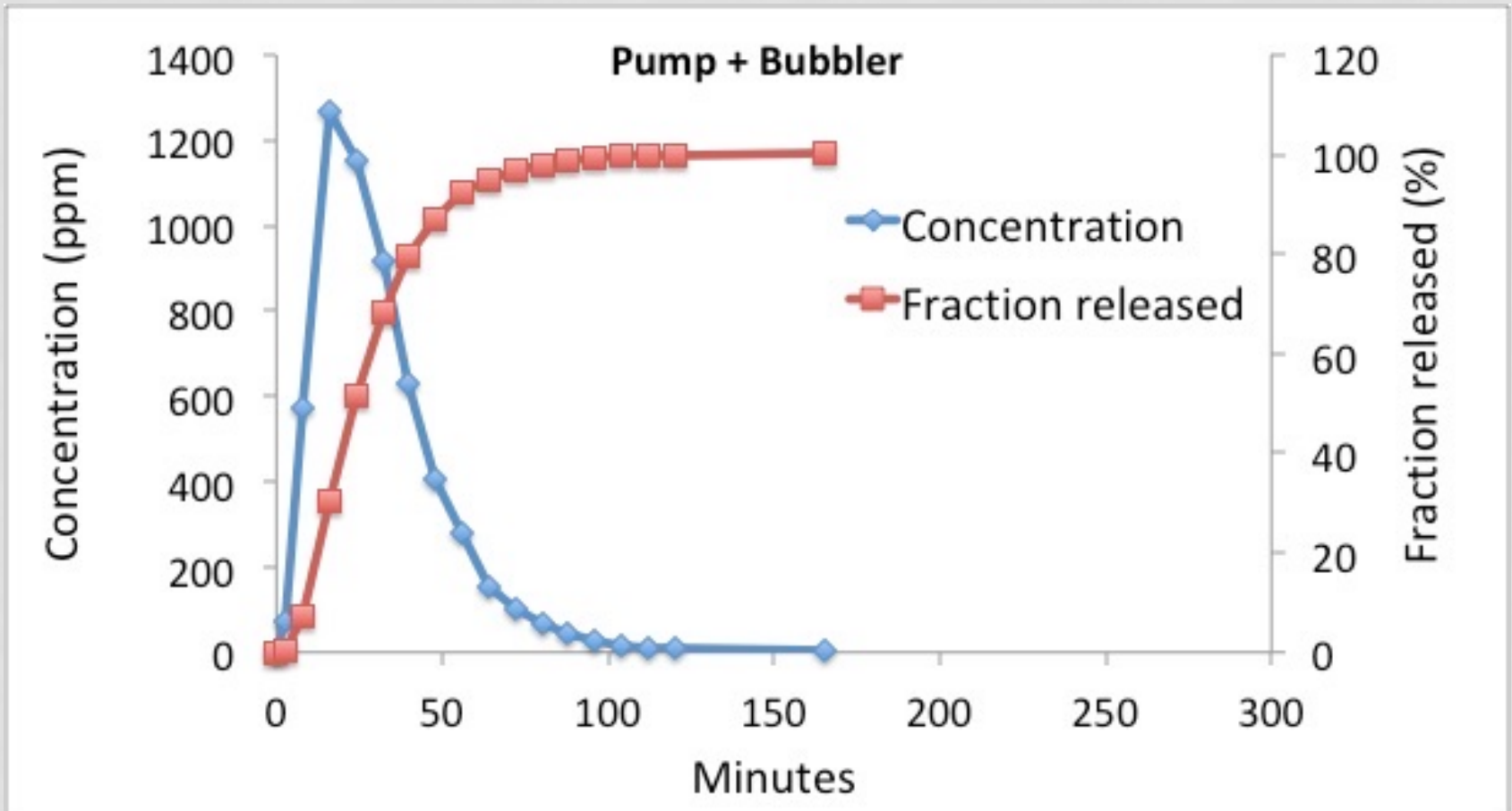
TOTAL: 100.0%

EPA REGISTRATION NO. 95270-1

