



Dazitol™

Effect of Dazitol and Methyl Bromide on Phytoparasitic Nematodes in Tomatoes, with Untreated Control

International Conference on Methyl Bromide Alternatives
Alternatives Fair

Lisbon, Portugal

28 September 2004

Jonathan Slevin, Champon Millennium Chemicals



Topics

- Dazitol™: The Product
 - Ingredients and Qualities
 - Climates, Soils, Crops
- Commercialization
- Economic Feasibility
- Recent Field Study:
“Effect of Dazitol™ and MBr On Phytoparasitic Nematodes In Tomatoes, With Untreated Control”
- A Few Other Grower Experiences
- UNEP, Critical Use Exemptions, and Dazitol™



What is Dazitol™?

- Patented technology using blend of plant extracts as pesticides
- Ingredients
 - Capsaicin and related capsaicinoids (Chilis)
 - Allyl isothiocyanate (from Essential Oil of Mustard)
- Dazitol™ and methyl bromide are the only US EPA-registered products with nematicidal *and* fungicidal efficacy



Dazitol™

- Meets Food Quality Protection Act requirements of 1996
- Waiver of Tolerance from the US EPA
- Bio-degradable into organic matter
- Manufactured in FDA-approved food processing plant
- Not harmful to humans, animals, or the environment

Essential Oils from Plants Provide Major Benefits as Chemical Pesticides



Cucumber crop in Jordan Valley using Champon's Dazitol as soil fumigation instead of methyl bromide





Dazitol™ Proven Efficacy: Climates and Soils

Commercialized and/or Trials on Grower Fields

Greece, Turkey, Morocco, Jordan
Valley, Jordan Highlands, Lebanon, UAE,
Kuwait, Israel, Chile, Mexico, Colombia,
Brazil, Argentina, Thailand, U.S.



Dazitol™ Proven Efficacy: Crops

- Tomatoes
- Cucumbers
- Melons
- Olive trees



Dazitol™ Is Replacing Methyl Bromide Worldwide

Registered

Chile, Jordan, UAE, Kuwait, U.S.

Registrations Pending

Morocco, Saudi Arabia, Mexico, Peru, Egypt, Israel, Argentina, Colombia, Thailand, Egypt, Spain, Greece, Turkey, Egypt, Iraq, Kuwait, UAE, Israel, Chile, Mexico, Peru, Colombia, Thailand

Production Capacity
Production Plant

Can supply worldwide need
Carlstadt, N.J.; other global locations as needed

Apply Dazitol™ by Drip Irrigation (or by Shank Injection)



Protocol for Application of Dazitol™

- 1) Dazitol™ Concentrate is used at a 15% rate of MBr.
- 2) Prepare the land for planting. Till the soil, make the beds or prepare the rows & lay the drip system. **MAKE SURE THE DRIP SYSTEM RUNS PROPERLY.**
- 3) We recommend that you use plastic as in MBr. The plastic reduces volatilizing and helps control weeds.
- 4) Three to five days prior to planting, apply Dazitol™ Concentrate. Dazitol™ is a liquid and passes through the drip system easily using an injector.
- 5) Run water through the drip system to fill the lines. Check the end line to make sure that the water is completely through the system.
- 6) Once the lines are filled with water, start the Dazitol™ Concentrate. To apply Dazitol™ Concentrate, it is best to set up an injector at the entry line to the greenhouse or field. Place Dazitol™ Concentrate in to a container with the amount of Dazitol™ Concentrate that you need to apply in that field or greenhouse. Set the injector to inject Dazitol™ for 15 to 20 minutes maximum. Because each irrigation system has different water pressures, work on the timing of Dazitol™ and not as much on the amount of water.
- 7) Run the water until all the Dazitol™ has emptied through the system. Observe the end of the line. Once the water becomes clear, turn the system off.
- 8) Wait 3 to 5 days and plant

Economic Feasibility— Dazitol™ vs. Methyl Bromide

	Dazitol™	Methyl Bromide
Price per acre: Based on MBr use of 350 Lbs/acre and Dazitol™ use at 15% of MBr = 53 Lbs/acre	\$504.56/acre* ($\$9.52/\text{LB} \times 53 \text{ LBS}$) Product cost to farmer	\$1,137.50/acre* ($\$3.25/\text{LB} \times 350\text{LBS}$) Product cost to farmer
Yield	Yields are the same or better	Shorter lifespan for crops than with DazitolJ
Equipment costs	Injector for \$200 , lasts for years + field hand for a few minutes	Tractor, shank injector; PPE due to harmful chemical; deadly gas
Production cycle	Plant 3 days after application; can reapply Dazitol™ while plant is growing	Plant 21 days after application; cannot reapply MBr , since MBr will kill the plant
Fumigation costs	Apply thru drip irrigation or shank injection ; less PPE; plastic recommended; no storage problems	Cannot apply thru drip irrigation ; tractor, nitrogen tank, plastic, certified applicators, usage restrictions; storage issues
Toxicity (safety, health, liability costs)	“Caution” label. Reduced overhead and lifecycle costs cf. to MBr; immediate reentry	“Danger. Poison. Highly toxic. May be fatal.” Worker safety and grower liability issues

