

DUAL-FUNCTION SUTURES: CHLORHEXIDINE AND DEXAMETHASONE DELIVERY FOR INFECTION AND INFLAMMATION CONTROL

Brisa Guadalupe Hernández-Ramírez^{1, *}, Giovanni Palomino-Vizcaino², Lilia Angélica Hurtado-Ayala¹, Jonathan Vincent Lopez-Baena¹, Hebrón Vazquez-Estudillo¹, Arturo Estolano-Cobián¹, Teresa G. Rodríguez-Tellez¹, Héctor Milla-Hinojosa³, José Manuel Cornejo-Bravo¹, Kenia Palomino-Vizcaino¹ and Héctor Magaña^{1, **}

¹ Autonomous University of Baja California, Tijuana 22390, Mexico

² Autonomous University of Baja California, Valle de Las Palmas, Tijuana 22260, Mexico

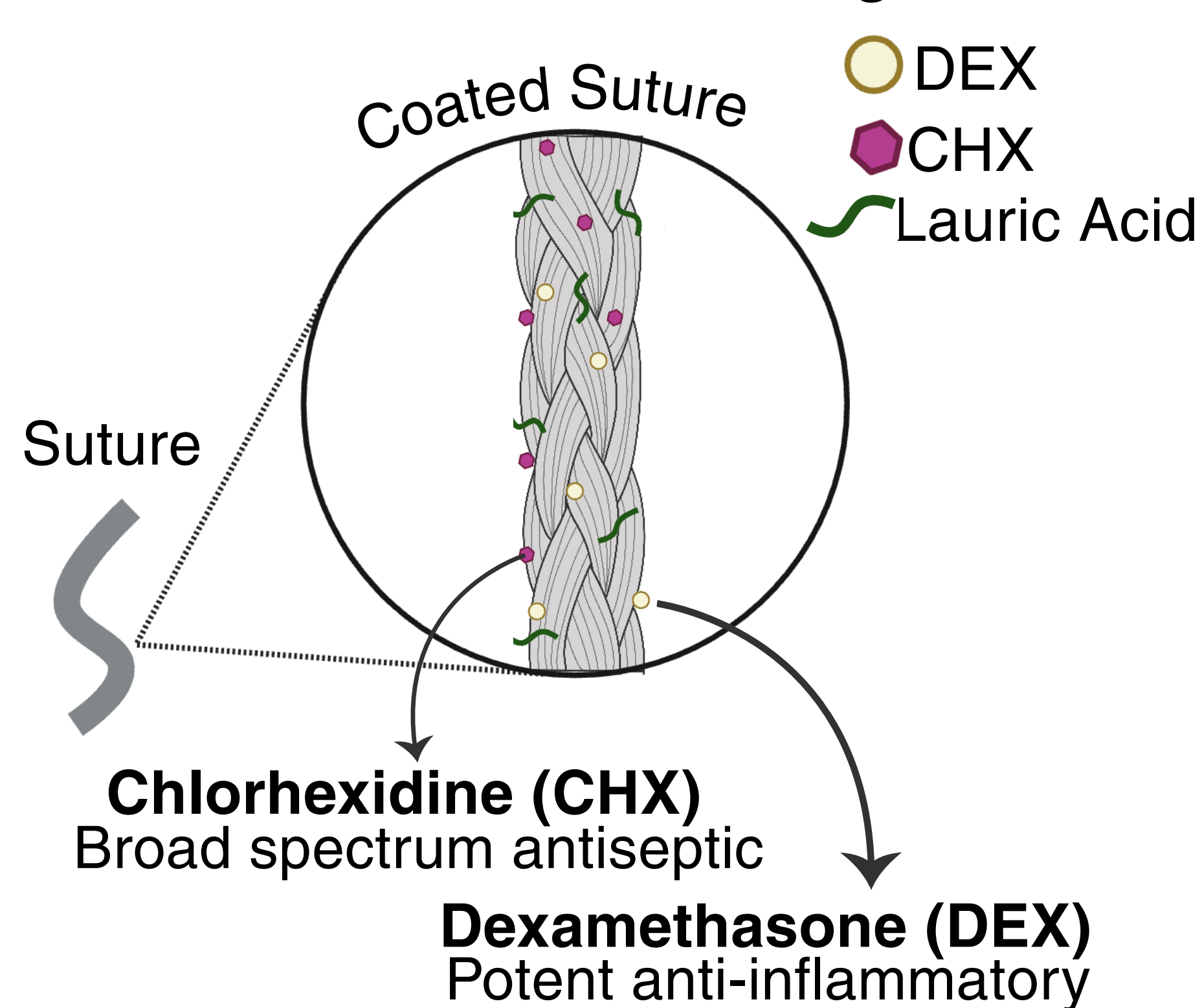
³ Tjplast Outpatient, Tijuana 22010, Mexico