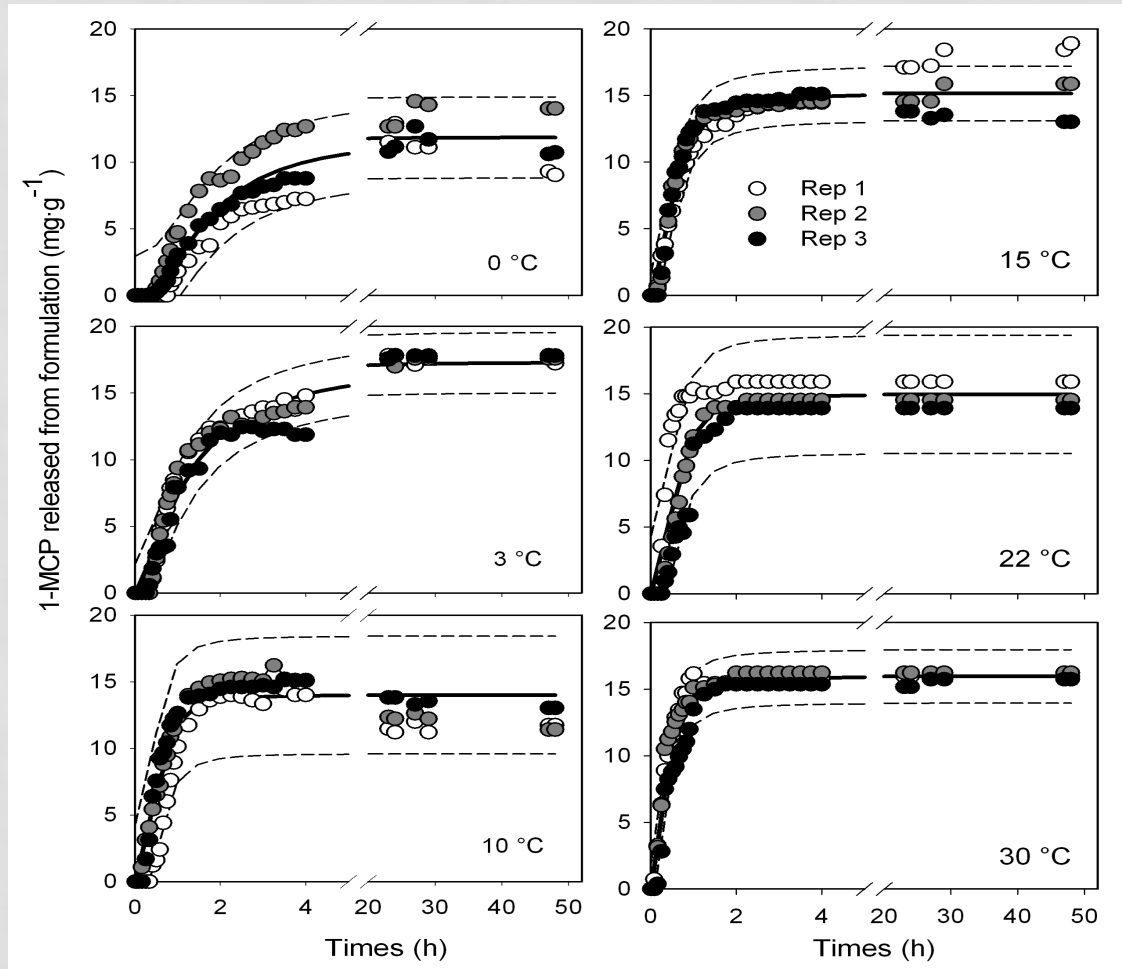
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1-MCP RELEASE KINETICS

