DAZITOL
The Replacement for Methyl Bromide Pre-plant Usage

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Introduction

I'm using the same title in this year's presentation as I did in my last paper, two year's ago at this same conference in this same city of Orlando. This is not because I'm unimaginative, but because some things haven't changed.

Two years ago, there was no universally recognized replacement to methyl bromide preplant. That is still true today.

Two years ago, we provided test results and photographs from a handful of field and laboratory results using Champon's DAZITOL. In the midst of a tomato farm, we produced beautiful, large Florida tomatoes hanging from deep-green plants with strong roots, whole all around us, fields treated with methyl bromide and an assortment of insecticides brought forth light green plants with infested roots and leaves drooling with fusarium. Data showed our non-toxic, bio-degradable, cost-competitive, EPA-registered, liquid product derived from plants was more effective than methyl bromide.

Cautious research scientists from South Florida to Beltsville, Maryland, who conducted the tests, characterized DAZITOL as very promising. Some even said, amazing, and asked about our formula and our patent. After two decades of product research and testing, we were fully confident about announcing that the silver bullet replacement for methyl bromide pre-plant usage had been formulated, tested, approved by the EPA, submitted for patent, and was commercially available in quantities sufficient to satisfy 100 percent of U.S. market needs.

We called for USDA's Agricultural Research Service (ARS) to launch an aggressive study of plant extracts. We offered to collaborate with such an endeavor. We boldly predicted that our technological breakthrough would lead to a worldwide re-orientation away from toxic and ozone-depleting synthetic chemicals and in the direction of Natural Chemicals.

Two years later, with the methyl bromide soil treatment phase out soon to hit 50 percent, some things haven't changed. DAZITOL is still the only EPA-approved replacement for methyl bromide preplant. And, according to the USDA, there is still no *validated* replacement for methyl bromide preplant. We agree with the USDA. DAZITOL is still not validated in the marketplace.

DAZITOL Testing Worldwide –So Far So Good

This is not because further investigation has shown that DAZITOL doesn't work. On the

contrary, ongoing small-scale product use and independent testing by distributors and growers in the United States, Brazil, and Spain have in every instance brought great results. We keep expecting some failures. In these early days, usage levels and applications are still being developed for different soils, temperatures, and crops. But when distributors ask for all of our results—good and bad—we apologize to them, because nobody has brought back poor results. We are astounded at this product performance.

The only report of results inferior to that of methyl bromide or of any aspiring replacement was from a secretive study which allegedly used a related product, Insect Control Concentrate, with samples that we did not supply, using protocols we did not provide, resulting in data we have not seen, and funded by competitors. We are not aware of any legitimate research results that discredit DAZITOL as the replacement for methyl bromide preplant.

Yet with all this good news for growers, DAZITOL still isn't validated. The question then becomes, validated by whom? As we see it, validation involves 1) growers and distributors; and 2) ARS and university-based researchers.

Marketing of DAZITOL therefore has required a two-pronged approach. We needed validation from the industry—from distributors and growers—as they experience a product that works, is affordable, and available. We also needed validation from the community of researchers. They control the flow of information to growers, bureaucrats, and politicians. In the case of methyl bromide replacement research, these guardians at the gate are being enticed by buckets of federal research dollars and cultivated by commercial interests pursuing the eight and nine-figure annual sales revenue for an unserviced market being created by the banning of methyl bromide.

After the 1998 methyl bromide alternatives conference, we continued our efforts to establish a global network of distributors; and decided to solicit the help of the USDA for ongoing testing and—if our product proved worthy—eventual validation from the community of researchers largely supported by public funding provided by Congress to find and develop what we had.

We were (and still are) a small company, and soon learned that it took political clout and lots of money to participate in a USDA program. So we focused on the end-user, and went directly to distributors and growers. It is here that we have made great strides. Some of the test results are being held under confidentiality agreements between us and major companies. There are other results that we can share at the November 2000 Conference in Orlando.

For the first year, we slowly and steadily gained the attention and participation of distributors and growers. During the past eight months, activity has accelerated greatly, due to the impending 50% phase out and because the accumulated results from independent testing has begun to create a buzz.

ARS and Natural Chemicals

On September 28, 1998, Dr.Kenneth Vick, National Program Leader at ARS for Postharvest Entomology, wrote in response to our questions, "ARS continues to evaluate potential

alternatives to methyl bromide for soil fumigation, including essential oils. Some essential oils have shown some efficacy for certain methyl bromide targets in soil, but more thorough investigation is needed before their economic and technical feasibility can be established."

On October 15, 1998, Dr. Vick again wrote us in response to questions, and explained, "ARS has continued to do some research on the Insect Control Concentrate material referenced in the Locke/Bowers study on fusarium in 1997. At this point ARS is not clear on the relationship of this material to DAZITOL and do not know the applicability of these results to DAZITOL." Dr. Vick also explained in this letter, that ARS was spending $73,000 a year for its research on natural products, which includes essential oils, and did not expect to increase research on essential oils/plant extracts.