E-mail: *brisa.hernandez@uabc.edu.mx, **hector.magana@uabc.edu.mx

1. Introduction

- Surgical Site Infections (SSIs) represent a **\$3.3 billion** annual burden.
- MRSA** and other strains colonize sutures, forming biofilms that evade systemic antibiotics.
- Persistent inflammation at the wound site can **delay recovery**.

Dual-Action Coating



2. Objective

To develop a dual-action suture designed to enable localized delivery of both therapeutic agents: an antiseptic and an anti-inflammatory.

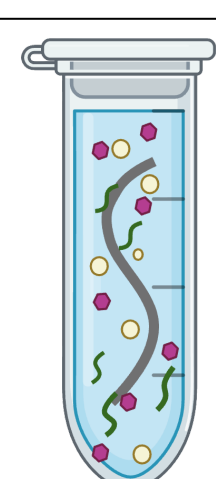
3. Metodology

3.1 Formulation

- Lauric Acid
- Dexamethasone
- Chlorhexidine In ethanol

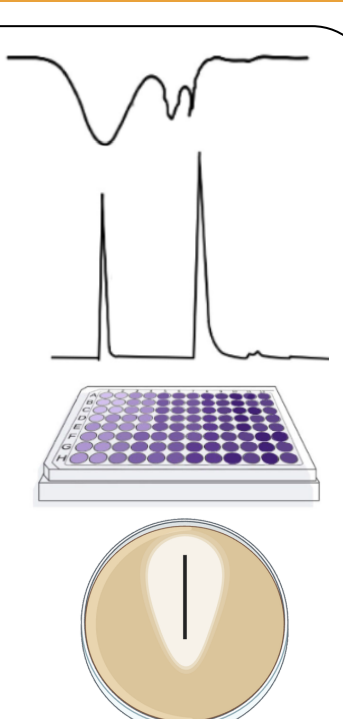
3.2 Coating Process

- Heat and oscilation for dip coating suture



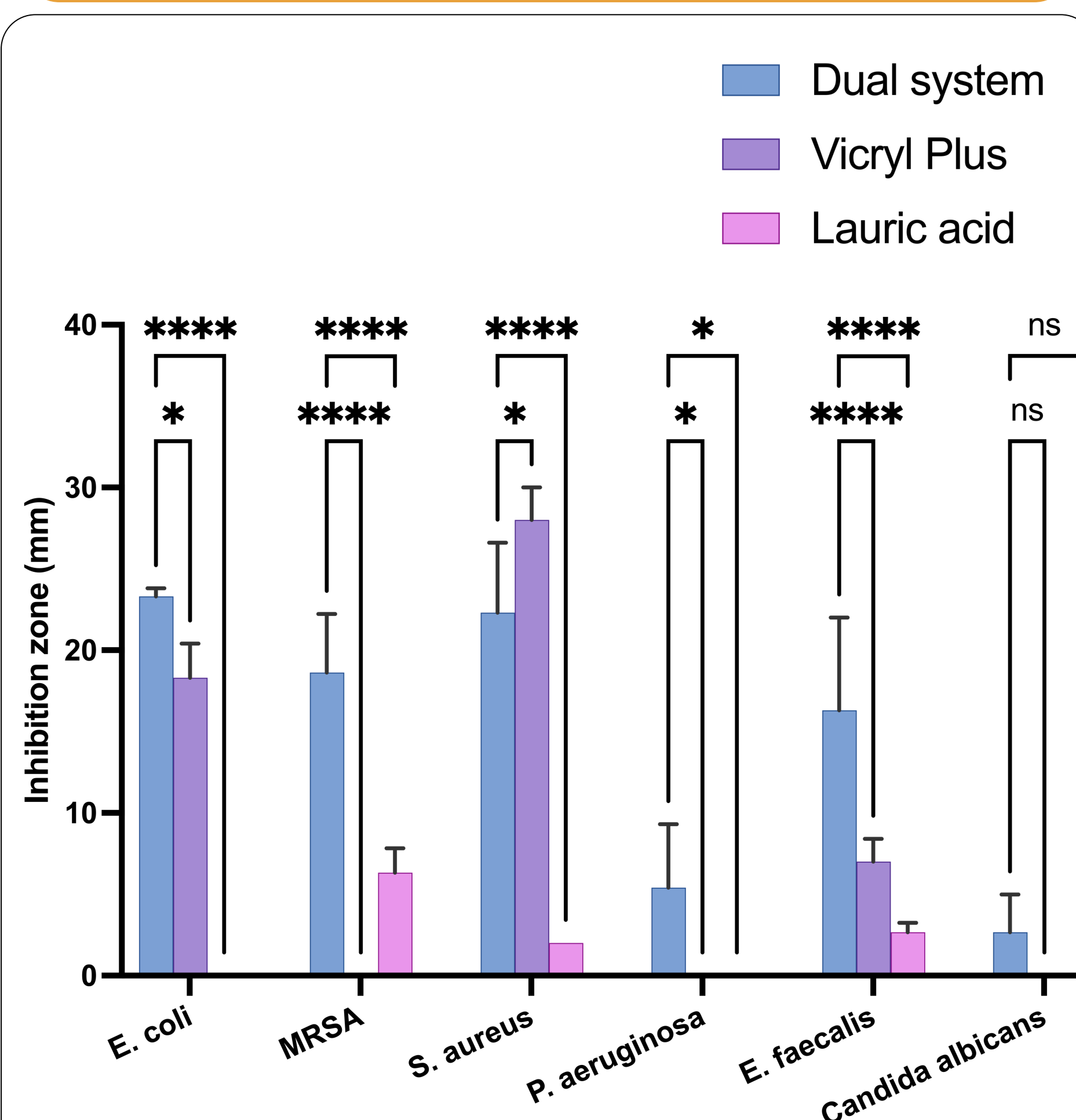
3.3 Characterization

- FTIR
- Tensile strength
- HPLC drug elution
- Cell viability
- Antimicrobial effect

