

Physicochemical and
Microbiological Properties of
BromMax 7.1 and Justeq07

What is Justeq07?

EPA registered biocide

Sulfamic acid stabilized form of chlorine

- 7% Sodium hypochlorite (6.7% as Cl_2)
- 1.5% Sodium bromide

What is BromMax 7.1?

EPA registered biocide

BromMax 7.1 is made from dilution of BromMax 10.2

- 16% Br₂ (7.1% expressed as Cl₂)

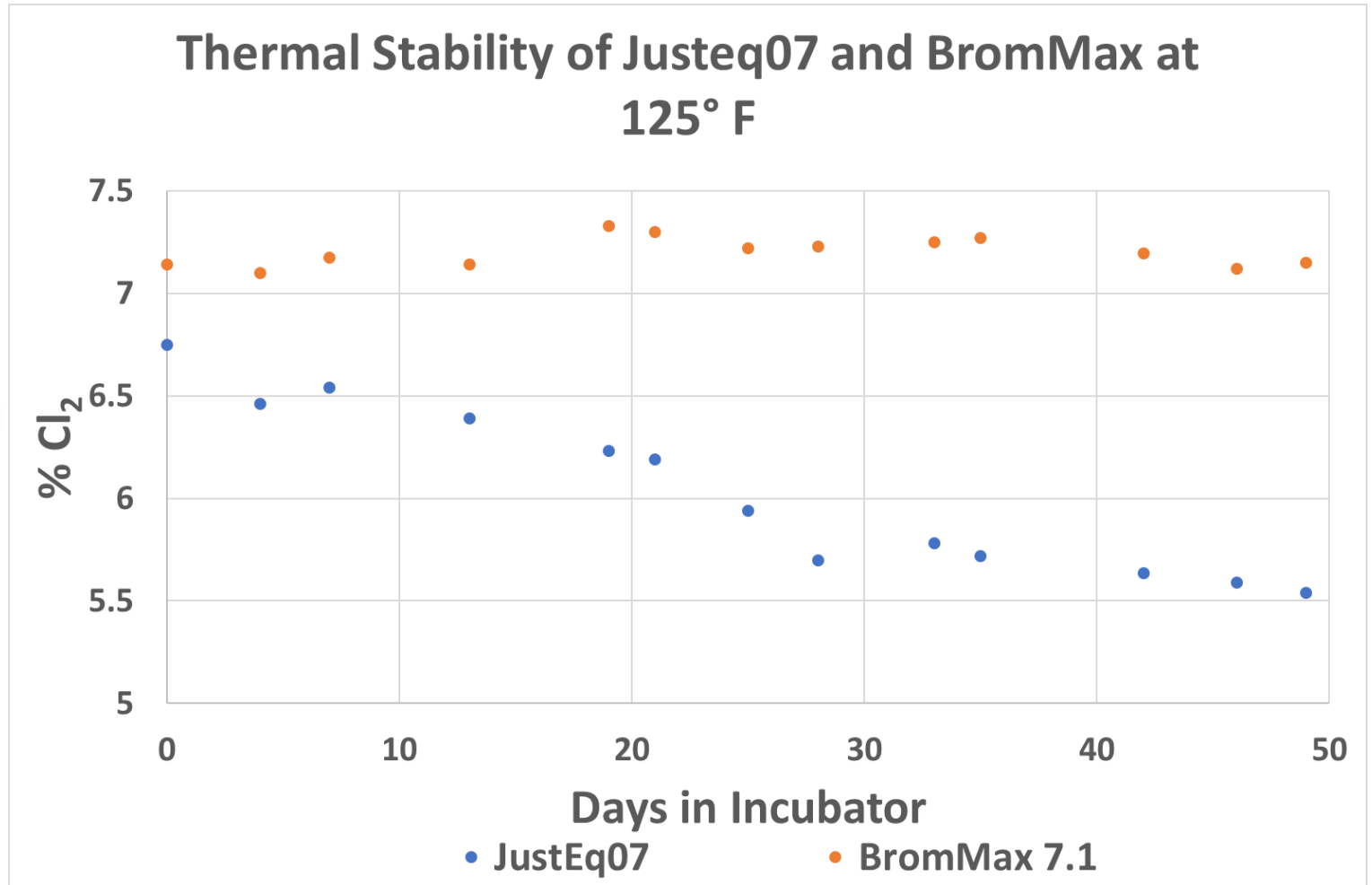
BromMax 10.2 is made by oxidizing sodium bromide with solid trichloroisocyanuric acid (trichlor)

- Solid trichlor means no introduction of water to dilute activity

What is Stabilized Chlorine?