In March 1999, several years after we first introduced our technology and products to ARS, twenty months after Locke/Bowers of ARS began soil studies with our Insect Control Concentrate, and five months after Dr. Vick's representation to us that out of $71,901,327 spent by ARS from October 1992 – October, 1998, only $365,000 had been spent on naturals, (of which the work on essential oils/plant extracts was one small part), Dr. Vick's agency announced, indirectly, that they were taking our technology very seriously indeed. A news release and an ARS magazine article revealed that ARS had embarked on a research project into plant extracts in collaboration with Israeli and South African interests. The headline on March 3, 1999 read: "Natural Plant Extracts Could Be Methyl Bromide Substitute."

We were disappointed that ARS had not taken us up on our repeated offers of collaboration—presented when we first introduced them to our product and restated at the 1998 conference. We were dismayed that ARS was conducting independent research on technology we had introduced to them and for which we had applied for a patent. We were surprised that they had a research program underway of self-proclaimed promise apparently larger in scope than what we had been led to believe. And we were pleased that their research was validating our technology.

The article in the Agriculture Research magazine explained that ARS "was testing benzaldehyde and other natural plant volatiles in lab studies at Kearneysville, West Virginia, as possible alternatives to methyl bromide fumigation." ARS plant pathologist Charles Wilson and his colleagues "have found several natural plant volatiles that have fungicidal properties."

"We…used benzaldehyde to fumigate soil and found it very effective against several soil pathogens," said Wilson. "Since it is inexpensive, easily biodegradable, and breaks down into products that aren't harmful to humans, animals, or the environment, benzaldehyde would be a desirable alternative to methyl bromide as a soil fumigant."

According to the ARS reports, Wilson and Debra Fravel in Beltsville, MD found that "benzaldehyde controls several soil pathogens, including Fusarium oxysporum, Rhizoctonia solani, Pythium aphanidermatum and Sclerotinia minor."

We were having mixed feelings. We had succeeded in pointing ARS in the direction of plant extracts. This was good for agriculture, good for the country, and good for the world. Yet they

were proceeding without us—the pioneers of this technology—and the world's leading experts on benzaldehyde.

We thought, wistfully, that if only we had access to the resources of ARS, we could help advance the knowledge base of Natural Chemicals for agricultural use very, very rapidly. We continued on, and agreed with what we read. After all, it was what we had been saying for several years. Here are some statements from the article.

- In addition to comparing the efficacy of natural fumigants in different soil types and different applications, scientists will need to evaluate delivery systems – Charles Wilson.

- "The first order of business is to find, in the lab, the compound or combination of compounds that will control soilborne pests and diseases." –Charles Wilson

- "Then, we'll need to test these in soil and eventually begin field tests to complete the research." – Charles Wilson

- "These oils could also provide a rich source of new compounds that may fumigate soil, agricultural commodities, and physical structures." -- Charles Wilson

- More research is needed on the destructive, or biocidal, activity of natural plant compounds against a wide range of pathogens, insects, and weeds.

- **W**ilson and colleagues identified several essential oils extracted from herb and spice plants that have proven effective as fumigants, to control the most common stored-product insects-the rice weevil, lesser grain borer, sawtoothed grain beetle, and red flour beetle.

- Wilson and Fravel built an apparatus to quickly and easily test soil fumigants against soil pathogens. They successfully used it to evaluate the effectiveness of benzaldehyde and nitrogen against soil pathogens. "Simple to use, this equipment allows the soil to retain uniform amounts of a fumigant for a definite period. Once the soil is fumigated, it can be tested for pathogen activity." – Charles Wilson.

- 2005 "gives us a little more time to find and test more natural compounds that may replace methyl bromide." –Charles Wilson

But then we read, with sadness: "Wilson and another associate, Jose Solar, have applied for a patent on a time-release formula of benzaldehyde to fumigate fruit, grain, and soil." Wilson explained, "We already have several interested companies."

ARS knew Champon had applied for a patent. We had told them a number of times. Their brazen behavior suggested that a U.S. government agency and its favored domestic and foreign private sector partners were hoping that we had done a poor job of it. We called our patent attorney, who assured us that they would not succeed in going around our patent.

Validation Achieved—A Successful Marketing Strategy

And this is the story of how a government agency inadvertently fulfilled the mandate of Congress and provided the replacement to methyl bromide preplant with the validation it deserves.

However, it is not because of this validation, but the experience of distributors and growers worldwide with whom we are working, that 2001 appears to be the year when DAZITOL will begin gaining recognition and market share worldwide as the replacement for methyl bromide preplant. Since we charge distributors and growers for the constant stream of samples they are requesting, we are achieving this market entry at an overall operating cost less than even the paltry $73,000 a year that ARS says it is spending on natural research, including essential oils/plant extracts.