Review of Microgen's D-125 for Odor Control in Industrial Settings

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Author Background:

Benjamin Tanner is the president of Antimicrobial Test Laboratories, a commercial microbiology laboratory. He holds a Ph.D. in Microbiology and Immunology and has worked in the disinfectant industry for several years. He is the author of the book, "Legal Aspects of Infectious Diseases." Before launching Antimicrobial Test Laboratories, he worked as a microbiologist for the Clorox Company (Oakland, CA), developing disinfectants and other antimicrobial consumer products.

Purpose:

The purpose of this evaluation is to describe the applicability of Microgen's D-125 product to odor control in industrial environments, such as in food processing facilities, tanneries, and abattoirs.

Introduction:

Unpleasant odors can be dealt with in three main ways. First, odors can be masked by fragrances. Addition of fragrance simply alerts the human nose to a more potent odor (that of the fragrance), thereby overriding the sense that the odor is present. Fragrances do not remove odors. The second way to deal with odors is to neutralize them chemically. Odor molecules are recognized by the human nose on a molecular level on the basis of their chemical constituency.[1] Thus, when the molecules responsible for odor are destroyed or rearranged substantially, the odor is no longer present. Finally, odors can be eliminated by removing the root cause of most odors – the growth of bacteria and fungi. Bacteria are the main source of odors in the industrial environment, since they are plentiful and grow quickly in nutrient-rich environments such as those found in tanneries and other settings. As bacteria feed on non-odorous organic matter in their environment, many produce gasses and release compounds that are highly odorous. By killing the bacteria that are fundamentally responsible for the production of odorous molecules, odor can be reduced substantially.

Microgen, Inc's DISNFX D-125™ is a dilutable, quaternary ammonium disinfectant that addresses odor issues through both destruction of the odorous molecules and, most importantly, by killing and preventing the growth of microorganisms in the industrial environment.

Destruction of odor molecules by the direct chemical action of the quaternary ammonium active ingredient:

1) Quaternary ammoniums are positively charged molecules that disrupt and coaculate proteins[2], which alters the way they interact with the human olfactory system (sense of smell).
2) Quaternary ammoniums appear to maintain this activity, even at low concentrations.

Prevention of odor by controlling the growth of microorganisms:

1) Microgen's DISNFX D-125™ product is a concentrated disinfectant. This means that at its use-dilution (1:64) it has been proven to kill great numbers of a broad range of microbes quickly and completely. Thus, it is capable of addressing existing, established odor issues both by killing the microorganisms responsible for odors quickly.
2) Recent testing at Antimicrobial Test Laboratories characterized D-125's ability to kill the odor-causing bacterium *Proteus mirabilis* showed that D-125 (1:64 dilution) produces a 6-log10 reduction on 90% of surfaces within 5 minutes of contact. Additional testing has shown that complete disinfection of this organism occurs within 10 minutes. *P. mirabilis* is generally considered to be one of the worst microbial sources of odor, and is present in many industrial environements.
3) One unique attribute of D-125 that makes it particularly well suited to stopping odors from the growth of bacteria at the source is that it has demonstrated "residual sanitizing efficacy" to the extent necessary to stop odor reduction. This means that a liberal application of D-125 can be expected to sanitize surfaces to a certain extent even after the first application. In general, if a product kills some percentage of microorganisms it stops their growth entirely (thereby preventing odors).
4) D-125 will also be effective (as an additive to tanning liquids) at preventing the appearance of microbial odors, even if used at very low concentrations, since quaternary ammonium compounds (the active ingredient of D-125) are known to inhibit the growth of bacteria in solution at very low levels.

Discussion and Conclusions:

Microgen's D-125 disinfectant is a product that can be used to stop the occurrence of odors associated with the growth of microorganisms and also to neutralize odors already present in an industrial environment. D-125 achieves odor reduction by killing microbes through the destruction of the cellular membrane and denaturation (coagulation) of microbial proteins, and subsequently by preventing their growth in liquids and on environmental surfaces. D-125 neutralizes existing odors by the direct action of the quaternary ammonium active ingredient on odorous molecules.

The D-125 product should be applied liberally on appropriate surfaces and liquid baths within the industrial environment to ensure that any existing microorganisms are disinfected and to prevent the growth of new odor-causing microorganisms through the action of the residual disinfectant left behind on the surface.

References:

1. Turin, Luca. (2002). A method for the calculation of odor character from molecular structure. Journal of Theoretical Biology, 216, 367-385.
2. Maillard, J.Y. (2002). Bacterial sites for target action. Journal of Applied Microbiology Symposium Supplement, 92, 16S-27S.