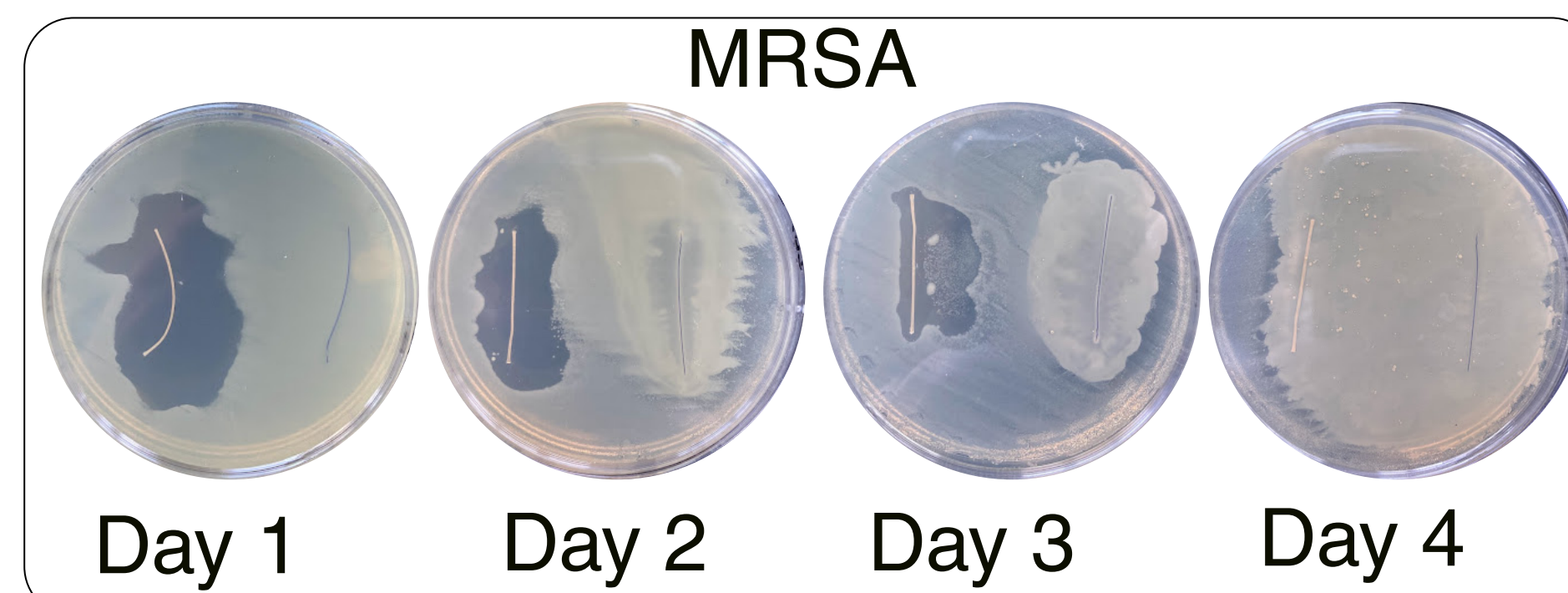
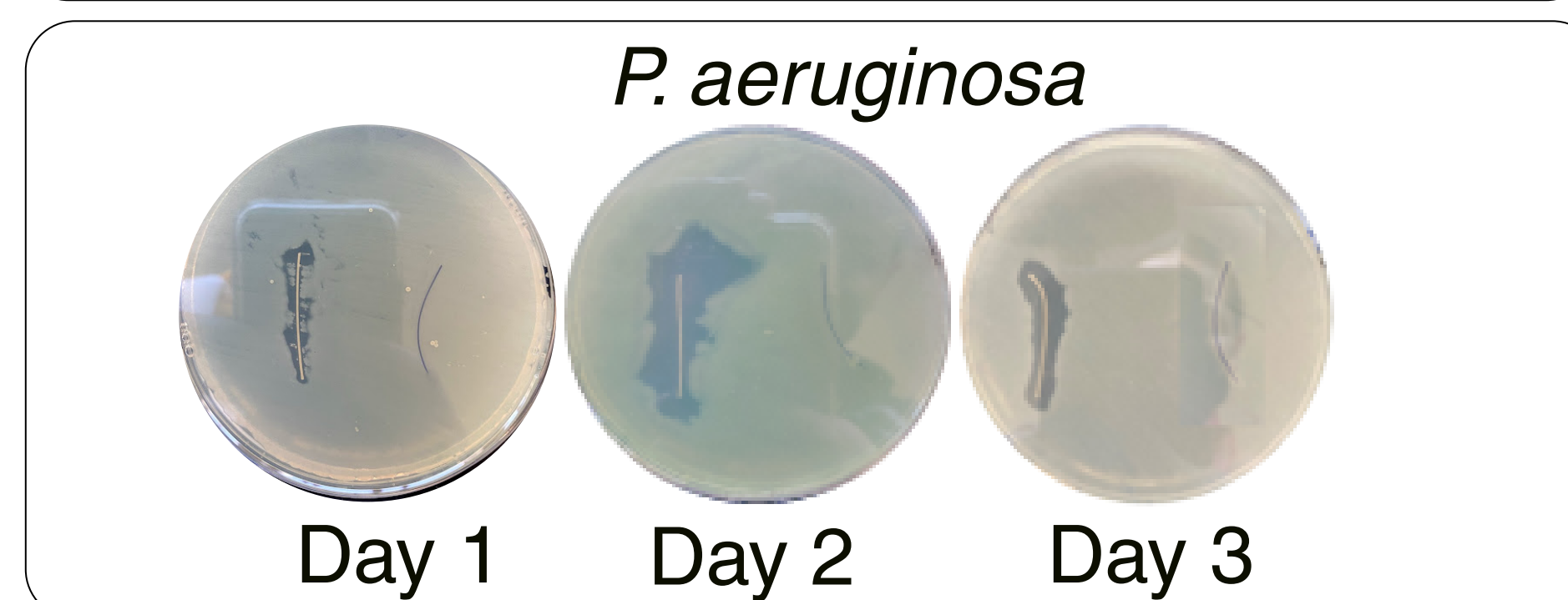