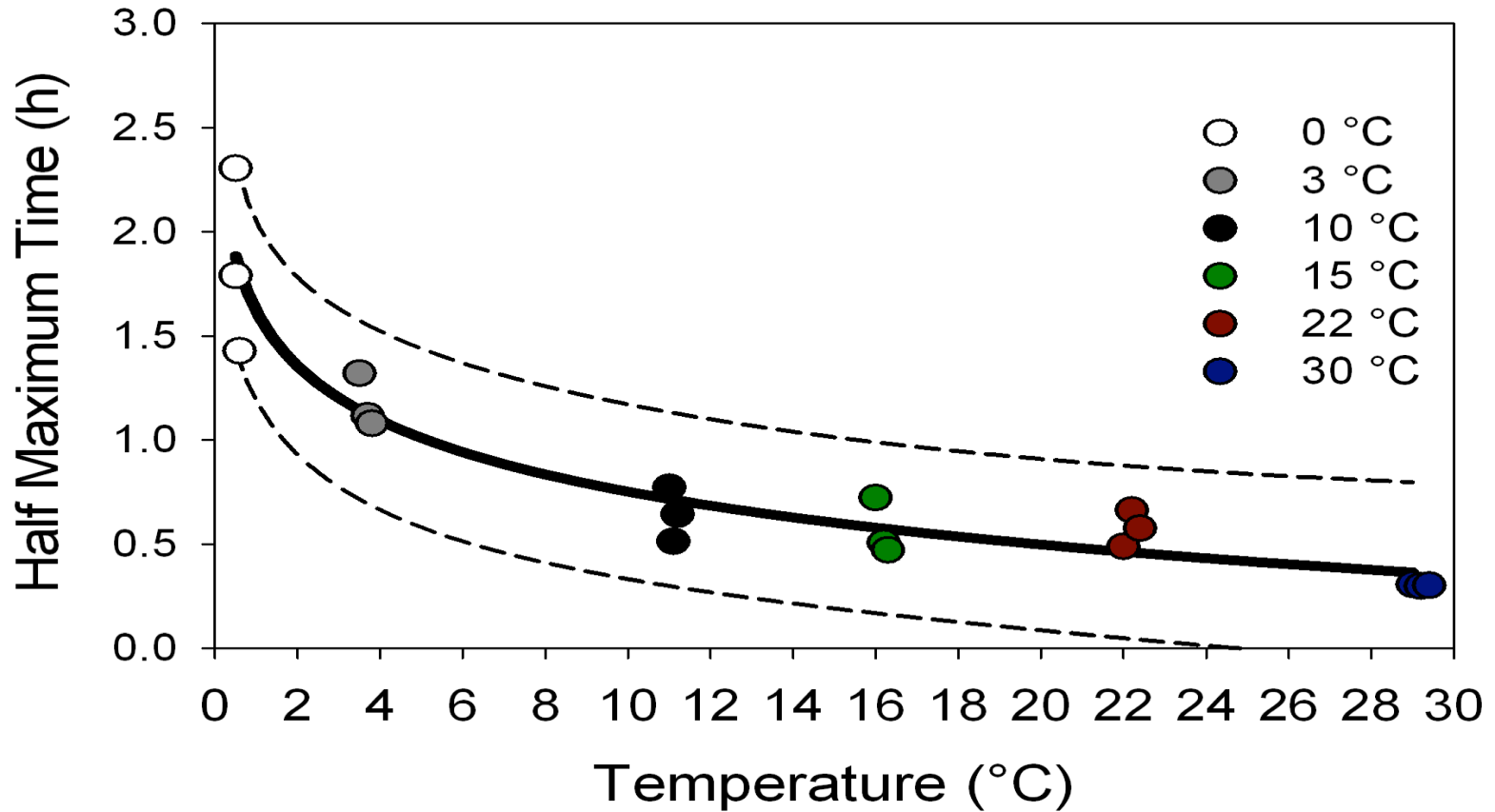
Room Temperature



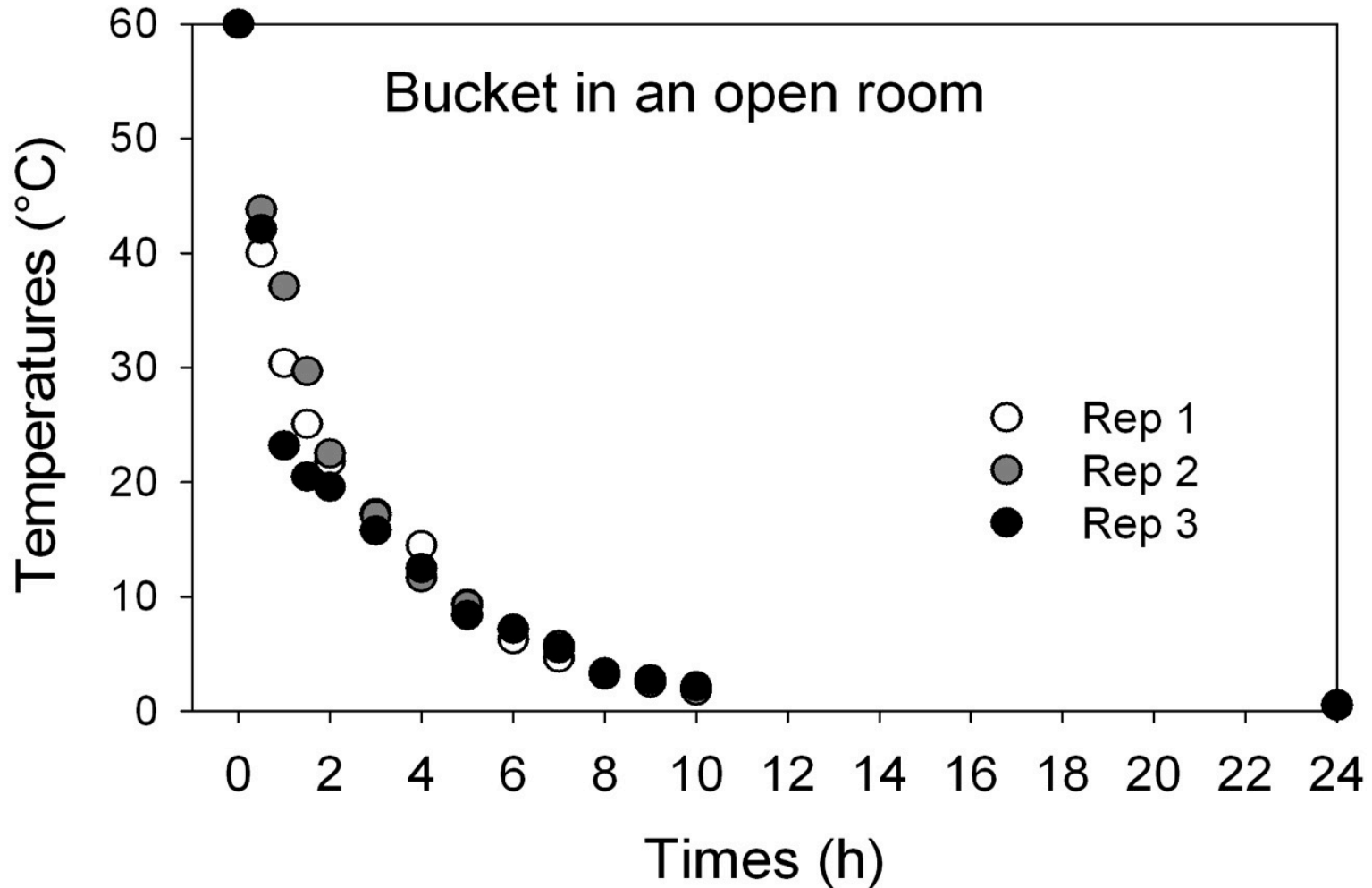
1-MCP RELEASE KINETICS



1-MCP RELEASE KINETICS



1-MCP RELEASE KINETICS



HAZEL GOT US THINKING...

