

FACTORS THAT AFFECT PYRETHRIN AEROSOL EFFICACY

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Aerosols are being utilized as alternatives to fumigation in flour mills, processing plants, and food production facilities. The efficacy and distribution of aerosols can be affected by structural components, milling equipment, and features within the interior of a structure that present barriers to aerosol dispersal. As part of our research program, we are characterizing dispersal of particles from different aerosol systems and for different insecticides.

Results of field studies with pyrethrin combined with either the insect growth regulator methoprene or pyriproxifen show that dispersal can be affected by structural components within mills. Artificial and real barriers also limit dispersal. While these aerosols may give quick knockdown of adult confused flour beetles, recovery can occur in areas within a mill where obstructions or barriers to aerosol dispersal may be present.

Aerosol particle size can also be an important factor in conferring toxicity. Smaller particles may have increased dispersion but also reduced efficacy due to lack of impingement on target insects. Laboratory studies show that a particle size of 16 microns will kill adult confused flour beetles, depending on the time of exposure and the presence or absence of food materials.

Future research efforts will focus on determining optimum particle size necessary to kill all life stages of flour beetles, through cooperative laboratory studies with industrial partners. We are also characterizing actual dispersal of aerosols within a milling facility, sizes of particles dispensed from commercial aerosol application systems, and distribution of particles during specified exposure times.