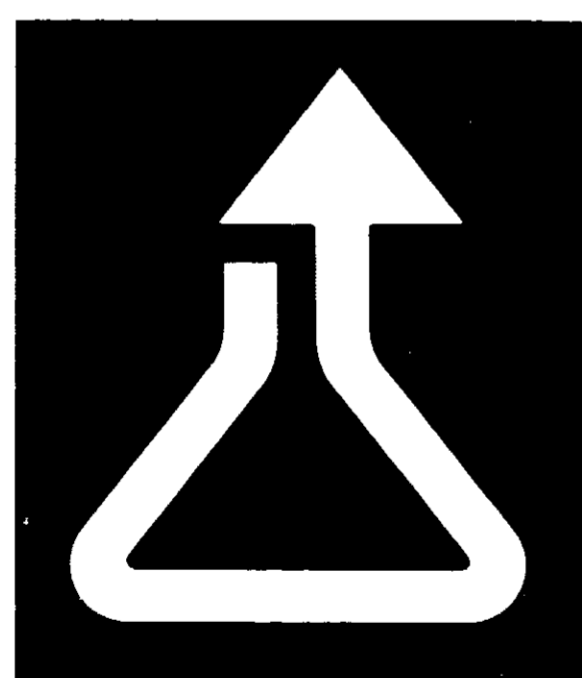


HYAMINE[®] 10-X CRYSTALS



**ROHM
AND
HAAS**
PHILADELPHIA, PA. 19105

1075

**GERMICIDE
CONCENTRATE**

Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended, for the pesticide EPA Reg. No. 707-81-1A registered under 707-81-1A

ACTIVE INGREDIENT:	
Diisobutylcresoxyethoxyethyl dimethyl benzyl ammonium chloride, monohydrate	98.8%
INERT INGREDIENTS	1.2%
EPA Reg. No. 707-81-AA	100.0%
EPA Est. No. 707-PA-1	

**FOR
FORMULATION
USE ONLY**

NET CONTENTS

_____ **LBS.**

**Minimum phenol coefficient—250
(S. typhosa—20°C—AOAC Method)**

DIRECTIONS FOR USE

Hyamine 10-X Crystals is a concentrate for formulating purposes only. Use only according to the directions in the Technical Bulletin available from the manufacturer.

NOTE: This product should not be used or compounded with any reducing or oxidizing agents (such as calcium hypochlorite, solid perchlorate, or nitric acid) since such admixtures may be explosive.

Do not use in conjunction with soap or any anionic wetting agent. In preparing packaging mixes containing Hyamine 10-X Crystals use normal precautions for handling powdered materials likely to create a dust:

- Use an exhaust fan to keep dust away from operators.
- Provide goggles, gloves and respirators.
- Under certain conditions, the use of protective creams may be advisable.

DANGER

KEEP OUT OF REACH OF CHILDREN

Corrosive. Causes severe eye and skin damage. Do not get in eyes, on skin or on clothing. Protect eyes and skin when handling. Harmful or fatal if swallowed. Avoid contamination of food.

FIRST AID: In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse. If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

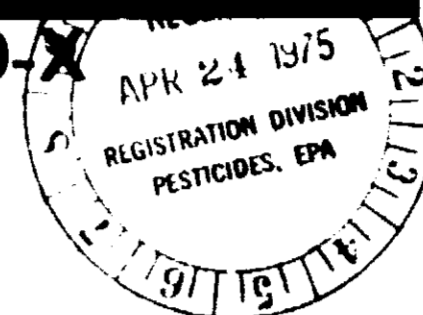
NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock as well as oxygen and measures to support breathing manually or mechanically may be needed. If persistent, convulsions may be controlled by the cautious intravenous injection of a short-acting barbiturate drug.

Do not reuse empty container. Return to container, reconditioner or destroy by perforating or crushing and burying in a safe place. This product is toxic to fish. Do not contaminate water by cleaning of equipment, or disposal of waste.

