



Evan Hutto, M.S., CM, RLATG  
Animal Facility Supervisor  
Division of Animal Resources  
Georgia State University

Comparing Two  
Disinfectants  
Through a Price  
Analysis



# The Disinfectants

# MB-10

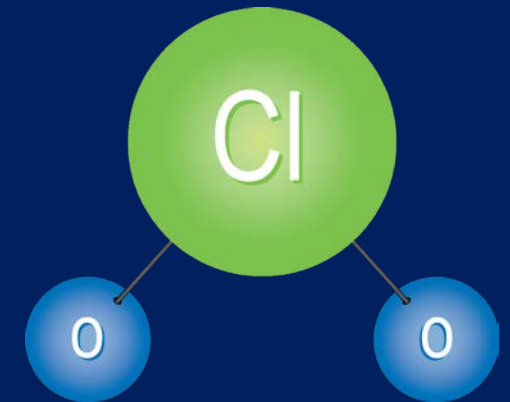


- Chlorine dioxide based disinfectant
  - Virucidal, tuberculocidal, sterilant
  - Active ingredients of sodium chlorite and sodium dichloroisocyanurate
- Tablet form (1.5g or 6g)
  - Used at 200ppm at GSU
    - (1x 6g tablet per gallon of water)
- 15 minutes/gallon to prepare
- 5 minute contact time
- 7 day shelf life after reconstitution



# Notes on Chlorine Dioxide

- Chlorine dioxide is **highly soluble in water**, especially in cold water, but **does not hydrolyze** when it enters water; it remains a dissolved gas in solution.
- Chlorine dioxide is an unstable gas that dissociates into chlorine gas ( $\text{Cl}_2$ ), oxygen gas ( $\text{O}_2$ ) and heat.
- Chlorine dioxide cannot be stored for too long, because it slowly dissociates into chlorine and oxygen
- When chlorine dioxide is photo-oxidized by sunlight, it falls apart
- Chlorine dioxide is corrosive



# RESCUE- Ready To Use (RTU)

- Accelerated hydrogen peroxide based disinfectant
  - virucidal, bactericidal, fungicidal and tuberculocidal
- Shelf life of 24 months
- Contact time of 30 seconds-1 minute
  - 30 seconds used at GSU
- Comes in Ready To Use (RTU) form, no diluting or reconstitution required
- Purchased in in sizes ranging from 32oz- 55 gal
  - GSU primarily purchases the 55 gallon barrel



# Notes on Hydrogen Peroxide

- Hydrogen peroxide breaks down into water and oxygen reducing the environmental impact
- “ Designed to be **easier** on surfaces, people and animals. Users are not exposed to VOCs (volatile organic compounds) and in-use solution does not require the use of PPE”

# Step 1

Price Comparison:

Face Value



# Price Comparison Per Bottle (21oz)

Why 21oz?

## MB-10

Price Per Case (160 tabs):	\$ 446
Price Per Tab (makes 1 gallon):	\$2.79
128oz (1 gallon) / 21oz =	6x Bottles
\$2.79 / 6 Bottles =	<b>\$0.46/ Bottle</b>

## RESCUE RTU

Price Per 55 gallon Barrel (7040oz):	\$1,173
7,040oz / 21oz =	335 Bottles
\$1173 / 335 Bottles =	<b>\$3.50 / Bottle</b>

**RESCUE RTU is 7.6x more expensive than MB-10 per bottle**

\* Note that MB-10 typically incurs wasted product, whereas RESCUE RTU typically has no waste and the true price per bottle varies per room based on time it takes to use bottle

# Step 2

Price Comparison:

Cost Per Year

# MB-10 Cost Per Year

- GSU was using 20 gallons of MB-10 Weekly between 2 facilities at 21oz/bottle

20 gallons/week X 52 weeks =	1,040 gallons
1 tab/ gallon x 1040 gallons =	1,040 tabs
1,040 tabs / 160 tabs/case =	6.5 cases/ year
7 cases @ \$446 =	<b>\$3,122 / year</b>

# RESCUE RTU Cost Per Year

Estimated 997 Bottles (32oz) would be used over a year

- Switched to 32oz per bottle in relation to extended shelf life to minimize time refilling bottle

997 Bottles @ 32oz per bottle = 31,891oz

31,891oz / 128oz (1 gallon) = 249.15 gallons

249.15 gallons / 55 gallon barrels = 4.53 barrels

5 barrels @ \$1,173 = **\$5,865**

# Price Comparison

## MB-10

Disinfectant Cost: \$3,122

TOTAL: \$3,122

## RESCUE RTU

Disinfectant Cost: \$5,865

TOTAL: \$5,865

Difference of \$2,743 in favor of MB-10

# Step 3

Price Comparison:

Labor Cost

# Labor Cost of MB-10

- 60 bottles changed out weekly @ 2 minutes per bottle
  - Retrieving bottle, disposing of waste, refilling, filling out new expiration sticker and returning bottle

	Time Spent		*Labor Cost
Weekly	120min		\$ 46.92
Pay period	240min	(4 hours)	\$ 93.85
Yearly	6240min	(104 hours)	\$ <b>2,440.06</b>

\* Labor cost calculated at \$23.46/ hour

# Labor Cost of RESCUE RTU

- 997 bottles used yearly at 2 minutes a bottle.

