## Product Name

Name: AkouGuard™-2 Disinfection solution for water bath

Cat. No.: C3481-0050, C3481-0500

Size: 50 mL, 500 mL

## Product Description

AkouGuard™-2 Solution is a highly active antimicrobial chemical compound which is effective against a wide range of both gram-positive and gram-negative bacteria including Pseudomonas aeruginosa. This bacterium is one of numerous opportunistic pathogens that often occur in very small densities passing through clean water-distribution systems. However, amplification may occur in static water areas and in sediment-laden water pipes especially during warm-water periods. What is most notable about Pseudomonas aeruginosa is that it is not only a highly relevant, important opportunistic pathogen and causative agent of emerging nosocomial infections, it is also known for its diverse bacterial mechanisms that contribute to its bacterial persistence.

Pseudomonas aeruginosa has a predilection for growth in moist environments. Not surprisingly, this is probably a reflection that in its natural habitat as a gram-negative, motile, flagellated, free-living bacterium, it is found most commonly in soil and water. It has often been observed just "growing" in distilled water. This implication is suggestive of the fact with regard to its very minimal nutritional growth requirements. It does not even require organic growth factors.

Moreover, due to the fact that it is one of many ubiquitous organisms in soil and water environments, what should concern us, in a laboratory setting, is the existence of something as apparently benign and omnipresent, is a chronic, moist-surface milieu as a water-bath. Such a situation should alert and remind us as to how important proper attention to maintenance, water quality and management as a high priority must be inculcated in our laboratory protocols regarding hygiene and sanitation.

Perhaps and most importantly, as one of the most worrisome characteristics of this bacterium, is its natural resistance to a wide array of common antibiotics in general, its' concomitant low antibiotic susceptibility and its apparent multi-drug resistance in particular. In short, there are few alternatives to good hygiene and sanitation practices in a laboratory setting. Our AkouGuard™-2 Solution used at the proper concentration (i.e., 2 mL/liter of $H_2O$), every one to two weeks, will help ensure that your water-baths are at least free of Pseudomonas aeruginosa and other similar obdurate bacteria. In order to increase its efficacy, good laboratory practices are the order of the day.

The biocidal activity of AkouGuard™-2 Solution does not vary much over the pH range of 5 - 8, however, its biocidal activity does fall with increasing pH (i.e., above pH 8.0).

## Mode of Action

Concentrations of 0.02% to 0.05% are bacteriostatic. The suggested Mode of Action (MOA) is the oxidation of the thiol groups of bacterial cell constituents to disulfides. Formaldehyde and nitrites are amongst the decomposition products produced. As a major metabolite of degradation, Formaldehyde reversibly polymerizes to its cyclic trimer 1,3,5 trioxane or the linear polymer polyoxymethylene and kills most bacteria.

It also crosses links amino groups. The raw material in its pure form is soluble in water and polar organic solvents and reacts with some metals, amines and alkaline compounds. It is incompatible with sulphydryl compounds or with aluminum or iron containers but stable in contact with tin or stainless steel. Anionic or non-ionic surfactants and 50% serum are stated to cause little or no activation. It is unstable in anhydrous solutions of glycerol.

Several alcohols, notably ethanol, phenylethyl alcohol and 2-Bromo-2-Nitro 1,3 Propanediol have marked antibacterial action against vegetative bacteria.

**Properties of AkouGuard™-2**

- Effective against vegetative bacteria
- Effective against fungi
- Effective against a wide range of gram-positive bacteria
- Effective against a wide-range of gram-negative bacteria

This is precisely why AkouGuard™-2 is ideal for various types of water-baths used in Cell Culture and Molecular Biology laboratories.

**Predominant Characteristics**

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| Source: | Synthetic; Non-Glutaraldehyde-Based Biocide |
| Active Ingredients: | 2-Bromo-2-Nitro-1,3-Popanediol |
| Biological Activity: | Biocidal; Bactericidal/Microbicidal; Dependent upon Concentration & Contact Time; Increases with Increased Temperature & Exposure Times |
| Duration Of Activity: | Contact Time; Limited to Time of Application |
| Environmental Considerations: | The Chemical Raw Material (CRM) is slightly toxic to Avian Species and Freshwater Fish; Moderately Toxic to Freshwater Invertebrates and moderately-to highly toxic to Marine Invertebrates. The Environmental Fate is highly dependent upon ambient conditions, temperature & pH. |
| Incompatabilities: | Reacts with some metals (e.g., Aluminum, Iron), amines and alkaline compounds. |
| Practical Application (Inanimate Objects Only): | Water-Baths |
| Mode Of Action (MOA): | The suggested Mode of Action (MOA) is the oxidation of the thiol groups of bacterial cell constituents to disulfides. Formaldehyde and nitrites are amongst the decomposition products produced. |
| Range of Activity (Dependent Upon Contact Time & Concentration) | Bacteria including Spore-Forming bacteria: $G^-$ G+, *Salmonella spp., Mycobacteria spp.* |
| | Fungi (Mildew, Molds, Yeasts) |

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| Specificity: | Non-Specific |

Selection and use of any chemical disinfectants requires a detailed knowledge of such factors among others as:

- Safety (i.e., Potential Hazards and Toxicity)
- Range/Spectrum of Activity
- Ambient Room Temperature & Humidity
- Type of Surface
- Effectiveness in the presence of organic matter, lipids, fatty-acids and proteins
- Stability and Reactivity
- Neutralization by pH Changes/Soaps or Detergents
- Water Hardness
- Contact Time
- Specificity
- Environmental Considerations

Essentially the goal of chemical disinfection is not to endeavor to sterilize surfaces but rather to destroy, neutralize, inhibit or reduce the extent of microbial contamination or disease-carrying microorganisms to the lowest possible level. Chemical Disinfection per se is practiced on inanimate objects only. Most people utilizing disinfectants appreciate how essential it is to practice pristine hygiene and sanitation protocols especially in a laboratory setting. Remember that disinfectants do not act instantaneously. Destruction of pathogens occurs in three distinct phases:

1. Initial/Lag Phase-When the disinfectant starts showing activity
2. Median Phase-When the majority, but not all the microorganisms might be killed
3. Final Phase-When the more resistant microorganisms are destroyed.

As a rule, allow the disinfection process the necessary time to optimize its biocidal activity.

**Storage and Stability**

The product should be kept at **-20°C~-10°C**.
The product is **light-sensitive** and therefore should not be left in the light.
Shelf life: 24 months from date of manufacture

**Procedure**

1. It is recommended to use 2 mL AkouGuard™-2 500X Concentrated Solution per liter of $H_2O$ in the water-bath and to repeat this procedure every one to two weeks. Emphasize Good Laboratory Practices in the work-setting.
2. Dilution: 1:500 in water
3. **Do not use AkouGuard™-2 in $CO_2$ incubator water-baths.**

**Quality Control**

AkouGuard™-2 Disinfection solution for water bath is tested for sterility.

**Manufacturer**

Shanghai Dr. Cell Co., Ltd.

**Issue Date**

March 2024

**Precaution and Disclaimer**

For research use only, not for clinical diagnosis, and treatment.