NOTICE: Seller warrants that the product conforms to its chemical description and is reasonably fit for the purpose stated on the label when used in accordance with directions under normal conditions of use, but neither this warranty nor any other warranty of merchantability or fitness for a particular purpose, express or implied, extends to the use, storage or handling of this product contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use.



HYAMINE® 1622 and HYAMINE 10-X



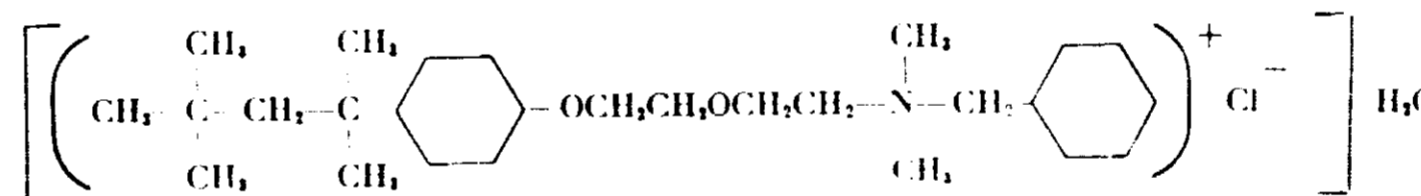
INTRODUCTION

Hyamine 1622 Crystals and Hyamine 10-X are crystalline quaternary ammonium microbicides. Hyamine 1622-50 percent is a 50 percent active aqueous concentrate. These compounds are effective against a wide variety of microorganisms in very low concentrations.

In suitable formulations these Hyamine products provide bactericidal and deodorant properties for a number of applications. The crystalline forms of Hyamine 1622 and Hyamine 10-X are readily soluble in water and a number of solvents. They can be formulated into powdered or liquid products for industrial, or household type sanitizers and disinfectants. These products may also prove useful in veterinary and proprietary pharmaceutical products as preservatives or antimicrobial agents for topical applications.

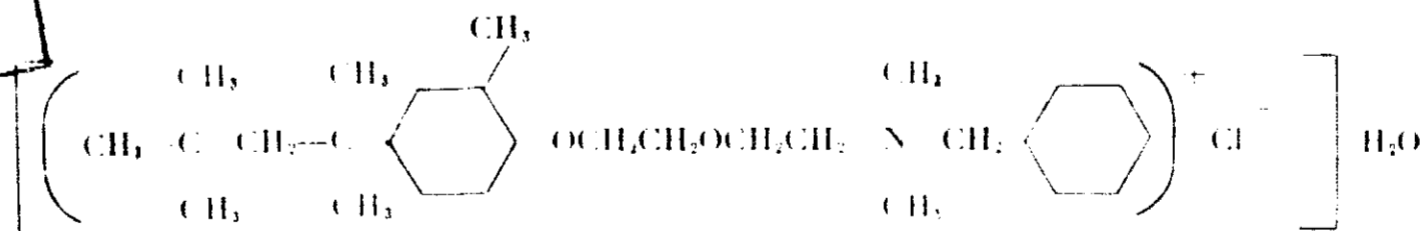
CHEMICAL AND PHYSICAL PROPERTIES

Composition Hyamine 1622 is diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride monohydrate with a molecular weight of 466.1



ACCEPTED
OCT 14 1975
Under the Federal Insecticide, Fungicide, and Rodenticide Act
EPA REGISTRATION DIVISION
OFFICE OF PESTICIDES AND PLANT QUARANTINE
WASHINGTON, D.C. 20540

Hyamine 10-X is diisobutylp-toleresoxyethoxyethyl dimethyl benzyl ammonium chloride monohydrate; minimum 98.8 percent pure, molecular weight of 480.1



Hyamine germicides are not corrosive to environmental surfaces when used according to directions.

Appearance Crystalline Hyamine 1622 and Hyamine 10-X are white, free-flowing powders. Hyamine 1622-50 percent is a moderately viscous, light amber colored liquid.

Density Hyamine 1622 Crystals and Hyamine 10-X Crystals: 27.5 lbs / Ft.³
Hyamine 1622-50 : 8.56 lbs / gallon.

