

The Ideal Degree of Dilution for Povidone-Iodine as a Breast Implant Irrigant Solution: An in-Vitro Model

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BACKGROUND

- In implant-based breast surgery, **infections** remain a challenging complication, leading to significant clinical and financial consequences.
- Surgeons may choose to prophylactically address this risk by irrigating the implant with **povidone-iodine** at the time of placement.
- There remains little consensus regarding the **ideal dilution** of povidone-iodine for optimal efficacy.

METHODS

- The authors assessed the efficacy of 10% povidone-iodine at three potential dilutions (**100%, 50% or 25% strength**) against four groups of bacteria:
 - Staphylococcus aureus*
 - Staphylococcus epidermidis*
 - Escherichia coli*
 - Pseudomonas aeruginosa*
- Normal saline was included as a negative control. **Sterile, smooth implant disks** were immersed in each irrigant solution and then incubated in suspensions of each bacterial strain overnight at 37°C.
- Each disk was rinsed and sonicated to displace **biofilm forming bacteria**.
- The displaced bacteria were quantified, and normalized values were calculated for the bacterial counts.

OBJECTIVE

- To assess the effect of **dilution** of povidone-iodine in prophylactic irrigation of breast implants against **Gram-positive** and **Gram-negative** bacteria

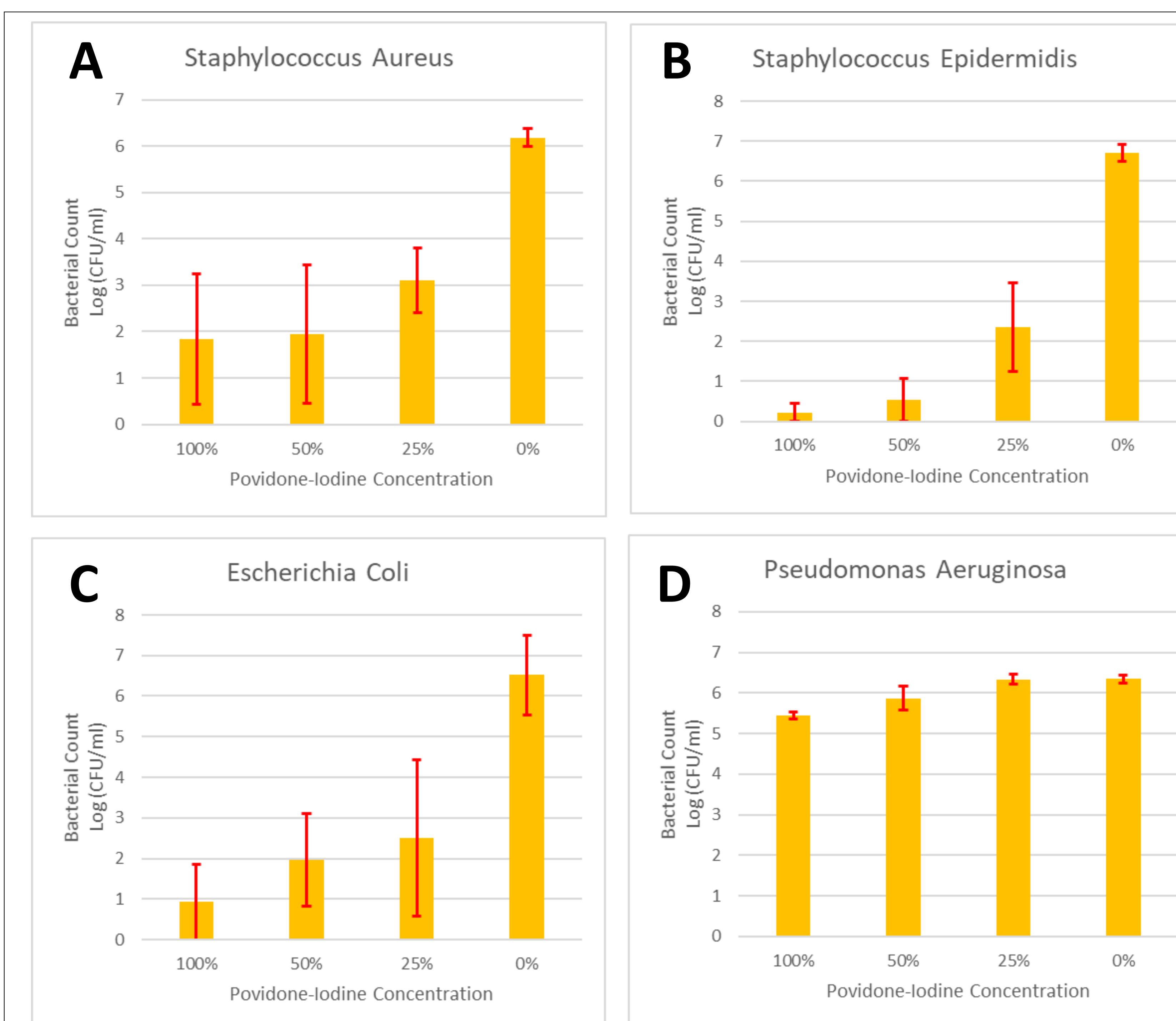


Fig 1. The mean log-transformed bacterial count cultured from the implant disks following irrigation with each respective Povidone-Iodine concentration in [A] *Staphylococcus aureus*, [B] *Staphylococcus epidermidis*, [C] *Escherichia coli*, [D] *Pseudomonas aeruginosa*. Error bars = Standard Deviation

RESULTS (Fig. 1)

- Across all strains of both Gram-positive and Gram-negative bacteria, povidone-iodine resulted in **lower reduction of bacterial load at greater levels of dilution**.
- Povidone-iodine had the greatest reduction in bacterial load in *Staphylococcus epidermidis*, but the lowest reduction in *Pseudomonas aeruginosa*.
- A dilution of 25% led to a moderate bacterial load reduction of **10³ to 10⁴** in three of our bacterial strains, but **no significant** reduction in *Pseudomonas aeruginosa*.
- For 50% and 100% strength, we noted a reduction of **10¹-10⁵** of all bacterial counts, with no significant difference between the dilutions.

CONCLUSIONS

- As we strive to conserve resources in breast surgery, we can recommend that diluting **povidone-iodine in equal parts saline** does not reduce the efficacy of its anti-microbial properties.