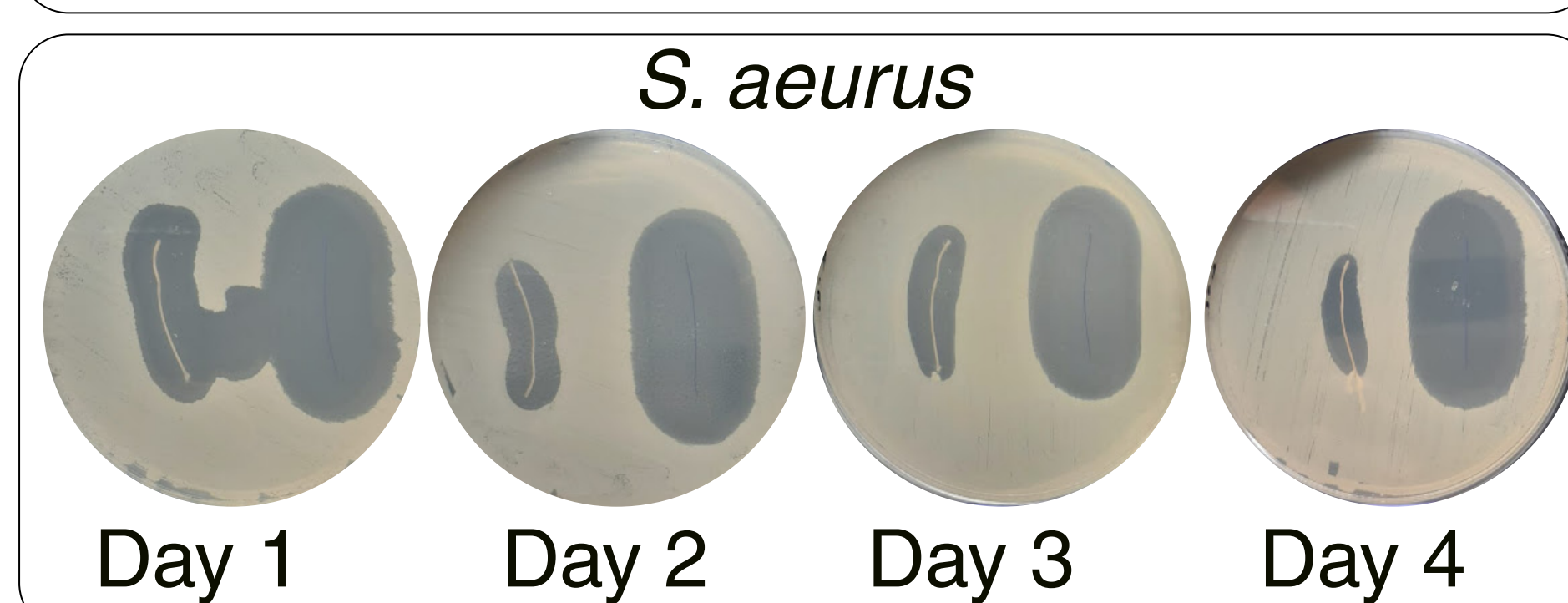