Solubility Hyamine 1622 and Hyamine 10-X are soluble in water, the lower alcohols, glycols, Cellosolve, ethylene glycol monomethyl ether, tetrachlorethane, and miscible in ethylene dichloride and carbon tetrachloride.

Compatibility: Hyamine 1622 compatibility has been determined by mixing dilute solutions of the germicide with solutions of substances with which it might be combined in formulations. Presence or absence of turbidity indicates physical compatibilities, however, final formulations should be carefully evaluated for both physical and bactericidal stability.

Compatible	Partially Compatible	Incompatible
Acetic acid	Potassium iodide	Anionic wetting agents
Aluminum chloride	Sodium hexametaphosphate*	Potassium chromate
Borax	Sodium metasilicate	Potassium dichromate
Calcium chloride	Sodium tetraphosphate*	Soaps
Citric acid	Sodium tripolyphosphate*	Sodium heptaphosphate
Nonionic wetting agents		
Polyoxy alkylene lanolin		
Potassium hydroxide		
Sodium acetate		
Sodium bicarbonate		
Sodium carbonate		
Sodium hydroxide		
Sodium nitrate		
Sodium sulfate		
Tetrasodium pyrophosphate		
Trisodium phosphate	*Only in dilute solutions or in the presence of sufficient non-ionic wetting agents or other suitable solubilizer	

NOTE Hyamine Biocides should not be used or compounded with oxidizing agents such as calcium hypochlorite, nitric acid or solid perchlorates, since mixtures of these materials with most organic compounds may be explosive.

DANGER

Keep out of reach of children. Corrosive. Causes severe eye and skin damage. Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food.

FIRST AID

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse.

If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock as well as oxygen and measures to support breathing manually or mechanically may be needed. If persistent, convulsions may be controlled by the cautious intravenous injection of a short-acting barbiturate drug.

PHENOL COEFFICIENTS

The bactericidal dilutions of Hyamine 1622 and calculated phenol coefficients for a variety of microorganisms are listed below. The bactericidal dilutions are those dilutions of active ingredients which kill in 10 minutes but not in 5 minutes according to the AOAC Phenol Coefficient procedure as described in the Official Methods of Analysis of the AOAC. Appropriate modifications of the culture media were made for those organisms having special growth requirements. The phenol coefficient values for quaternary ammonium chlorides cannot be used to determine disinfectant concentrations, but are offered only as a guide for assessing the relative cidal potency of a product against various types of microorganisms.

HYAMINE 1622

AOAC Phenol Coefficient

Ten Minute Cidal Dilution of Active Ingredient

Organism	Hyamine 1622	Phenol	Phenol Coefficient
<i>Salmonella typhosa</i>	1:25,000	1:90	275
<i>Salmonella pullorum</i>	1:18,000	1:90	200
<i>Salmonella gallinarum</i>	1:16,000	1:80	125
<i>Salmonella paratyphi</i>	1:10,000	1:85	120
<i>Salmonella typhimurium</i>	1:17,500	1:80	215
<i>Listeria monocytogenes</i>	1:40,700	1:80	543
<i>Salmonella choleraesuis</i>	1:17,500	1:80	215
<i>Escherichia coli</i>	1:20,000	1:80	250
<i>Klebsiella pneumoniae</i>	1:10,000	1:90	111
<i>Brucella abortus</i>	1:40,000	1:100	400
<i>Shigella sonnei</i>	1:30,000	1:90	333
<i>Pasteurella multocida</i>	1:40,700	1:110	370
<i>Proteus vulgaris</i>	1:4,200	1:70	60

Organism	Hyamine 1622	Phenol	Phenol Coefficient
<i>Staphylococcus aureus</i>	1:25,000	1:60	410
<i>Saccharomyces cerevisiae</i>	1:5,000	1:100	150
<i>Streptococcus pyogenes</i> C-203	1:18,000	1:80	225
<i>Streptococcus faecalis</i>	1:10,000	1:65	154
<i>Streptococcus viridans</i>	1:40,000	1:90	444
<i>Listeria monocytogenes</i>	1:60,000	1:70	860
<i>Clostridium sporovans</i>	1:10,000	1:90	111
<i>Pseudomonas aeruginosa</i> PRD-10	1:49,000	1:70	700
<i>Lactobacillus casei</i>	1:8,000	1:80	100

