

## Improving Biocide Cost-Performance and Toxicity Profile with Biocide Potentiation

Biocides are well-known additives used for microbial control in oil and gas (O&G) to mitigate costly issues, such as poor heat transfer, microbially induced corrosion (MIC), plugging and fouling. However, biocides are toxic by definition and often added in excess, potentially compromising asset integrity.

With increased interest in sustainability, companies across industries are seeking less-toxic, lower-cost alternatives with reduced environmental impact and without sacrificing performance.

Verza360 (Verza) is a series of organic acid-based chemistries that do not exhibit any pesticidal activity when used alone. When co-fed with biocides, Verza helps achieve consistent microbial control by reducing interference from inorganic environmental contaminants, such as naturally occurring minerals and metals that interfere with active biocides.



### The Verza360<sup>®</sup> Advantage

#### Lowers use of active biocide and related treatment costs

Verza improves the efficacy of biocidal applications, such as glutaraldehyde, glut/quat mixtures, and THPS, allowing for lower use of active biocide and related treatment costs.

#### Multifunctional iron control agent

Verza is a proven solution for iron control in water treatment applications within O&G, providing multifunctional performance benefits.

#### Sustainable US supply

Verza is manufactured in the US via a carbon-negative chemienzymatic process. It is non-toxic, biodegradable, and lowers safety risks associated with biocide use, such as discharge water toxicity.

# Solugen

## Test Case: Verza360® Enables Reduced Biocide Use and Improved Performance

Across three test cases where Verza was evaluated by itself and co-fed with common biocides used in O&G, Verza demonstrated no pesticidal effect by itself and a potentiation effect when co-fed, enabling up to 50% reduction in biocide use while maintaining or improving performance by up to 4.5 log reduction (Figure 1).

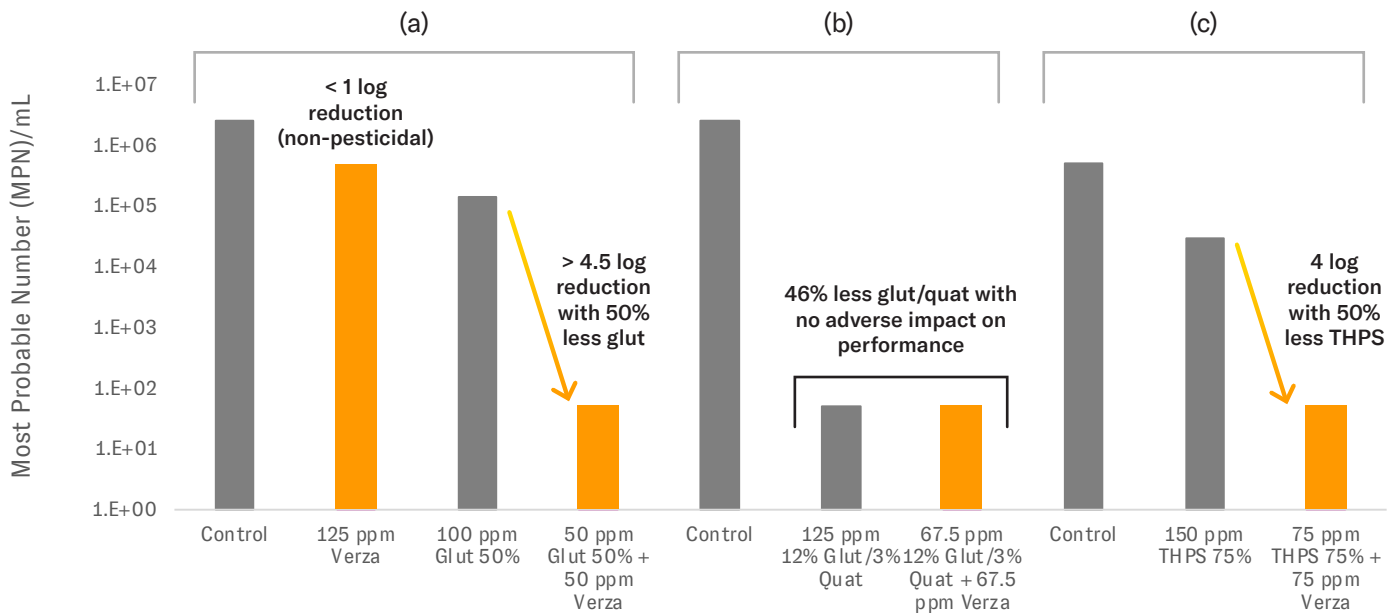


Figure 1. Potentiation Effect of Verza with (a) Glutaraldehyde, (b) Glut/Quat, and (c) THPS

## Test Conditions

All three laboratory tests were conducted in triplicate using a 96-well microtiter plate at rm. temp. and mixed bacterial inoculum in Permian fresh water. The bacterial inoculum for tests (a) and (b) was a mixture of GHB and APB with a 4-hr. contact time while the inoculum for test (c) was a mixture of SRBs with a 24-hr. contact time.

For a complete case study or additional information on our Verza360 product line, visit [solugen.com/oilandgas](http://solugen.com/oilandgas) or contact us at [energysolutions@solugen.com](mailto:energysolutions@solugen.com). Pricing available upon request.