A REVIEW OF POTENTIAL METHYL BROMIDE ALTERNATIVES (MBA) FROM IR-4 MBA PROGRAMS

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IR-4 began addressing methyl bromide alternative (MBA) needs for minor crops in 1998 and since then has conducted large-scale field trials in California, Florida and Michigan in strawberries, fresh market tomatoes, eggplant, peppers, cucurbit vegetables and cut flowers and bulb crops. Plans in 2003/2004 are to expand the IR-4 MBA programs into other states and to begin evaluations in other specialty crops including turf, ginseng, and asparagus; and into additional states including Alabama, Wisconsin, and North Carolina. These trails are a result of a large collaborative effort between IR-4, USDA ARS, Land Grant Universities, commodity organizations, and the agricultural chemical industry. The IR-4 MBA programs are sponsored primarily through funding from the agricultural chemical industry and more specifically from companies believed to have products that could serve as partial or complete replacements for methyl bromide. Based on efficacy comparisons against the performance of a standard methyl bromide/chloropicrin 67:33 (MB/PIC) standard 350 lbs ai per acre treatment versus the products evaluated in the IR-4 programs, there are a number of products and product combinations that can provide pest control and yields comparable to the MB/PIC standard. Several of these products are not registered at the time of submitting this abstract and others have regulatory limitations that prevent them from being fully viable replacements. Some products were extensively tested in IR-4 programs in tomatoes and strawberries in California and Florida and then dropped since we were unable to find ways to optimize pest control performance and in some cases avoid excessive crop injury. A brief discussion of products evaluated in the IR-4 MBA programs follows:

AJ1629 287EC: This product provided excellent control of fungal pathogens in strawberries in California and excellent control of fungal pathogens in tomatoes but the performance was inconsistent. Unpredictable excessive phytotoxicity also occurred in strawberries leading to a decision by the company to drop further efforts to develop the product as a MBA.

Basamid (dazomet): Basamid has been used as a bed top treatment in combinations with either Telone C35, Inline, or Chloropicrin EC in both strawberries and tomatoes with consistently excellent yield results comparable to the MB/PIC standard. Basamid enjoys fast track regulatory status in EPA's Office of Pesticide Programs Registration Division and it is hoped that this product can be registered based on the data provided by the registrant.

Chloropicrin EC: Beginning in 2002, this product was included both as a stand alone treatment and in combination with low rates of metam sodium for weed control with very good results usually equal to the MB/PIC standard. It must be "partnered" with a weed control product for reliable full spectrum control and there are several possibilities

including dazomet, low rates of metam sodium, and selective herbicides, trifloxysulfuron sodium (in tomatoes) and halosulfuron methyl.

Fosthiazate: Fosthiazate is a specific nematocide that enjoys fast track regulatory status in tomatoes but at the time of this writing a registration decision has not been reached. The product is clearly an excellent nematocide that when used in combination with a product that controls fungal pathogens and with products for weed control, results comparable to the MB/PIC standard are consistent under Florida and California conditions. Fosthiazate has been evaluated in combinations with Chloropicrin for fungal pathogen control and with low rates of metam sodium for weed control (except nutsedges) and results have been excellent in most comparisons.

Metam Sodium: Metam sodium continues to be an excellent bed top treatment at low rates for effective control of annual weeds in IR-4 trials. When combined with either Telone C35, Inline, or Chloropicrin, results are often comparable to what we have obtained from the MB/PIC standard. Consistency of performance is improving each year as we learn better the optimum conditions for application. Frequently when used as a stand alone treatment at full labeled rates, yields have been statistically comparable to the MB/PIC standard in various IR-4 MBA programs.

MULTIGUARD™ FFA, MULTIGUARD™ PROTECT: These products contain the active ingredient furfural and both have given good control of nematodes, fungal pathogens and some annual weeds in IR-4 trials in tomatoes, strawberries, cucurbits and cut flowers. MULTIGUARD™ FFA contains 6% aitc as an active ingredient used to enhance weed control. MULTIGUARD™ PROTECT contains a single active ingredient, furfural. Both products are formulated as emulsifiable concentrates for applications through drip tapes. MULLTIGUARD™ PROTECT has the unique property of safety to all crops tested when applied post transplant at rates effective against fungal pathogens and nematodes. An application for registration in greenhouses has been submitted to EPA by the registrant.

Propozone (propylene oxide): This product is EPA-registered for the protection of stored products (spices, nut meats, cocoa). Amended labeling to include protection of in-shell nuts and cocoa beans was also accepted by EPA in 2003 expanding the use of Propozone for these stored commodities. Other post harvest uses are pending EPA-acceptance, including an amendment to allow extending the period of treatment of spices from 2 hrs to 12 hrs. Soil applications from Propozone at 45 gallons per acre have been the leading treatments in some trials but correct application must be used for reliable results. It appears that optimum efficacy from this broad spectrum product is obtained when it is shanked deep into the soil (12 inches) and mulching follows simultaneously with the shanking operation.

SEP-100: This is another potentially excellent product that when used properly will provide results at rates of 75-100 lbs ai per acre equivalent to the MB/PIC standard. More work is needed on application tactics to optimize performance against weeds, nematodes and soil borne fungal pathogens.