A.C.A.C. DILUTION

The A.C.A.C. Use Dilution Continuation Procedure is used to determine the effective disinfectant concentration for hard surfaces using the two basic index bacteria, *Staphylococcus aureus* and *Salmonella choleraesuis*. If the product is to be used in hospitals, the effective disinfectant use dilution for *Pseudomonas aeruginosa* PRD-10 must be also determined.

The effective disinfectant concentrations of Hyamine 1622 (Crystals or 50 percent solution) and Hyamine 10-X for the microorganisms are:

Organism	Disinfectant Concentration of Active Ingredients, ppm	Disinfectant Dilution of Active Ingredient
<i>Staphylococcus aureus</i>	500	1:2000
<i>Salmonella choleraesuis</i>	500	1:2000
<i>Pseudomonas aeruginosa</i> PRD-10	1000	1:1000

MICROBIOSTATIC AND MICROBICIDAL TITERS

The maximum microbiostatic and microbicidal dilutions of Hyamine 1622 are determined by means of serial dilutions in broth tubes inoculated with a fresh culture of organism to be tested. After 24 hours incubation, transfers are made from the tubes not showing growth to fresh broth containing a quaternary neutralizer. After an additional 24 hours incubation (total incubation time of 48 hours) the initial set of tubes is reexamined for growth. The highest dilution of active ingredient preventing growth in the subculture tubes (quaternary neutralizer present) after a total incubation time of 48 hours is the microbicidal titer.

NOTE: The values indicate the effect of Hyamine 1622 on these microorganisms under constant contact conditions such as preservative applications. They should not be interpreted as effective concentration for disinfecting or sanitizing applications.

Microbiostatic and Microbicidal Titers of HYAMINE 1622

	Dilution of Active Ingredient	
	Bactericidal	Bacteriostatic
<i>Streptococcus pyogenes</i> C-203	1:50,000	1:50,000
<i>Streptococcus viridans</i>	1:200,000	1:400,000
<i>Escherichia coli</i>	1:16,000	1:16,000
<i>Salmonella gallinarum</i>	1:32,000	1:32,000
<i>Salmonella choleraesuis</i>	1:32,000	1:32,000
<i>Salmonella typhimurium</i>	1:16,000	1:16,000
<i>Pseudomonas aeruginosa</i> PRD-10	1:8,000	1:8,000
<i>Lactobacillus casei</i>	1:50,000	1:100,000
<i>Shigella sonnei</i>	1:16,000	1:32,000
<i>Klebsiella pneumoniae</i>	1:16,000	1:16,000
<i>Saccharomyces cerevisiae</i>	1:100,000	1:100,000
<i>Pityrosporum ovale</i>	1:800,000	1:800,000
<i>Trichophyton interdigitale</i>	1:20,000	1:40,000
<i>Monilia albicans</i>	1:400,000	1:800,000
<i>Aspergillus niger</i>	1:400,000	1:800,000
<i>Aspergillus oryzae</i>	1:800,000	1:1,600,000
<i>Penicillium notatum</i>	1:800,000	1:800,000
<i>Penicillium luteum</i>	1:400,000	1:800,000
<i>Salmonella schottmuelleri</i>	1:8,000	1:32,000

EFFECT OF HARD WATER ON ANTIMICROBIAL ACTIVITY

Hyamine 1622 and Hyamine 10-X retain their effectiveness as hard surface disinfectant and preservatives in the presence of hard water, however, like other quaternaries, their speed of action is slowed by the presence of calcium and magnesium salts. The effectiveness of hard surface sanitizers is determined by the AOC Germicidal and Detergent Sanitizer Test. Since this procedure requires a 200 ppm active quaternary solution to kill 99,999 of an *E. coli* culture in 30 seconds, speed of kill becomes a critical factor in selecting a sanitizing agent.

