OsmoPro

Heat, Drought, Salinity, Cold

- Increases vield
- Reduces damage caused by osmotic pressure, e.g. fruit cracking, tip burn
- Improves flower retention and fruit setting
 Enhances photosynthesis and nitrogen fixation
 - Enhances coloration and uniformity
 - Is Natural and Safe
 - OMRI Listed for organic applications

OsmoPro is the purest commercial form of glycine betaine (trimethyl glycine), one of the plant's biological osmotic regulators. It is non - chemically extracted from sugar beet and is a minimum 97% active glycine betaine.

OsmoPro is an easily applied foliar spray for open field vegetables, orchards, vineyards, turf and other plants.

Glycine Betaine is a water soluble osmoprotectant found in many organisms and plants. In nature, it is synthesized and accumulated in response to environmental stress to protect the plant cell. When sprayed on the plant canopy, OsmoPro penetrates through the plant surface and translocates throughout the plant within 24 hours. It then remains metabolically active for a minimum of 21 days.

Glycine betaine is a very small molecule and carries positive and negative charges but overall is neutral which accounts for some of its physiological properties.

In a patented process, glycine betaine is obtained by chromatographic separation from sugar beet molasses.

Mode of Action

OsmoPro acts as an osmoprotectant in the plant, regulating water flow between the inside and the outside of the plant cell. Under conditions of environmental stress. OsmoPro helps

to maintain the normal osmotic balance and thereby plant cell metabolism resulting in enhanced photosynthesis and nitrogen fixation.

In a well hydrated plant with good quality water there is an osmotic balance within the cell. However, when there is excessive external water, such as in high humidity and/or high levels of rain, the outer cell solution becomes more dilute (hypo-osmotic), water flows into the cell, ultimately causing it to swell which, if allowed to continue, can lead to breaking of the tissue and cracking in fruit.

Where there is a lack of water, extreme temperatures or high salinity, the outside cell solution concentration is higher than the inner (hyperosmotic) and water flows out of the cell to redress the osmotic balance.

This reduction in cell water content can result in:

- Enzyme and protein denaturation, even destruction of the cell membrane.
- Increase in cell solutes concentration blocking the cellular reactions.
- A resulting slow down in plane cellular processes such as photosynthesis, respiration, etc. and ultimately a reduction in quantity and quality of the harvest.





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OsmoPro The Natural way to help the plant overcome Environmental Stress





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Technical Data Chemical name - trimethyl glycine

- CAS-N° 107-43-7
- Purity minimum 97%
 Highly soluble in water 1.6/1
 Low Molecular Wt 117

Glycine-betaine





Application and Rates: OsmoPro is applied as an aqueous solution to the canopy. Adjuvant is recommended in order to maximize penetration through the leaf surface.									
Crop	Application Rate	Application Volume	Application Timing	Trial Locations	Target Effect	Results			
le Trees	4.4 - 6.0 lbs / acre	5 gallons / tree	mid-flowering						
bage	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre	, and the second s	Buenget, Philippines	yield	32% increase			
sicum	1.75 - 3.5 lbs / acre	30 - 85 gallons / acre	mid-flowering	Thailand & Spain	yield / flower drop	20-30% increase; bigger fruit			
rot	1.75 lbs / acre	20 - 50 gallons / acre	during vegetative development - single spray						
rry	2.2 - 4.4 lbs / acre	5 gallons / tree	1st at 50% fruit pink/red, 2nd at 75% fruit pink/red - 2 applications	California Spain & Australia	cracking / yield	cracking reduction of 30-60%; 15% increased wt			
ck Peas	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre	1 / 11	India	cold stress	chill damage reduced by 63%			
us Tree	4.4 - 6.0 lbs / acre	5 gallons / tree	mid-flowering			5			
US	2 - 4.4 lbs / acre	4 gallons / tree	beginning of flowering - single spray						
nges tarines gelo nons				Thailand, Cyprus Spain Arizona Spain	yield cracking / yield yield yield	18-57% increase; + 15% fruit / tree 63% cracking reduction; 5% increase fruit / tree 43% increase in gross yield 46-50% increase			
umber	1.75 lbs / acre	20 - 50 gallons / acre	during flowering - every 3 weeks during flowering		,				
plant	2.2 lbs / acre	30 - 50 gallons / acre	mild flowering - single spray	Italy, Spain & Philippines	yield	11-19% increase			
pes (table)	1.75 - 3.5 lbs / acre	30 - 85 gallons / acre	2 treatments, 1st beginning of ripening, 2nd two weeks later	Spain	cracking	reduction of 40 & 63%; less incidence of botrytis			
pes (wine)	1.75 - 3.5 lbs / acre	30 - 85 gallons / acre	2 treatments, 1st beginning of ripening, 2nd two weeks later	Tasmania	yield	28-51% increase			
en Beans	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Tarragon, Spain	yield	17-25% increase			
ourg Lettuce	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Finland (open field)	tip burn	19% reduction and improved recovery			
è.	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Thailand	vield	4.6-51.8% increase			
on	1.75 lbs /acre	20 - 50 gallons / acre	early to full flowering, single spray or 1st beginning of flowering & 2nd 3 weeks after	Spain	yield	20-76% increase			
e Trees	2 - 4.4 lbs / acre	5 gallons / tree	early flowering						
r Trees	4.4 - 6.0 lbs / acre	5 gallons / tree	mid-flowering	France	calcium uptake	60% improved rot after 6 days storage reduced from 50% to 6%			
ato	1.75 lbs / acre	20 - 50 gallons / acre	at tuber initiation (25cm leaf stage)	Buenget, Thailand	yield	37% increase in # of tubers & 46% increase gross			
2	1.75 - 2 lbs / acre	20 - 50 gallons / acre							
e (jasmine)	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Jamckook, Thailand	flower cover	x's 6 increase			
ash	1.75 lbs / acre	20 -50 gallons / acre	single spray or 1st beginning of flowering & 2nd 3 weeks after						
wberries	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Malaysia Kansas State Univ	yield cold stress	17% increase increased cold tolerance of leaves 2-fold improved freezing survival & regrowth in plants			
nato (process)	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Greece & Philippines					
nato (table)	1.75 - 2 lbs /acre	30 - 50 gallons / acre	beginning of full flowering, then every 3 weeks, 2-3 times	California Spain & Italy	yield	5-45% increase; heat and salinity stressed			
	1.75 - 3.5 lbs / acre	20 - 50 gallons / acre	1st at beginning of inter., 2nd at beginning of summer						
ermelon	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Tasmania	yield	28-51% increase			
		2							