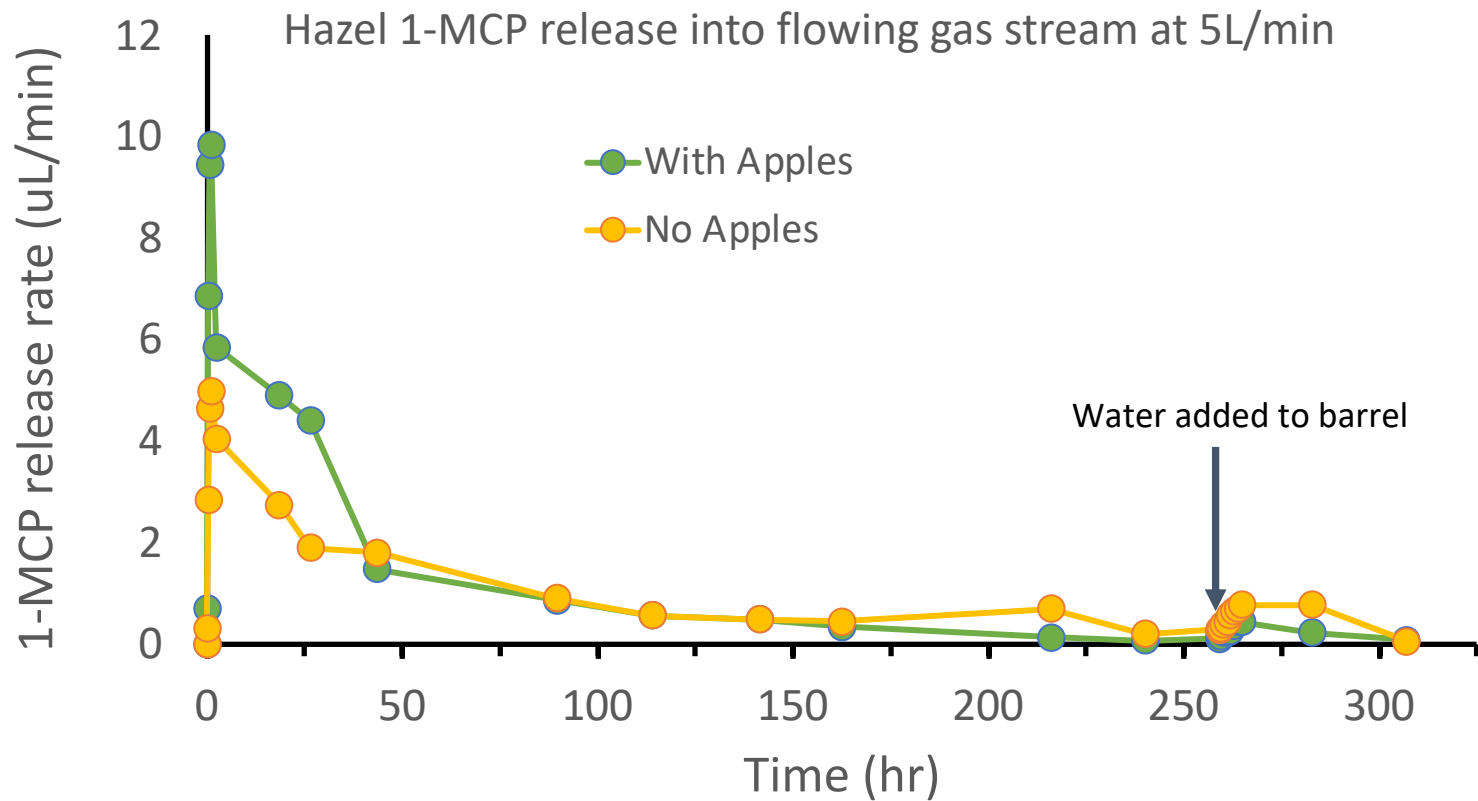


ABOUT AGROFRESH AND UNCONTROLLED ENVIRONMENTS



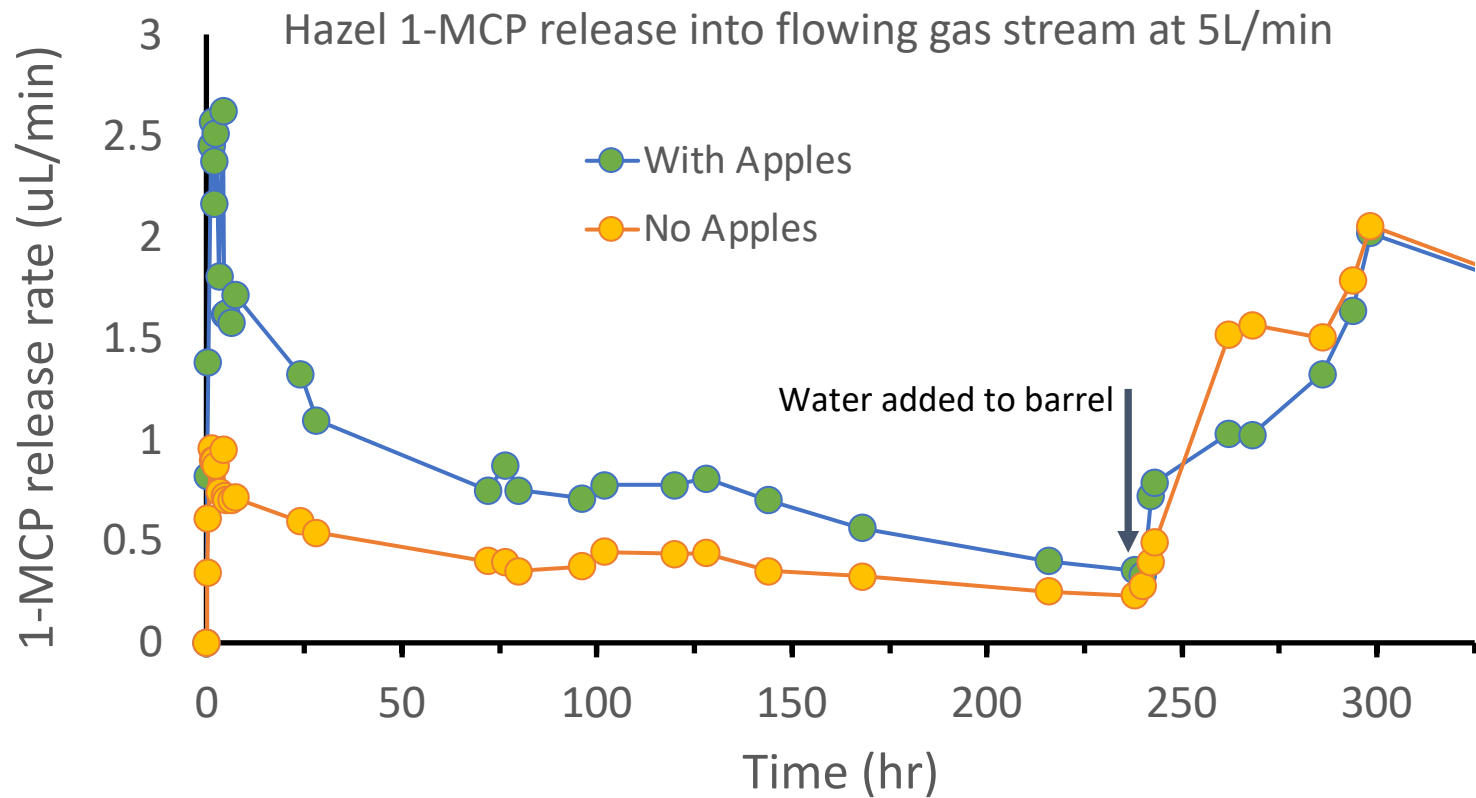
1-MCP RELEASE FROM HAZEL SACHETS

Room Temperature



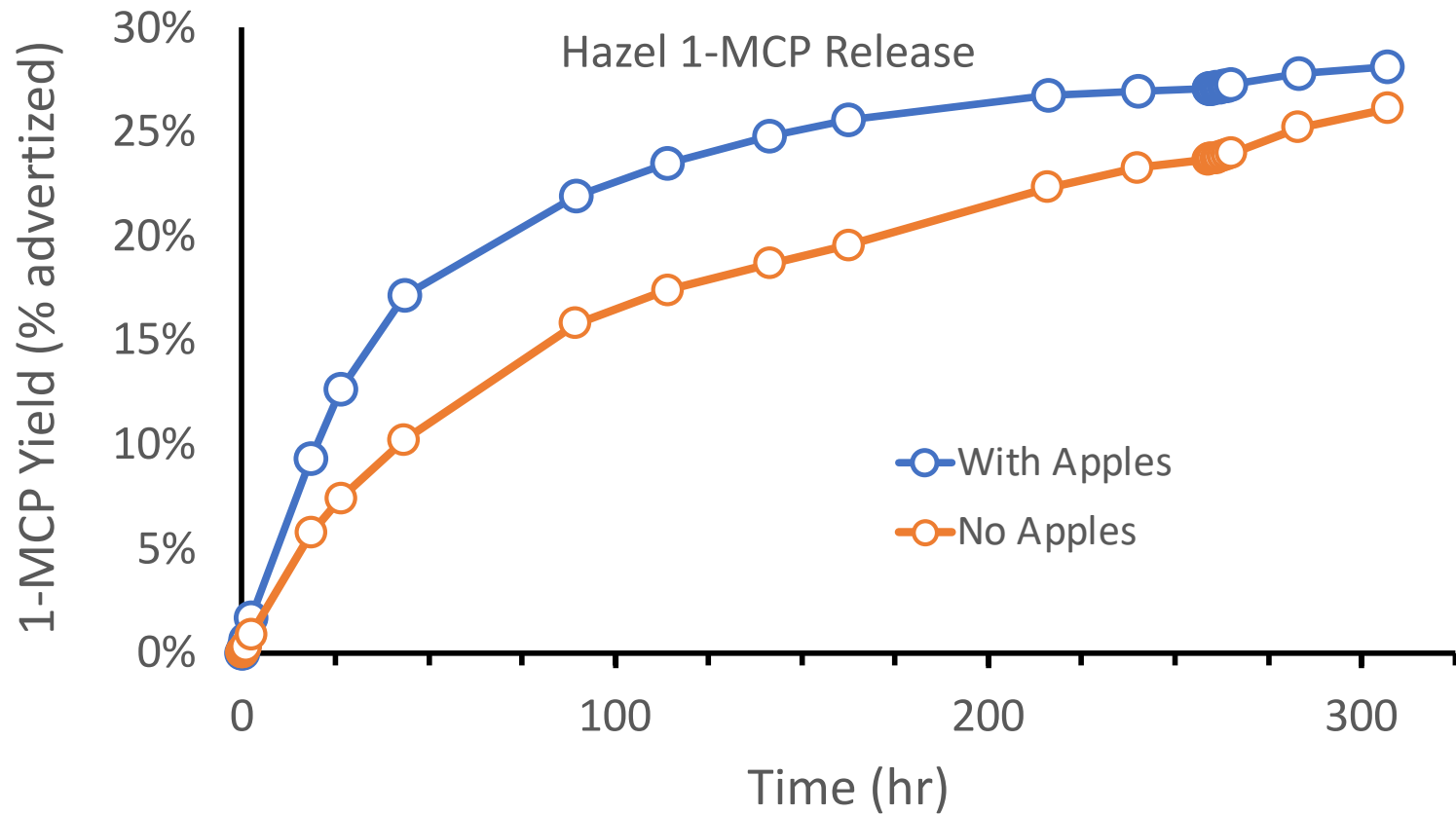
1-MCP RELEASE FROM HAZEL SACHETS

