

Beta-Lactam Decontamination

Chlorine dioxide gas is proven effective against Beta-Lactams, and can inactivate them on equipment or in rooms so that there is no risk of allergic exposure. After inactivation, equipment can be used on non-Beta-Lactam pharmaceuticals with no risk of contamination.

Pharmaceutical company was looking to renovate a Beta-Lactam production facility and turn it into a training facility space. Beta-Lactam manufacturing facilities are often dedicated for the production of beta-lactam products for the facility's life and then demolished upon the cessation of production to limit cross contamination.

The beta-lactam cocktail consisted of beta-lactams from the Penicillin, Cephalosporin, and Carbapenem groups. From the penicillin group, Penicillin G, Penicillin V, Ampicillin, and Amoxicillin were included into the cocktail. From the Cephalosporin group, Cefadroxil, Cefazolin and Cephalexin were incorporated into the cocktail. Imipenem, of the Carbapenem group, was also inside the cocktail. The inoculums were dried on the carriers prior to treatment with Chlorine Dioxide gas.

The goal was to validate a cycle that could be used to treat a pharmaceutical manufacturer's beta-lactam manufacturing equipment for the future production of non-beta-lactam compounds. Testing was conducted using chlorine dioxide gas at various concentrations and exposure times in an effort to achieve the pharmaceutical manufacturer's required 3-log (99.9%) reduction of eight different beta-lactams on various surfaces. The pharmaceutical manufacturer's requirement of achieving 3-log (99.9%) reduction (maximum postexposure recovery of 0.1%) was the baseline for acceptance. After a period of cycle development, multiple chlorine dioxide gas cycles at various concentrations and exposure lengths were shown effective in inactivating the eight beta-lactam compounds to a successful degree.

Various decontamination cycles of differing concentrations and exposure times were tested for efficacy towards inactivation of beta-lactams. Test results demonstrated that chlorine dioxide gas was effective towards the inactivation of the eight betalactams involved at varying concentrations and exposure lengths.