Dazitol™ vs. Methyl Bromide— Total In-the-Field Cost Comparison

	Dazitol™	Methyl Bromide
Product Cost	One-half of methyl bromide	
Application cost	\$10/acre*	\$800** + per acre ??
TOTAL COST	\$515/acre	\$1,937/acre

*To apply Dazitol™ by drip irrigation, there is a one-time cost of \$200 for an injector + the labor cost of a farm hand to turn the knob. Thus \$10 an acre.

** Estimated cost

Note: Numbers are based on MBr cost of \$3.25/LB. UN uses \$5/LB (March 2004). Some large US growers are paying \$2.75/LB. Cost in Europe is about \$7/LB.

Note: Transfer of Dazitol™ (a liquid) is from the storage container directly into the drip irrigation system. It is a closed delivery system and nobody ever touches Dazitol™. Dazitol™ can also be applied through shank injector.



Dazitol™ Study by Erwin Aballay, University of Chile July 2004

Effect of Dazitol™ and Methyl Bromide
On Phytoparasitic Nematodes In
Tomatoes, With Untreated Control

*Erwin Aballay E., University of Chile
Agronomy Engineer, M. Sc., Nematologist*



Tomatoes in Greenhouses

- Rapel Zone in Chile
- Summer/fall variety of tomatoes (Yonit)
- Application followed three years of monoculture with no fumigants use
- Therefore, a high rate of nematodes

Nematode Populations Pre-Application Soil Sample

<u>Species</u>	<u>no / 250 cm³ of soil</u>
<i>Xiphinema americanum</i> s.l.	235
<i>Meloidogyne</i> ssp	105
<i>Pratylenchus</i> sp.	35
<i>Trichodoridos</i>	370
<i>Nematodes saprofagos</i>	580



Soil Characteristics

pH:	7.2
Organic Matter:	1.82%
C.E. (dS/m):	1.53
N (ppm):	19
P (ppm):	114
K (ppm):	530



Planting Density And Irrigation

- Tables 120 cm apart
- 80 cm wide
- Plants every 20 cm on the tables
- Irrigation through two tapes per table
- 4 liters of water per meter of tape



Application: Dazitol™ and Methyl Bromide

- Dazitol™ applied 8 days before planting
- Dazitol™ diluted in pool of 100 liters of water [note: not recommended]
- Dazitol™ then injected through irrigation system for 40 minutes
- MBr applied using gas cylinders, each 10 ms² of surface
- Tables watered for 2 hrs, 2 days before planting

Dazitol™ Diluted in Water and Injected Into the Irrigation System



Figure 2:

General View of the Culture





Treatments

- Dazitol™, 40 l/ha
- Dazitol™, 80 l/ha
- Dazitol™, 120 l/ha
- Methyl bromide, 45 g/m²
- Control, without treatment



Evaluation Method: At 60 Days And At Harvest (120 Days)

- Measured
 - Dry weight of aerial part
 - Sanitary state of the radical system
 - Entered number of nodules caused by *Meloidogyne* sp.

Table 1: Evaluation of plants, health and damage in roots 60 days post planting

Treatment	n. j2 <i>Meloidogyne</i> sp./250 cm ³ of ground		R	% control	Dry weight aerial part (g)
	before	60 days			
Dazitol 40 l/ha	471	78	0.17 a	91.9	41.8 b
Dazitol 80 l/ha	445	97	0.22 a	89.3	48.8 b
Dazitol 120 l/ha	399	125	0.31 a	84.7	43.7 b
Methyl Bromide 45 g/m ²	167	53	0.32 a	84.6	85.6 a
Control	320	655	2.05 b	-----	39.3 b

R: reproductive rate. Previous to ANDEVA, the data were transformed to log (x+1). Different letters in the same column indicate significant differences (P<0.05).

Table 2: Results 120 Days After Transplanting, At The Start Of Harvest

<i>Treatment</i>	<i>n. j2 Meloidogyne sp./250 cm³ of ground before harvest</i>		<i>R</i>	<i>% control</i>	<i>Yield k/plant</i>
<i>Dazitol 40 l/ha</i>	471	108	0.23 ab	87.9	3.75 b
<i>Dazitol 80 l/ha</i>	445	27	0.06 a	96.8	3.65 b
<i>Dazitol 120 l/ha</i>	399	80	0.2 a	89.7	3.90 b
<i>Methyl Bromide 45 g/m²</i>	167	289	1.73 b	8.7	3.85 b
Control	320	607	1.90 b	-----	3.05a b

Values are average of 4 repetitions. R: reproductive rate. Previous to ANDEVA, the data were transformed to log (x+1). Different letters in a same column indicate significant differences (P<0.05).