As indicated in the following table, the hard water rating of Hyamine 1622 and Hyamine 10-X is relatively low, and they should be compounded with inorganic or organic sequestering agents to improve sanitizing performance under hard water conditions.

Product

Limiting Water Hardness as ppm
CaCO₃, AOAC Germicidal &
Detergent Sanitizer Test

200 ppm Active Solution

Hyamine 1622	25
Hyamine 10-X	75

SURFACE TENSION

Surface Tension and Interfacial Tension Data

Figures in Dynes Per Centimeter

	Hyamine 1622 Active Concentration			
	1.0%	0.1%	0.01%	0.001%
Surface Tension	55	50	45	55
Interfacial Tension*	1.9	2.6	15.8	25.8

	Hyamine 10-X Active Concentration			
	1.0%	0.1%	0.01%	0.001%
Surface Tension	55	55	40	55
Interfacial Tension*	1.2	1.1	11.2	21.6
* Interfacial tension vs. Atrol No. 2	All data via Cenco duNouy tensiometer at 25°C.			

TOXICITY

EVALUATION OF HYAMINE 1622 TOXICITY

ACUTE TOXICITY

In rats, Hyamine 1622 administered orally was shown to be acutely toxic with an oral LD₅₀ of 420 ± 25 mg/kg. Following oral dosing, deaths occurred between 24 and 48 hours; symptoms of toxicity prior to death were limited to severe depression.

Intraperitoneal and intravenous administrations of Hyamine 1622 to rats resulted in LD₅₀'s of 33.1 ± 2.5 mg/kg and 19.1 ± 0.8 mg/kg, respectively.

Eye irritation studies indicated that Hyamine 1622 in concentrations of 1 percent, 5 percent, and 10 percent produced progressively greater irritation, manifested by varying degrees of erythema and conjunctivitis. A 0.01 percent solution instilled into the eye produced no irritation. The higher concentrations, similarly, produced no irritation when the eyes were washed immediately after instillation.

On mucosal tissue 0.1 percent solution produced no irritation, while some irritation resulted from application of a 0.2 percent solution.

On the skin of rabbits and dogs, solutions of 1.0 percent concentration caused erythema, blanching and edema. A single application of 0.5 percent solution was nonirritating to the skin of dogs.

SUBACUTE TOXICITY

Hyamine 1622 was applied to the skin of rabbits daily, 5 days per week for 4 weeks. A concentration of 0.1 percent Hyamine in water was applied. No dermal or systemic effects were observed at this dilution, but a 1 percent solution produced erythema after 7 daily applications to the skin.

CHRONIC TOXICITY

Hyamine 1622 was administered to rats in their diets for 2 years at levels of 0, 50, 200, 1000, 2500, and 5000 ppm. At the 5000 ppm level some growth retardation was observed. Histopathologically, the testes of the male rats at the 2500 and 5000 ppm levels were atrophied. Otherwise, no aberrations were observed in appearance and behavior, in hematological studies, or in tissues.

Chronic dietary administration for one year to dogs at levels of 0, 5, 100, and 500 ppm produced no adverse effects on growth, survival, hematology, or tissues.

EVALUATION OF HYAMINE 10-X TOXICITY

ACUTE TOXICITY

In rats, Hyamine 10-X administered orally was shown to be acutely toxic with an oral LD₅₀ of 828 mg/kg. Toxic symptoms preceding death were indicative of CNS depression. In mice, the oral LD₅₀ was determined to be 750 mg/kg.

Applied locally to the eye and mouth, Hyamine 10-X was demonstrated to be irritating to the eye at a dilution of 0.13 percent and to the mouth at a dilution of 0.2 percent.

Single applications of a 1 percent solution of Hyamine 10-X to the skin of humans resulted in slight irritation, but no evidence of a burning or pruritic skin irritation.

SUBACUTE TOXICITY

Dietary administration of Hyamine 10-X to rats for a period of 100 days at levels of 0, 50, 200, 1000, 2500, and 5000 ppm, resulted in slight growth depression at the 5000 ppm level. Also, the 5000 ppm level caused some decrease in liver and kidney weights. The 2500 ppm level also caused reduction of kidney weight. No significant gross or microscopic pathological changes were observed at any level.