- Not EPA registered biocide
- Made in the laboratory from sulfamic acid, NaOCl, and NaOH
 - 6.4% expressed as Cl₂
- **Contains no Sodium Bromide**

30 days at 125°F is
equivalent to 1 year at
ambient temperatures



Microbiological Properties in Synthetic Cooling Water (SCW)



Calcium Hardness – 250 mg/L (as CaCO₃)



Carbonate Alkalinity – 200 mg/L (as CaCO₃)



PBTC – 10 ppm (to prevent CaCO₃ precipitation)



Conductivity – 2500 μS/cm (adjusted with NaCl)



pH – 8 and 9 (adjusted with NaOH)

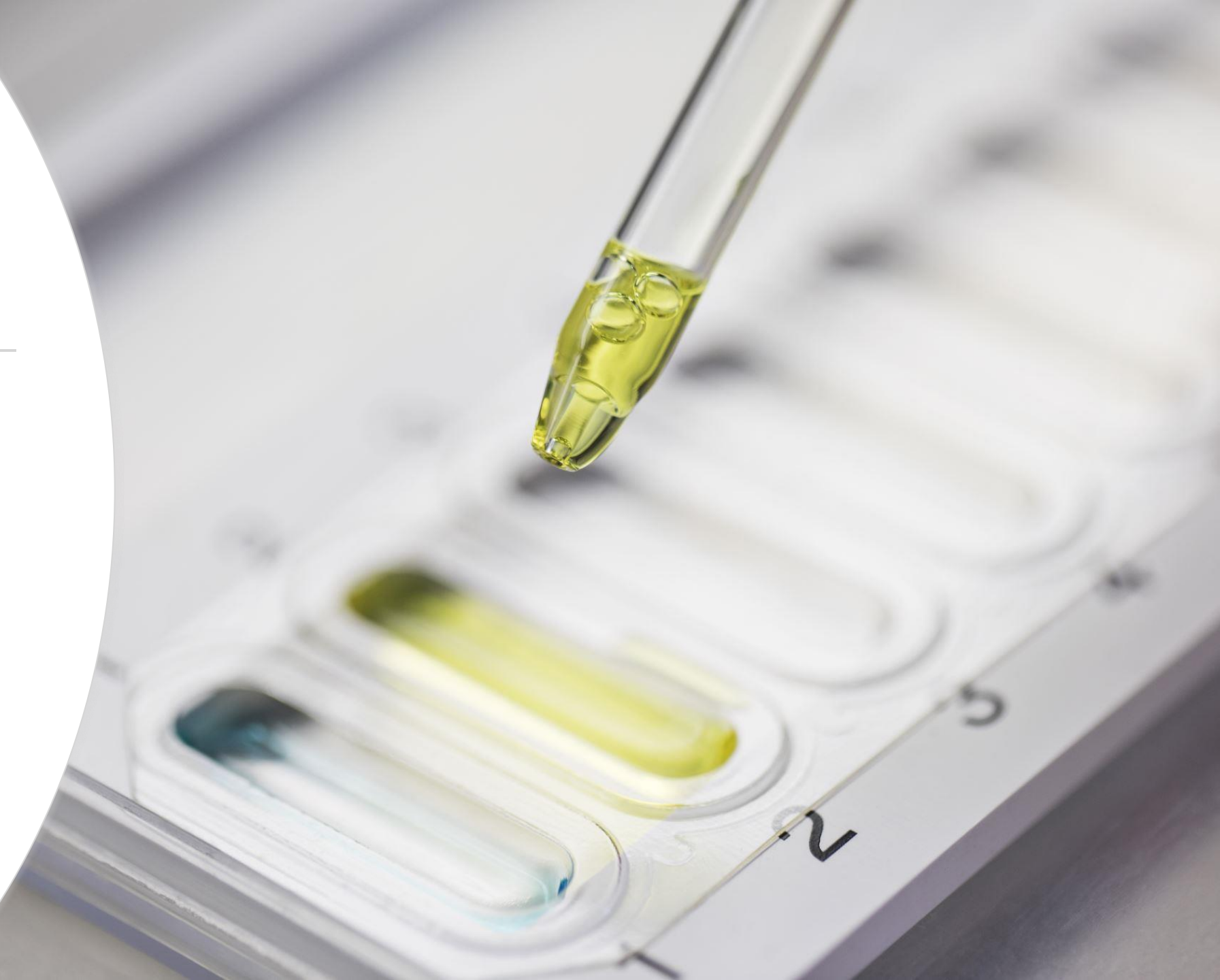


Target Organism – *Pseudomonas aeruginosa* (ATCC 27853)