Final Report: Dr. Aballay's Comment

“The dose of methyl bromide could be less than what might be used in fields with very high infestation, but this is the dosage the distributor recommended for the use of gas cylinders.”



Dazitol™ Compared To MBr-Treated Area and Untreated Control

“Areas treated with Dazitol™ – in the 3 different doses – maintain as inferior levels of populations of nematodes as possible.”



Dazitol vs. MBr in Florida Commercial Field Trial

“Dazitol™ was found more effective than methyl bromide to control various pests of tomato (var. Carmello) in Manley Farms.”

Dr. Dakshina Seal,
University of Florida Nematologist



Field Trials: Nematode Study on Gonzalez Farm, Florida Tomatoes

Gonzales Farms, South Florida, 1998

- Pre-treatment samples
 - 410 - 440 nematodes per 250 cc of soil
- 4 days post soil treatment
 - 290 of 410 nematodes dead: 60%
- 5 days post treatment, 90% kill of 440 nematodes
 - 305 rootknot nematodes -- 100% dead
 - 20 stubby nematodes -- 100% dead
 - 5 spiral nematodes -- 100% dead
 - 110 stunt nematodes -- 60% dead
- Thus, **90% kill and 100% of major nematodes**



Field Trials in Jordan, 2002 - '03 Farm of Eng. Ziad Tommalieh

Problem: “Huge infestation of nematodes”

Action: Dazitol™ Trials for two years

Results:

No nematode infestation July – Sept.

No infestation of fungus

Increase in productive life of the plant

80 greenhouses of 500 sq. meters + 50 acres of open field farmland. Crop: cucumbers



Ziad Tommalieh: Presentation to U.S. MBr Conference, 2003

**“Dazitol™ is without question
the alternative to methyl bromide.”**

**“I personally experienced that Dazitol™ increases yields
by 20 percent. It is cost effective, and is environmentally
safe and effective.”**

Eng. Ziad Tommalieh, leading Jordan Farmer; Member:
Jordan Agriculture Engineers Union, INCART,
Jordan GAP Declaration Committee; US AID consultant

Alghzawi Farm

Aug. 28, 2003 – Dazitol™ Is Applied



Soil is fumigated with Dazitol™ in 29 tunnels



“I can’t grow cucumbers without methyl bromide.”

Nov. 21: Yield of 20 Cases Per Tunnel Each Day





Kamal Alghzawi Compares Dazitol™ to MBr as Soil Fumigant for Cucumbers

“I couldn’t grow here before. **Now with Dazitol™ I’ve never seen such a beautiful crop.**”

“Farmers using methyl bromide have dead plants, while I’m harvesting 20 cases of cucumbers a day per tunnel.”

“I think the plants will produce into late January. This has never happened before in Jordan.”

- 2 December 2003

“My yields are 30% more than with methyl bromide.”

- 2 January 2004

“It is now January 28, and the plants are still producing.”

- Kamal Alghzawi
28 January 2004



Lebanon Grower Report After Two Years of Dazitol™ on Tomatoes

**Fady Daw, Agricultural Engineer; DSPU Horticulture;
Organic Consultant**

Site: Fady Daw's organic farm
500 sq. meter greenhouse

Area: 700 meter altitude, in Byblos, Lebanon

Crop: Tomatoes

Application: April 2002



Lebanon Grower Report After Two Years of Dazitol™ on Tomatoes

Problem

“The greenhouse was infested in the previous season with: Fusarium, Botrytis, Sclerotinia, Aphids, White fly, and Lyriomisa.

Results

“In summer 2002, after applying Dazitol™:

- I did not have any damp off after planting”
- I saw very few insects during the growing season”
- I only had to spray one time (organic pesticide) and 3 times with sulfur and Copper sulfate during the summer growing season
- The crop lasted in economical production for 5 months”



Benefits from Dazitol™: By Fady Daw, Lebanon Grower

“During the growing season with my crops where I used Dazitol™ I observed:

- Absence of serious infection
- Reduction of pesticide use
- Production increase of 20 - 25 percent
- A very healthy root system
- Easy application; no special equipment needed
- Short term of application: only 10 days needed to clean soil
- Dazitol™ is safe for the environment and for humans”



Lebanon: Grower Report

“I’ve used Dazitol for two years on my tomato crops. My yields are 30% more than when I used methyl bromide.”

Fady Daw, Farmer in Lebanon
Regional Expert on Organic Farming
January 2, 2004

Growers Are Switching to Dazitol™ Based On Technical, Economic, Environmental Feasibility



Thank You

Jonathan Slevin, General Manager
Champon Millennium Chemicals, Inc.
570 Herndon Parkway, Suite 500
Herndon, VA 20170
703 766-3787 Fax: 703 689-4417
jslevin@kswproducts.com

Louis Champon, President
Champon Europe
Bordeaux, France
champon@ix.netcom.com