MIDAS™ (TM-425), 2002 DEVELOPMENT AND REGULATORY UPDATE

M. A. ALLAN, Arvesta Corporation, 100 First Street, Suite 1700, San Francisco, California, USA 94105, *e-mail* mallan@arvesta.com

Arvesta Corporation, formerly Tomen Agro, Inc., is a multinational company having as its core business agricultural products. Arvesta focuses on premium - branded products and is active in worldwide development, registration, manufacturing and sales. Chloropicrin (TM-442), one of our proposed mix partners is included in our manufacturing portfolio of products.

TM-425, (active ingredient: Iodomethane) is in commercial development as a replacement for current uses of methyl bromide. TM-425 is an environmentally friendly, broad-spectrum fumigant applied to soil for the control of various economically important weed seeds, plant parasitic nematodes and soil borne pathogens. Target markets include strawberries (including nursery production), fresh market tomatoes, turf and ornamentals (cut flower and bulbs). Pre-plant fumigation to soil is shank applied by conventional equipment typically used for flat / broadcast, prepared raised bed or through buried drip line fumigation. Field efficacy trials conducted in the United States support rates of 100 – 235 lbs/A for TM-425. Testing has been conducted with TM-425 and in combination with chloropicrin (TM-442). Formulations in development include TM-425: TM-442 ratios of 98:2, 50:50 and 25:75. Additional formulations are under evaluation. Rates are dependent upon target species, soil conditions, texture, and cultural practices. TM-425 formulations are well suited for both field and greenhouse applications.

In 1999,Tomen Agro placed TM-425 in a Biological Development program as a soil fumigant and replacement candidate for methyl bromide. Regulatory briefings with regulatory agencies in the U.S., EU and Japan have been held. Conferences with the U.S. EPA and California Department of Pesticide Regulations have been favorable resulting in TM-425 being given an EPA top priority and the expectation of an accelerated review process. Target data package submissions and registration/sales are the following:

- January 2002 United States submission
- September 2002 United States registration, Section 3
- 2003 Israel submission
- 2004 Israel registration
- 2005 EU and Japan Submissions
- 2006 - 2007 EU Provisional Sales
- December 2006 Japan Sales

This paper will present data that confirms the advantage TM-425 offers relative to methyl bromide. In summary, Research has demonstrated there are no detectable residues in all fruits tested (less than 0.01 ppm) and its half-life in soil and air is short (less than 5 days). TM-425 has an extremely low ozone depletion potential (ODP). The calculated ODP value is 0.0015, which US EPA confirms, makes it a non-threat to the ozone layer. Importantly, TM-425 is a liquid at ambient temperature and can be handled and stored using conventional equipment. Research confirms it is well suited for use in closed systems for pre-plant soil fumigation including buried drip line irrigation. The end result is reduced potential for worker exposure.

Data from various field trials have shown increased yields in crates/ha for strawberries. TM-425 at 175 lbs/A, and TM-425 + Chloropicrin at 300lbs/A (50:50 ratio) and 355 lbs/A (60:40 ratio) were equivalent or superior to the commercial standard, methyl bromide + chloropicrin @ 393 (238 +116) lbs/A. (See Table 1) Data from tomato field trials show increased yields of marketable fruit as much as 123% of yields harvested for methyl bromide. (See Table 2)

Efficacy results for TM-425 reflect a spectrum of activity similar to what is observed with methyl bromide treated soil. However, TM-425 is effective at rates lower than standard methyl bromide rates. This increased effectiveness is mostly attributed to retention of a higher concentration over time in the soil. Because TM-425 is a liquid as it is injected into the soil it will penetrate further in the soil profile before it completely enters the gas phase. TM-425 vapor pressure and Henry's Law constant still classify this chemical as a true fumigant, which means that it will move as a gas in all directions through the soil profile.

Conclusion

Based on the data presented the following conclusion can be made. TM-425 is a superior quality material, which can be used as a drop-in replacement for methyl bromide for the control of economically important pests and disease. The spectrum of activity of TM-425 and its TM-442 combinations is equal to or superior to commercial standards. Additionally, we have strong evidence of increased yields resulting from treatment of fresh market strawberry and tomato fields.

Table 1: Effect of fruit yields as a percent of yield from methyl bromide treated soil. Methyl bromide applied at 350 lbs/A, 67:33 ratio. Average from two strawberry field trials in California.

Treatment	Rate	Ratio	Percent Yield
TM-425	175 lbs/A	Stand alone	103%
TM-425 + TM-442	240 lbs/A	50:50	93%
TM-425 + TM-442	295 lbs/A	60:40	100%

Table 2: Effect of fruit yields as a percent of yield from methyl bromide treated soil. Methyl bromide applied at 350 lbs/A, 67:33 ratio. Average from a single tomato field trial in Florida.

Treatment	Rate	Ratio	Percent Yield
TM-425	175 lbs/A	Stand alone	94%
TM-425	235 lbs/A	Stand alone	123%
TM-425 + TM-442	240 lbs/A	50:50	120%
TM-425 + TM-442	295 lbs/A	60:40	135%