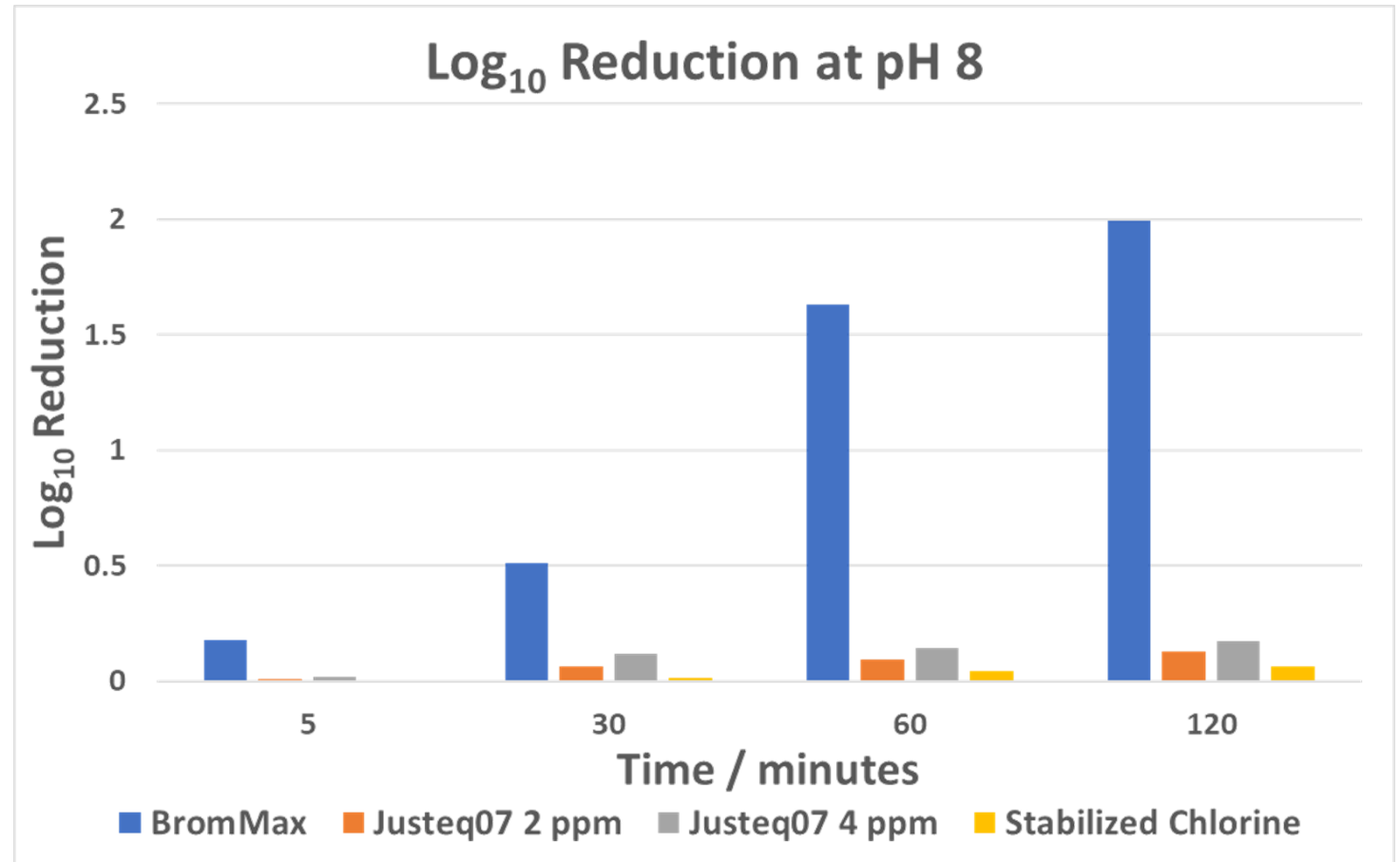
Test Solutions

- BromMax
 - 2 ppm as Cl₂
- Justeq07
 - 2 ppm as Cl₂
 - 4 ppm as Cl₂
- N-Chlorosulfamate (Stabilized Chlorine)
 - 2 ppm as Cl₂