Crop	Application Rate	Application Volume	Application Timing	Trial Locations	Target Effect	Results
Apple Trees	4.4 - 6.0 lbs / acre	5 gallons / tree	mid-flowering			
Cabbage	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre	·····e································	Buenget, Philippines	vield	32% increase
Capsicum	175 - 3 5 lbs / acre	30 - 85 gallons / acre	mid-flowering	Thailand & Spain	vield / flower drop	20-30% increase: bigger fruit
Carrot	1.75 lbs / acre	20 - 50 gallons / acre	during vegetative development - single spray			
Cherry	2.2 - 4.4 lbs / acre	5 gallons / tree	1st at 50% fruit pink/red, 2nd at 75% fruit pink/red - 2 applications	California Spain & Australia	cracking / yield	cracking reduction of 30-60%; 15% increased wt
Chick Peas	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		India	cold stress	chill damage reduced by 63%
Citrus Tree	4.4 - 6.0 lbs / acre	5 gallons / tree	mid-flowering			, ,
Citrus Oranges Nectarines Tangelo Lemons	2 - 4.4 lbs / acre	4 gallons / tree	beginning of flowering - single spray	Thailand, Cyprus Spain Arizona Spain	yield cracking / yield yield vield	18-57% increase; + 15% fruit / tree 63% cracking reduction; 5% increase fruit / tree 43% increase in gross yield 46-50% increase
Cucumber	1.75 lbs / acre	20 - 50 gallons / acre	during flowering - every 3 weeks during flowering		,	
Eggplant	2.2 lbs / acre	30 - 50 gallons / acre	mild flowering - single spray	Italy, Spain & Philippines	vield	11-19% increase
Grapes (table)	1.75 - 3.5 lbs / acre	30 - 85 gallons / acre	2 treatments, 1st beginning of ripening, 2nd two weeks later	Spain	cracking	reduction of 40 & 63%; less incidence of botrytis
Grapes (wine)	1.75 - 3.5 lbs / acre	30 - 85 gallons / acre	2 treatments, 1st beginning of ripening, 2nd two weeks later	Tasmania	yield	28-51% increase
Green Beans	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Tarragon, Spain	yield	17-25% increase
Iceburg Lettuce	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Finland (open field)	tip burn	19% reduction and improved recovery
Kale	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Thailand	vield	4.6-51.8% increase
Melon	1.75 lbs /acre	20 - 50 gallons / acre	early to full flowering, single spray or 1st beginning of flowering & 2nd 3 weeks after	Spain	yield	20-76% increase
Olive Trees	2 - 4.4 lbs / acre	5 gallons / tree	early flowering			
Pear Trees	4.4 - 6.0 lbs / acre	5 gallons / tree	mid-flowering	France	calcium uptake	60% improved rot after 6 days storage reduced from 50% to 6%
Potato	1.75 lbs / acre	20 - 50 gallons / acre	at tuber initiation (25cm leaf stage)	Buenget, Thailand	vield	37% increase in # of tubers & 46% increase gross
Rice	1.75 - 2 lbs / acre	20 - 50 gallons / acre	(· · · · · · · · · · · · · · · · · · ·	<u> </u>	j	
Rice (jasmine)	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Jamckook, Thailand	flower cover	x's 6 increase
Squash	1.75 lbs / acre	20 -50 gallons / acre	single spray or 1st beginning of flowering & 2nd 3 weeks after			
Strawberries	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Malaysia Kansas State Univ	yield cold stress	17% increase increased cold tolerance of leaves 2-fold improved freezing survival & regrowth in plants
Tomato (process)	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Greece & Philippines		
Tomato (table)	1.75 - 2 lbs /acre	30 - 50 gallons / acre	beginning of full flowering, then every 3 weeks, 2-3 times	California Spain & Italy	yield	5-45% increase; heat and salinity stressed
Turf	1.75 - 3.5 lbs / acre	20 - 50 gallons / acre	1st at beginning of inter., 2nd at beginning of summer			
Watermelon	1.75 - 3.5 lbs / acre	100 - 250 gallons / acre		Tasmania	yield	28-51% increase