Cold room

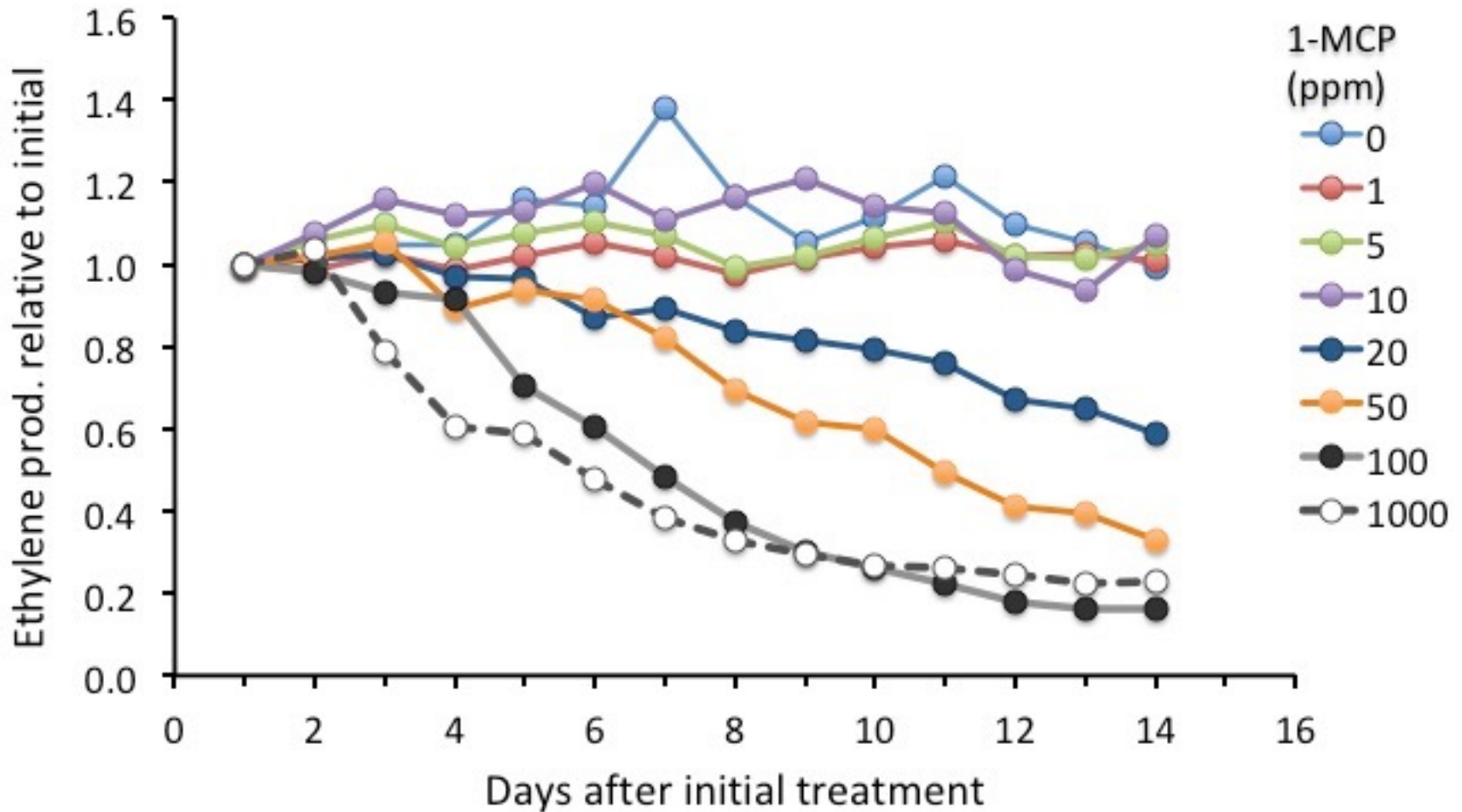


1-MCP RELEASE FROM HAZEL SACHETS

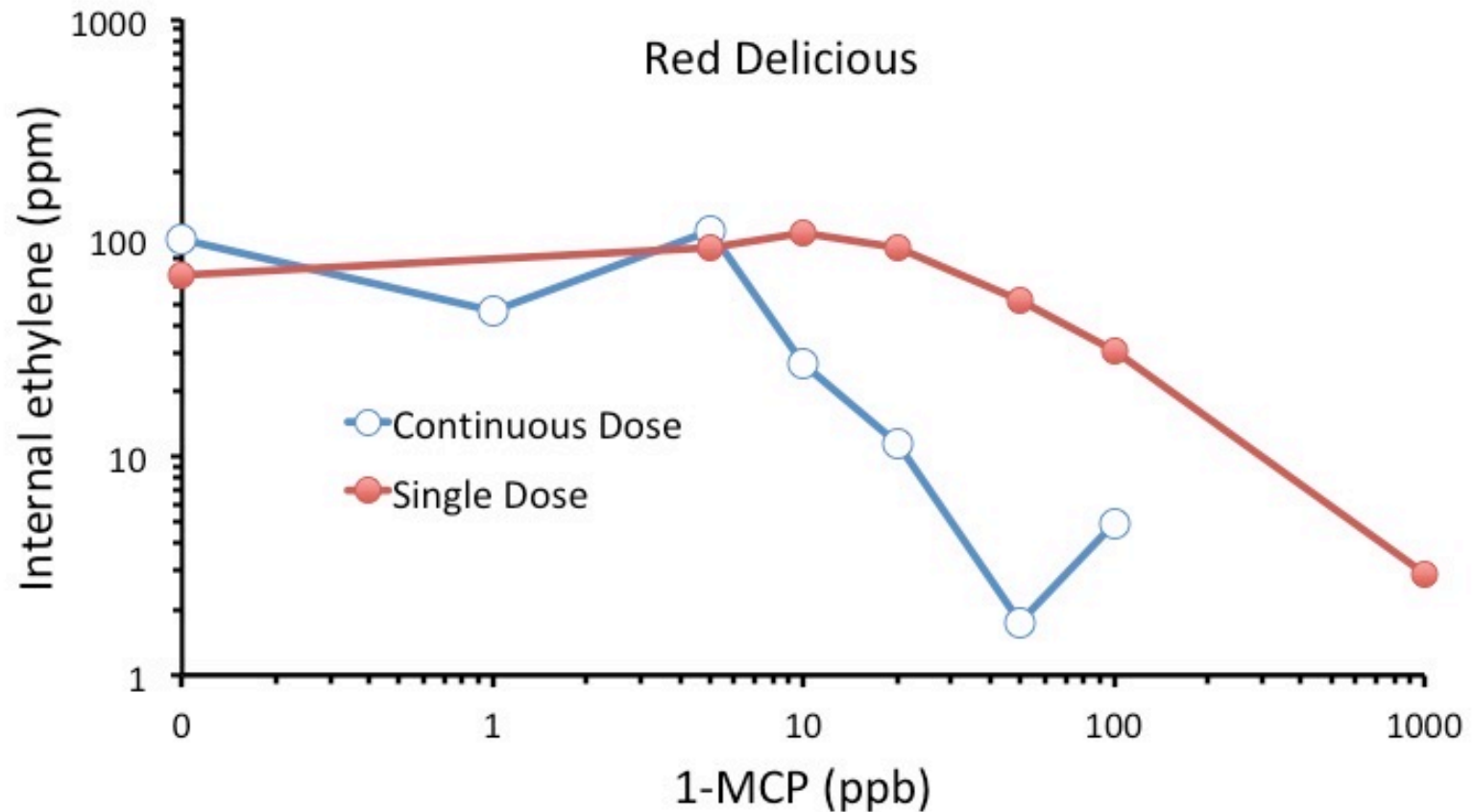
Cold room



ETHYLENE INHIBITION FOLLOWING HARVEST



ETHYLENE INHIBITION FOLLOWING HARVEST



AND YET MORE ALTERNATIVES!

VerdantTM
TECHNOLOGIES



HarvestHoldTM
Verdant
TECHNOLOGIES

*Innovative post-harvest solution can now be used on a
wider variety of fruits and vegetables*

SO, WHAT IS THE TAKE-HOME?

1-MCP is 1-MCP, but delivery of an effective dose is critical.

Providing an effective dose is 'easy', but it pays to know the details – warm water, sealed room, dose detection.

Conceptually, extreme low doses CAN be effective, but they need to be maintained for an extended period (min dose ~ 18 ppm-h for apples).