	Time Spent		*Labor Cost
Weekly	39min		\$ 15.25
Pay period	77min	(1hr 17min)	\$ 30.03
Yearly	1994min	(33.5 hours)	\$ <b>785.98</b>

\* Labor cost calculated at \$23.46/ hour



# Price Comparison

## MB-10

Disinfectant Cost: \$3,122  
Labor Cost: \$2,441

**TOTAL: \$5,563**

## RESCUE RTU

Disinfectant Cost: \$5,865  
Labor Cost: \$786

**TOTAL: \$6,651**

Difference of \$1,088 in favor of MB-10

A reduction in the previous price difference by 40%

MB-10 labor cost is >3x than labor cost for Rescue RTU

# Step 4

Price Comparison:

Accounting for the  
Small Things and Less Considered  
Cost

# Small Things

## Ex. Expiration Stickers

			1 Year	2 Years
MB-10	60 bottles/wk	3120 stickers/yr	\$ 87.23	\$ 174.46
RESCUE RTU	60 bottles/wk	60 stickers/2 years	\$ 6.99	\$ 6.99

- A small cost on either option when looking at one year, but can see how the price difference increases exponentially the further you go out.
- Reinforces the cons and cost that are associated with the weekly bottle changes that occur with MB-10.
- What other small items might we be missing that would add into the actual cost of these disinfectants (example: bottle/sprayer wear and tear)

# Contact Time

	Contact time	Animal Rooms	Per Day (min)	Per Yr (min)	Per Day (\$)	Per Yr (\$)
<b>MB-10</b>	5 min	27 Hoods	135	35,100	\$52.79	\$13,725.33
<b>Rescue RTU</b>	30 sec	27 Hoods	13.5	3,510	\$5.28	\$1,372.53

-This number is hard to encapsulate due to so many other factors. It would be nearly impossible to account accurately for as many times contact time would be a factor (bring items into facility, disinfecting items from ABSL2/ABSL3, disinfecting surfaces, etc.).

- The idea of using hoods gives us a model to look at with a fixed number to compare the two disinfectants

# Price Comparison

## MB-10

Disinfectant Cost:	\$3,122
Labor Cost:	\$2,441
Sticker Cost	\$ 87
Contact Time	\$13,726

**TOTAL: \$19,376**

## RESCUE RTU

Disinfectant Cost:	\$5,865
Labor Cost:	\$786
Sticker Cost	\$ 7
Contact Time	\$1,373

**TOTAL: \$8,031**

Difference of \$11,345 in favor of RESCUE RTU

# Step 5

Price Comparison:

Accounting for the  
Invaluable

# Think About This...

What are some of the things that we might not be able to as easily put a number on or would not take into account at a first glance but could skew the decision one way or another

# Confidence in the product...

- Confidence that RESCUE RTU is not **Off Gassing** like MB-10
  - Losing efficacy
  - Not maintaining long enough to work on surfaces
- Confidence researchers/staff are upholding the listed contact time.
  - Unlikely with 5 minutes compared to 30 seconds
- Confidence in proper preparation
  - Eliminates the possibility of human error in mixing MB-10 compared to buying premade RESCUE



# Wear and Tear on Facility

- MB-10 is corrosive
  - Noticeable damage to stainless steel surfaces
    - Counter tops
    - BSC surfaces

# Convenience

- No missed bottles during weekly changes
  - Ineffective disinfectant in facility
  - Inspector favorite
- No dedication of time weekly to changing bottles facility wide
  - Including inconvenient areas (ex. Transport vehicles)

# In Conclusion

Comparing the two disinfectants (RESCUE RTU and MB-10) showed us that MB-10 was a cheaper option for the chemical alone, but when adding labor cost the two disinfectants were much closer in price than initially expected.

After considering several other theoretical models and several non-cost factors we were able to come to our conclusion. Even though the hard numbers showed RESCUE RTU to be more expensive option, based on the comparison we were able to gather a theme that our price difference would be more than recaptured to make RESCUE our best option.

**Evan Hutto**

**Phone: 404-759-1480**

**Email: [ehutto3@gsu.edu](mailto:ehutto3@gsu.edu)**



# VOEN Analytics Conference 2018

## Impact Summary



**Title:** Comparing Two Disinfectants Through a Price Analysis

**Problem and analysis method:** Compared price models of two disinfectants based on usage, labor cost, and other potential cost factors to see which is more price efficient for our program.

**Summary:** Comparing the two disinfectants (RESCUE RTU and MB-10) showed us that MB-10 was a cheaper option for the chemical alone, but when adding labor cost the two disinfectants were much closer in price than initially expected. After considering several other theoretical models and several non-cost factors we were able to come to our conclusion. Even though the hard numbers showed RESCUE RTU to be more expensive option, based on the comparison we were able to gather a theme that our price difference would be more than recaptured to make RESCUE our best option.

### Impact of the analytics study

**Decisions made/Actions Taken:** Based on the discussed price analysis and investigation GSU was able to confidently change disinfectants used across our rodent facilities.

### Calculated or actual Improvements:

- Reduced labor hours by 70.5hrs/year or \$1,653
- Increase in confidence of biosecurity (no off gassing)
- Preservation of facility and equipment
- Staff morale