4. Results

4.1 Antimicrobial effect vs Commercial suture



Inhibition Zones (mm) of Suture Formulations on Day 1 (mean ± SD). (*) indicated significant differences among groups (**** $p < 0.0001$; ns, not significant).

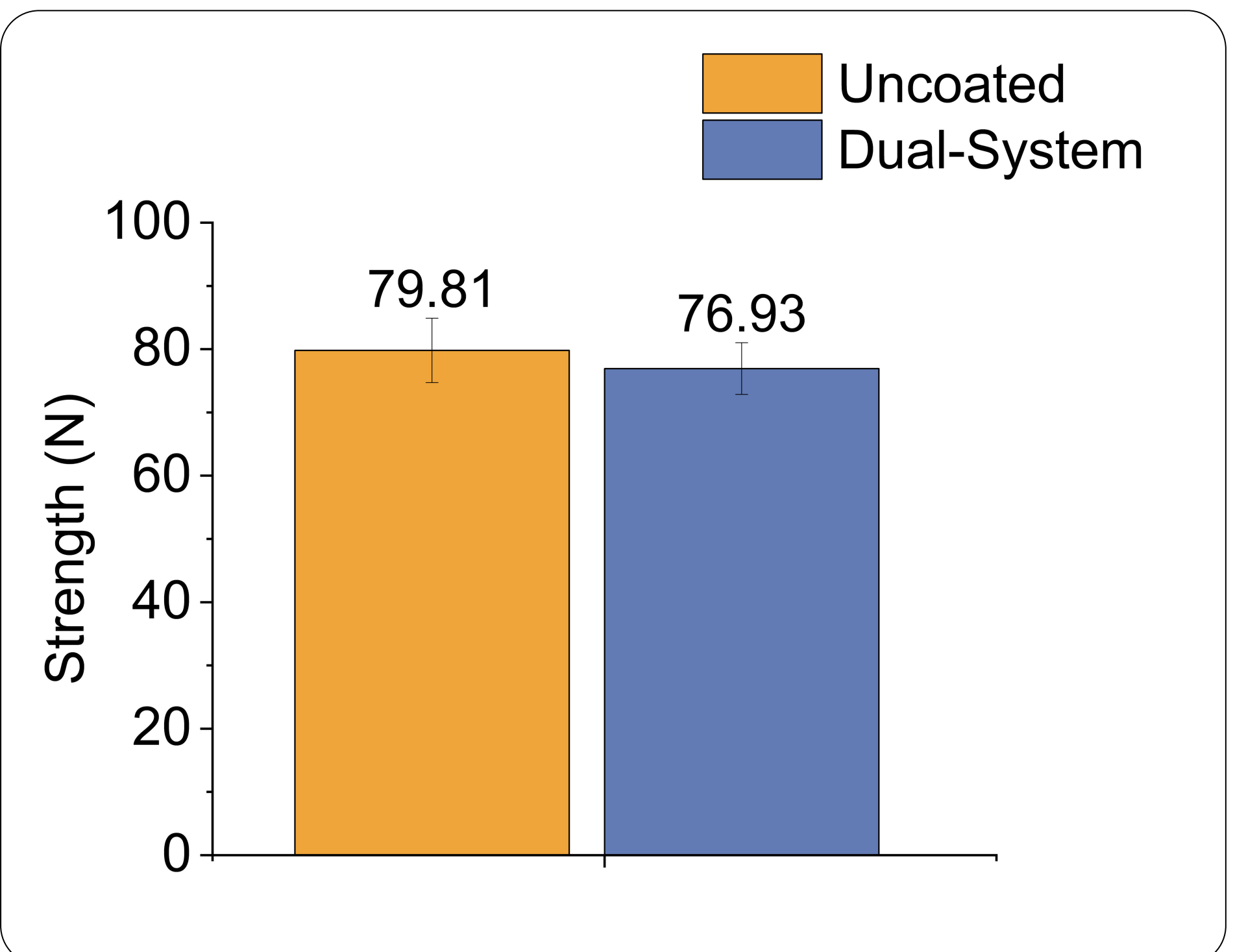


Inhibition zones per day of the dual system (left) and Vicryl Plus (right).

