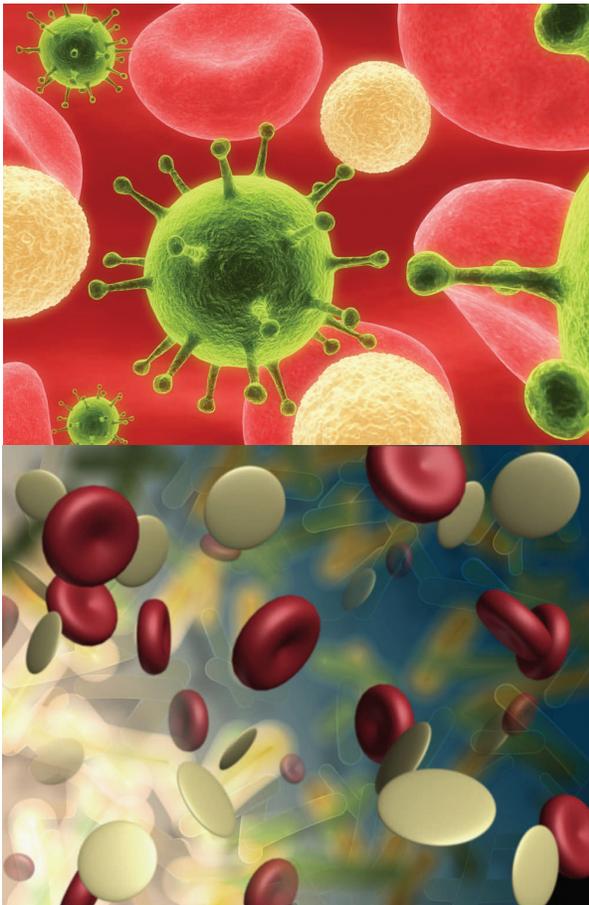


Chroma's Antimicrobial compounds minimize mold, mildew, fungus and bacteria.

- Inhibit the growth of Mold, Mildew, Fungus and Bacteria.
- Protect plastics against damage from microbes
- Can be colored and combined with other functional properties
- Minimize odor, discoloration and damage



Overview

Algae, bacteria and fungi attack the surface of plastics, rubber and synthetic fibers and can result in discoloration, staining, odor, biofilm formation, cross contamination and, eventually, deterioration of mechanical properties, increased maintenance or reduce service life of the finished product.

Chroma Corporation offers integrated solutions to address undesired growth of microorganisms. Chroma's broad selection includes both organic and inorganic antimicrobials that target on specific microorganisms. These products are offered as fully compounded products or master batches that are designed to protect the plastics against bacteria and or fungi.

Hygiene issues have been becoming more and more relevant in the last few years. With increasing population, it is inevitable to find a solution to reduce the problems with microbial contaminations. Bacteria, fungi and algae can be major problems in health, construction, food, and packaging industries. Contamination problems are especially relevant in the health industry; there are many cases of infections in hospitals, which can be prevented through hygiene and disinfection.

Antimicrobial can be used to control the build up and growth of bacteria in plastics. The market for antimicrobial Compounds has been developing steadily, with the largest market share for the food and beverages industry

Antimicrobials protects plastics from staining and degradation caused by bacteria, mold, mildew, and fungi and does not compromise end-product safety by migrating out of the plastic or being rubbed off the surface. Some additives do not compromise optical properties when used with high-clarity resins.

Applications

- **Medical devices and surfaces in healthcare environments.** The spread of infection in hospitals and the development of antibiotic-resistant strains of bacteria are nationally recognized as a critical healthcare problem, antimicrobials can help solve through its use in catheters, wound dressings, and high-contact environmental surfaces such as doorknobs and countertops.
- **Building products.** The heat and moisture to which wallboard, flooring, roofing, decks, and other components are exposed promote the growth of molds and mildews. According to insurance industry estimates, mold-related damage to building products causes well over \$2-billion in claims per year.
- **Electronic/human interfaces** such as keyboards, ATM machines, and airport kiosks present special contamination problems. Microbial counts on computer keyboards can be more than 60 times higher than on toilet seats, averaging 3,300 bacteria per square inch. Public surfaces such as those of ATM machines present even greater possibilities for the product damaging microorganisms.

Chroma Corporation

ISO 9001:2008 Registered

3900 W Dayton Street, McHenry, IL 60050

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Product History and Chroma Offerings

Chroma Antimicrobials

In the United States, all antimicrobials are regulated by the Environmental Protection Agency under the FIFRA Act. The EPA has dictated that any antimicrobial claim must be directed to the material that is being protected. You can claim that your product has been treated to protect the product from degradation due to fungal or bacterial attack. You cannot claim that your treated product will protect something or someone that may be in the immediate vicinity of your treated product. In addition, no health claims can be made for your treated product. There is no FDA sanctioned antimicrobials for use in plastics. As an example, in the mid 90's many companies added antimicrobial components to plastic kitchenware and cutting boards. Claims were made that the antimicrobial treated cutting board would kill bacteria on the surface of the board, therefore protecting the foods from cross contamination. Hefty fines were levied on those manufacturers who made those claims. Canada, European countries, Japan and Korea all have similar regulatory agencies oversee the claims of the effectiveness of the antimicrobial products. We suggest you investigate the regulations before manufacturing items for use in any country. In the U.S., as well as the other countries previously mentioned, before a material can be sold as an antimicrobial it must be registered with the governing Environmental Protection Agencies. The Registration Number must be posted on the product label. It is a federal offense to use an antimicrobial in an unapproved manner. Chroma can assist you in working through these areas.

Chroma's Antimicrobial products are formulated as follows:

- Inorganic, silver-glass based or silver zeolite based antimicrobials
- Special glass matrix or zeolite design allows controlled silver-ion release for longer life
- Highly active against a wide range of Bacterial, mold, and yeast
- Especially suitable for thin wall articles and transparent applications
- Designed for use in polymers process up to 500° C
- Formulated not to discolor when exposed to outdoor light

Chroma's Antimicrobials offer the following benefits:

- Suppress Odor development
- Reduce Biofilm formation
- Eliminate discoloring and staining film, sheet extrusion, profile extrusion or Rotational molding.

Contact Chroma today to learn more about these products and to have our laboratory technicians formulate an antimicrobial to meet your products requirements. These products are available in fully compounded products or an economical master batch and can be formulated for injection molding, blow molding, blown film, sheet extrusion, profile extrusion or Rotational Molding.



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