

COMBINATIONS OF FURFURAL (2-FURFURALDEHYDE) WITH METAM Na AND DAZOMET FOR WEED CONTROL

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Furfural (2-furfuraldehyde) is a naturally occurring compound produced commercially from sugarcane bagasse and other pentosan containing materials. The compound has significant nematicidal properties with limited activity against some weed species. Drench applications of furfural to soil can control plant parasitic nematodes when applied at rates ≥ 400 kg/ha but acceptable herbicidal activity requires rates ≥ 600 kg/ha. Mixtures of furfural with methyl isothiocyanate, and methyl isothiocyanate generating compounds (metam Na, dazomet) have been proposed as broad-spectrum treatments to replace methyl bromide in soil fumigation. There is however, limited knowledge on the exact dosage relationship for herbicidal activities of these mixtures. A greenhouse study was conducted to define the dosimetry of combination treatments of furfural with metam Na, and with dazomet (Basamid^R) for weed control. In a factorial experiment with metam Na (Vapam HL) furfural (Multiguard Protect^R) was applied to soil at rates of: 0 - 500 mg ai/kg soil alone and in combination with metam Na at 19.6 mg ai/kg soil. The soil was from a cotton field (silt loam; pH 6.2; CEC < 10 meq/100 g soil; org. matter < 1.0%) was infested with yellow nutsedge (*Cyperus esculentus*), large crabgrass (*Digitaria sanguinalis*), hybrid pigweed (*Amaranthus* spp.), annual morningglory (*Ipomoea* spp.) and other annual weeds. Each treatment was delivered by drenching 100 mls aqueous volume onto the surface of 1 kg soil in cylindrical pots (10-cm diam; PVC). Immediately after treatment each pot was covered by clear low density polyethylene (1.5 mil) bag held tight against the outer wall of the pot by a rubber band. The pots were arranged on a greenhouse table in a randomized complete block design. After one week the bags were removed and weed counts were taken from each pot (experimental unit) at 7, 14, 22, and 31 days after application of the chemicals. Results indicated that the herbicidal activities of furfural against all weed species were significantly enhanced by combining it with metam Na. The combination of furfural at 200 mg/kg soil [400 kg/ha] with metam Na [39.2 kg/ha] resulted in adequate control of nutsedge and excellent herbicidal activity against all other weeds.

In a second experiment furfural and dazomet were delivered in an aqueous emulsion containing 8% furfural and 2% dazomet. The emulsion was prepared from an emulsifiable solution of dazomet (Basamide^R) in furfural and diluting in water to the desired concentration. The emulsion was applied to soil by drenching as described for the first experiment to have rates (mg/kg soil) of: 0 - 300 for dazomet and 0 - 1200 for furfural. The experiment was established using soil of identical origin and following the

methods and procedure described for the metam Na test. Results indicated that the furfural-dazomet combination is an excellent broad spectrum herbicide. It eliminated 95% of all weeds when applied at rates 100 - 140 mg dazomet/kg soil and resulted in near 100% control with rates \geq 150 mg dazomet/kg soil.

Results from the study suggest that combinations furfural with either metam Na or dazomet possess strong herbicidal activities derived from synergistic interactions between furfural and the other compounds.