4.2 Drug elution

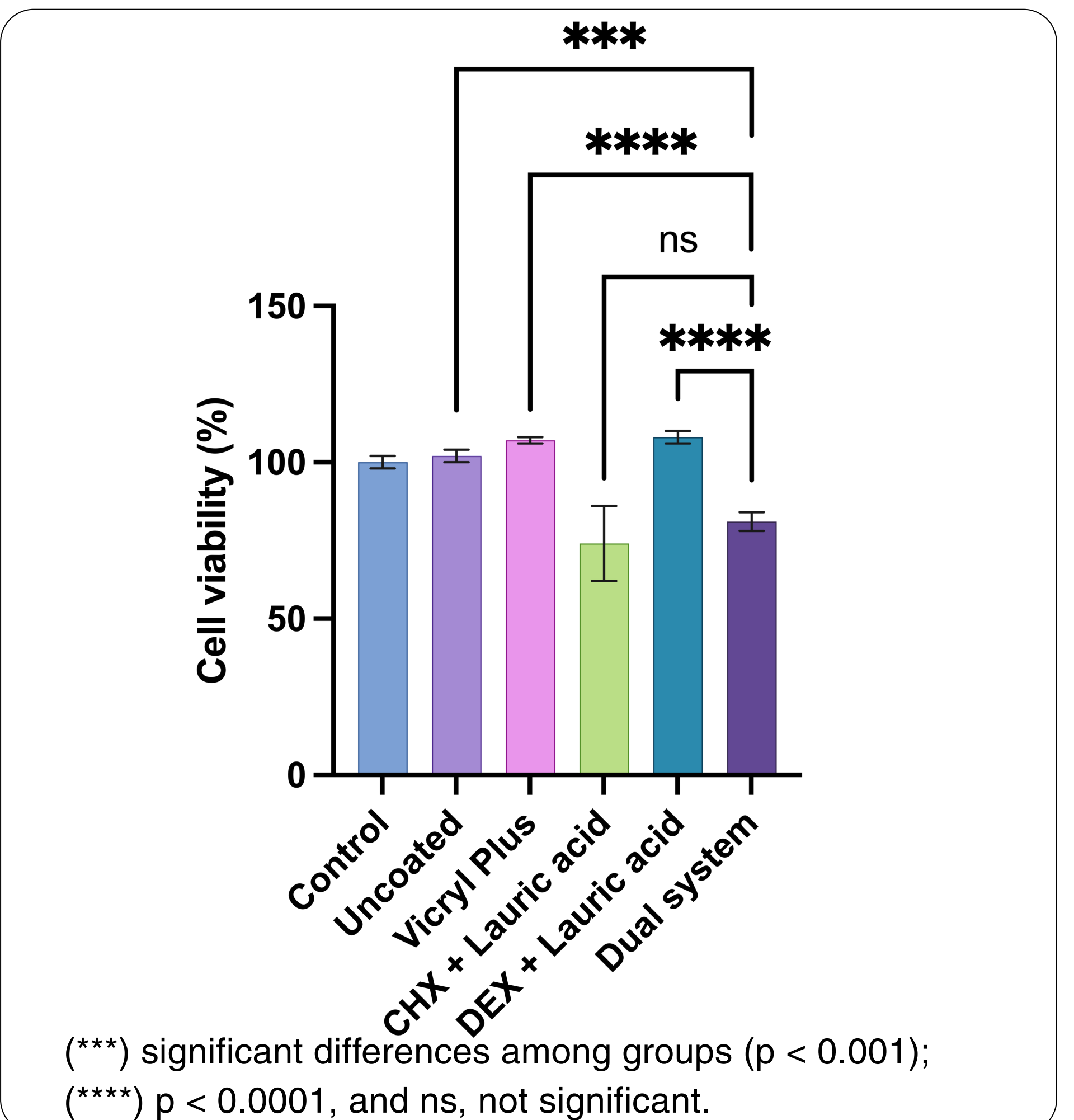
The amount released at 96 h was 140 μg for CHX and 66.45 μg for DEX

4.3 Sutures pre- and post-coating tensile strength



No significant difference ($p > 0.05$)

4.4 Cell viability



(***) significant differences among groups ($p < 0.001$); (****) $p < 0.0001$, and ns, not significant.

5. Conclusions

- Successful MRSA inhibition.
- Elution of both drugs.
- Biocompatibility confirmed.

6. Reference and Contact

- Matl, F.D., et al. New Anti-Infective Coatings of Surgical Sutures Based on a Combination of Antiseptics and Fatty Acids. J. Biomater. Sci. Polym. Ed. 2009, 20, 1439–1449.
- Chua, R.A.H.W., et al. Surgical Site Infection and Development of Antimicrobial Sutures: A Review. Eur. Rev. Méd. Pharmacol. Sci. 2022, 26, 828–845.



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Contact: hector.magana@uabc.edu.mx