Repeated applications of Hyamine 10-X to skin of rabbits for three weeks resulted in mild but persistent skin irritation with a 0.1 percent solution. The 1.0 percent solution caused erythema and scaling. With toluene-inflamed skin the 1 percent solution produced hardening, necrosis and skin sloughing.

Human patch tests on adults and children demonstrated no primary skin irritation or sensitization.

A 0.01 percent solution of Hyamine 10-X used repeatedly as an eyewash in humans produced only mild irritation.

APPLICATIONS

Hyamine 1622 Crystals and Hyamine 10-X are powdered crystalline quaternary germicides, and are especially suited for formulating dry powdered products. By mixing Hyamine crystals with inert, compatible diluents, powdered disinfectants or sanitizers can be prepared.

Convenience and exactness of dosage contribute to the popularity of tablets. Hyamine 1622 Crystals and Hyamine 10-X can be made into sanitizing tablets containing up to 50 percent active quaternary. As noted earlier, these products have a relatively low hard water ceiling and sequestering agents should be employed to improve the efficiency of these products in hard water. The tablet manufacturer should evaluate his final composition by the AOAC Germicidal and Detergent Sanitizer Test to assure proper sanitizing performance in his marketing area. Other excipients such as lactose, ammonium sulfate, sodium bicarbonate, citric acid and other highly soluble substances may be used to optimize the physical properties of the finished tablet.

SPECIALTY APPLICATIONS

Disinfectants for surgical instruments, barbers' tools, and dentures can be prepared in the form of aqueous concentrates, powders, or tablets. A quaternary concentration of 1000 ppm is required for instrument disinfection.

Hyamine 1622 and Hyamine 10-X find wide use in the veterinary field as disinfectants and deodorants. Tinctures and lotions may be considered for topical antiseptics and for storage of sterile instruments. Products of this type will also require clearance by the Food and Drug Administration.

Pharmaceutical formulations are subject to the New Drug Regulations of the Federal Food, Drug, and Cosmetic Act, as amended, pertaining to the safety and effectiveness of such products.

GENERAL DEODORIZATION

Hyamine 1622 and Hyamine 10-X are true deodorants which destroy obnoxious odors instead of masking them. Odors due to microbial decomposition are also eliminated by the destruction of the microorganisms.

A 1:1000 dilution of active ingredient of Hyamine products, applied by mopping, spraying, or sponging, will quickly control cooking odors, odors of putrefaction, personal illness, and odors in public rooms without contributing a chemical or disinfectant odor.

ALGAE CONTROL

Algae developing in swimming pools can be controlled with very low concentrations of the Hyamine germicides. Concentrations of only 10 ppm active Hyamine 1622 will kill most algae strains, and only 5 ppm are necessary to maintain algaestatic conditions.

Pre-measured quantities of Hyamine 1622 Crystals can be packed in water-soluble plastic, and added to the water system as required.

The algacidal concentration of 10 ppm active ingredient in Hyamine 1622 does not replace chlorine as a disinfectant, but its activity on algae will help to maintain the chlorine residual.

Algae, like most organisms, may develop resistance to toxicants, necessitating a change in treatment. Should some algae show resistance to Hyamine 1622, a shock treatment with 5 ppm active Hyamine 3500 is recommended.

FEDERAL REGISTRATION

When shipped in interstate commerce, microbicidal formulations must be registered with the Environmental Protection Agency. Applications for registration must be accompanied by five copies of your proposed label, and should be sent to the Coordination Branch, Pesticides Registration Division, Environmental Protection Agency, Washington D.C. 20250. To expedite handling of such applications, reference should be made to EPA File No. 707-X and to the fact that the active germicide is a Rohm and Haas Company Hyamine product. The specific file numbers are: Hyamine 1622 Crystals, 707-15; Hyamine 1622-50[™], 707-50; Hyamine 10-X, 707-81.

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