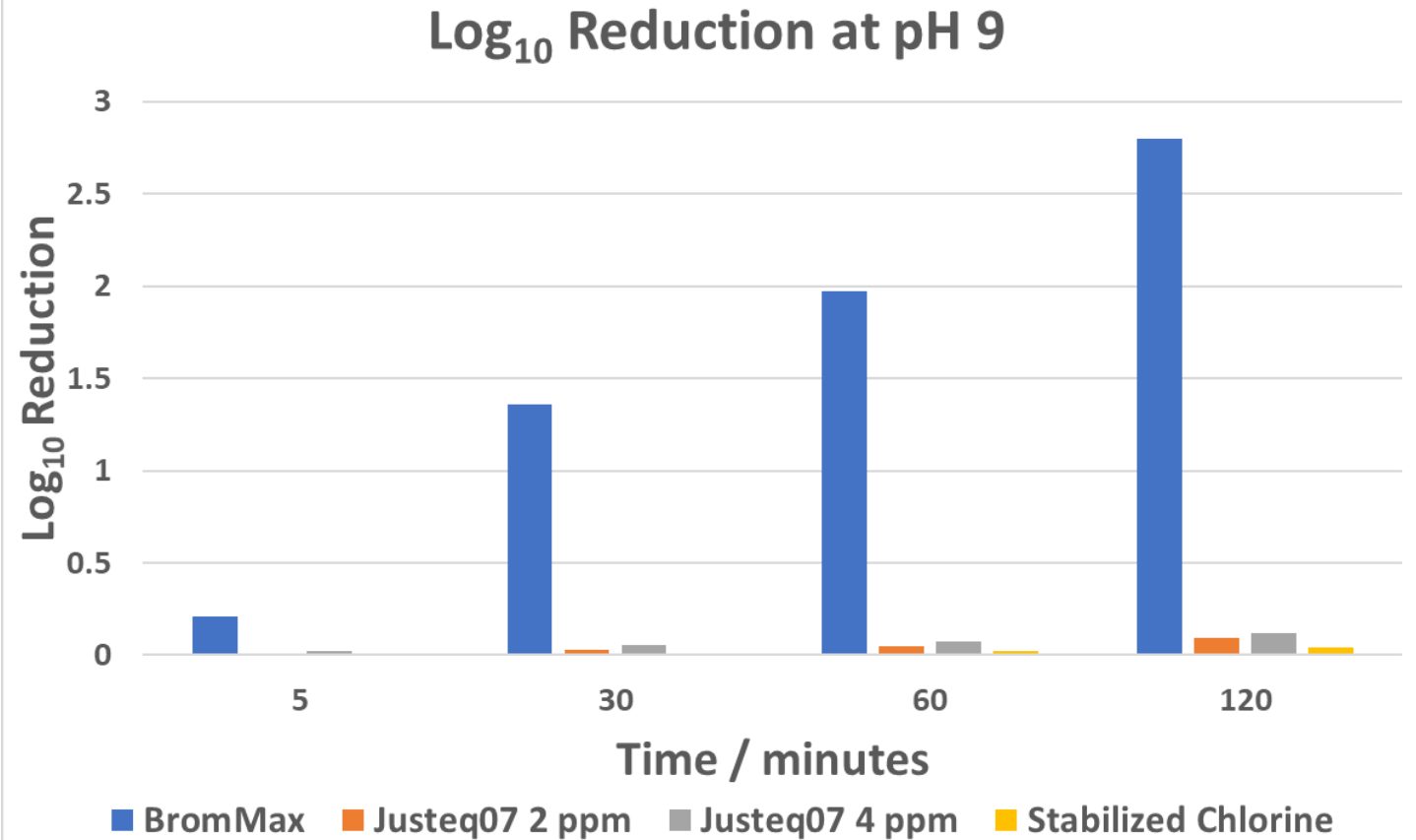
Initial \log_{10} 7.83

Target Organism *Pseudomonas aeruginosa*



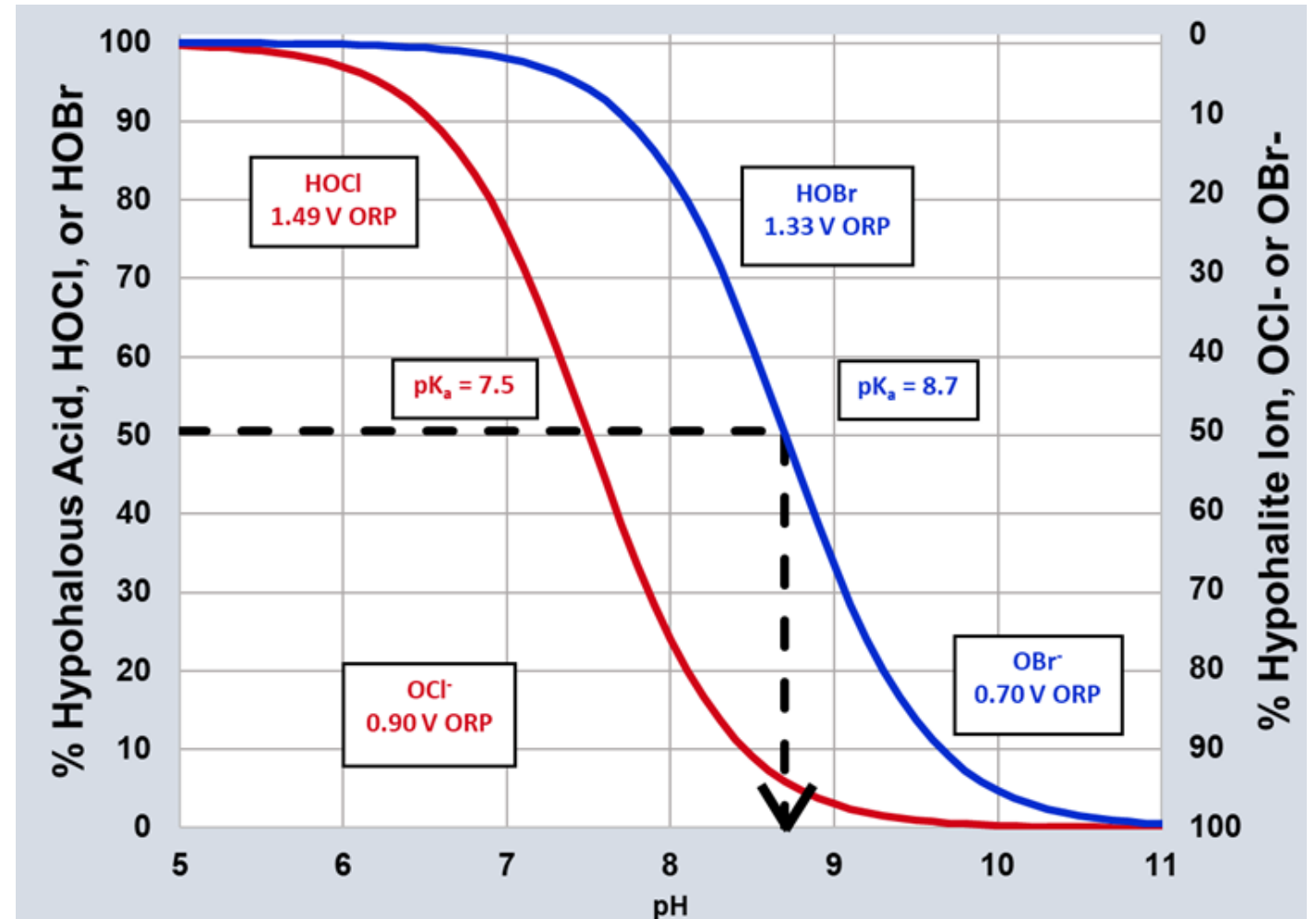
Initial \log_{10} 7.83

Target Organism *Pseudomonas aeruginosa*



How does BromMax 7.1 Compare to Justeq07?

- At pH 8.8, 50% of the bromine is present as effective HOBr, while only 5% of chlorine is present as HOCl



Conclusions



Both BromMax 7.1 and Justeq07 display acceptable storage stability



At pH 8 and 9, BromMax 7.1 performs as HOBr-releasing biocide



At pH 8 and 9, Justeq07 performs as HOCl-releasing biocide



Justeq07 has the same biocidal performance as N-chlorosulfamate

Presence of NaBr confers no benefit



Even at 2x concentration of Justeq07, biocidal performance does not even come close to BromMax 7.1