



Enabling Your Technology



# antimicrobial **FOOD CONTACT**

## **FDA - EPA**

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BIOSAFE®'s keystone product, HM4100 Antimicrobial, is registered for safe use in food-contact applications and complies with EPA and FDA regulations.

BIOSAFE® renders materials inherently antimicrobial. The organosilicon technology is more cost-effective and faster acting than silver-based additives, avoids discoloration, and is non-leaching.

HM4100 forms an interpenetrating network with the host polymer system. The HM4100 polymeric antimicrobial forms hydrogen bonds with the host polymer and becomes permanently entangled with the host such that the antimicrobial forms an interpenetrating network with the plastic resin or coating rendering the antimicrobial non-leaching.

BIOSAFE® technology provides an environmentally sustainable means of rendering food-contact products bacteriostatic, fungistatic, and algistatic. BIOSAFE® addresses the growing demand among the food prep, food service, and consumer food and beverage markets for increased hygienic cleanliness of the surfaces the food it touching such as plastics,

coatings, and activated carbon antimicrobial properties without migrating, BIOSAFE® eliminates the safety issues associated with leaching antimicrobials and does so while actually reducing the cost to protect finished goods.

BIOSAFE® protected products contain no volatile organic compounds (VOCs), heavy metals such as arsenic, or polychlorinated phenols. Toxicity tests have demonstrated that BIOSAFE® products do not cause irritation or sensitization with or on skin contact. BIOSAFE®'s chemistry has been reviewed and approved by FDA and EPA, and is registered with EPA as HM4100 Antimicrobial Reg. No. 83019-1.

## **A SAFE MODE OF ACTION**

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The antimicrobial component of HM4100 kills microorganisms by effectively puncturing and rupturing the organisms' cell wall. By comparison, conventional antimicrobials kill by leaching into the cell, where they are metabolized and interfere with critical life processes. This conventional mode of action has been shown to cause microorganisms to mutate and adapt, becoming resistant to the antimicrobial. BIOSAFE® products avoid this problem.

BIOSAFE® protects materials used in a wide range of consumer and industrial applications where microorganisms can cause staining, pitting, deterioration, or foul odors. BIOSAFE® solves microbial problems in these food contact end uses:



## FOOD PREP SURFACES

BIOSAFE® protects surfaces in kitchen and food prep environments either incorporated into the resin, a food contact laminate layer, or applied to the surface as part of a coating. BIOSAFE® may be used at a maximum use level of 1 weight percent of the resin, laminate, or coating.



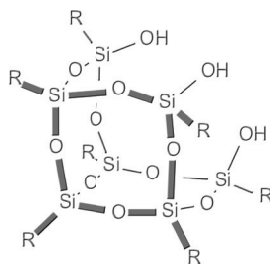
## BEVERAGE TUBING

The moisture and nutrients that can reside in beverage tubing are a prime place for microbes to flourish. This can lead to staining from mold, odors from bacteria, and bad tasting beverages. BIOSAFE® protects the tubing and extends its useful life, keeping it fresh and clean.



## ACTIVATED CARBON

Bacteria growing in my water filter? – not something we thought too much about, until recently. Headlines on the evening news have brought attention to a growing issue. Products ranging from hand-held filter pitchers and faucet filters to in-line water treatment systems are evidence the public's growing concern. BIOSAFE® is added to coconut shell activated carbon for the drinking water filtration market. Please contact Gelest with more questions about bacteriostatic activated carbon.



# Gelest

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 BIOSAFE®

GELEST, INC. supplies antimicrobial products based on two awarded patents. The company's core product is BIOSAFE® HM4100 antimicrobial polymer. This is available in the form of a powder for mixing, compounding, and dispersing; treating pigment and filler surfaces, rendering them antimicrobial; and incorporating in water or solvent solutions at various concentrations. These modified fillers can be formulated into a range of technology platforms such as thermoplastic and thermoset resins, water and solvent-based coatings, adhesives, or sealants. BIOSAFE® also assists customers in obtaining antimicrobial test results from third party labs.

Gelest, Inc. Headquartered in Morrisville, PA, Gelest is recognized worldwide as an innovator, manufacturer, and supplier of commercial and research quantities of over 3,000 organosilicon compounds, metal-organic compounds, and silicones. The company provides focused technical development and application support for semiconductors, medical materials, pharmaceutical synthesis, diagnostics and separation science, specialty polymeric materials, and cosmetics. Visit [www.gelest.com](http://www.gelest.com).

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