

Manufacturing of tear resistant probiotic loaded membrane patches for application on eardrums in chronic otitis media treatment

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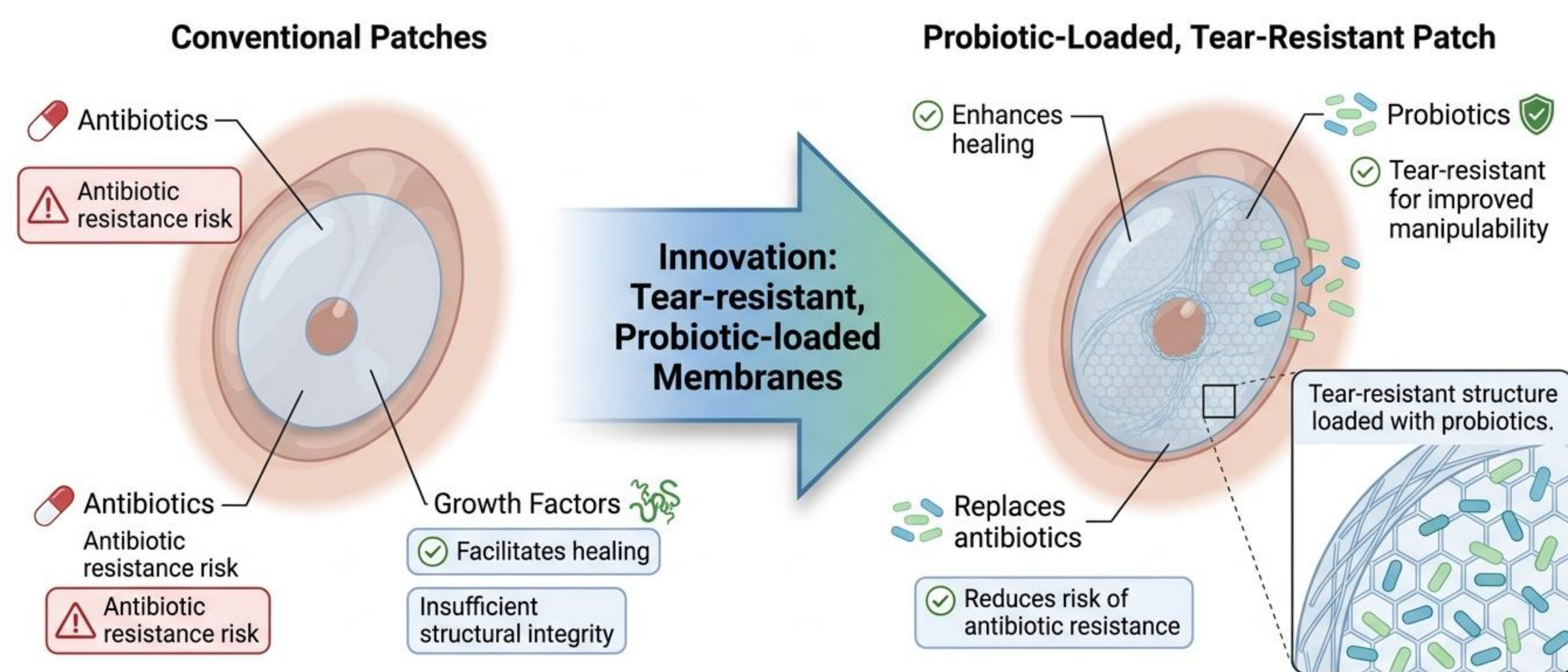
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INTRODUCTION & AIM

Transition from Conventional to Probiotic-Loaded, Tear-Resistant Bioactive Tympanic Membrane Patches



Next-generation tympanic membrane patches replace antibiotics with embedded probiotics for enhanced healing and reduced resistance risk. Structural advances deliver tear resistance, enabling improved surgical handling.

Figure 1: 3D-printed probiotic-loaded membranes as a strategy for restoring a perforated tympanic membrane

METHOD

3D Bioprinting Workflow for Probiotic-Loaded Polymeric Patches

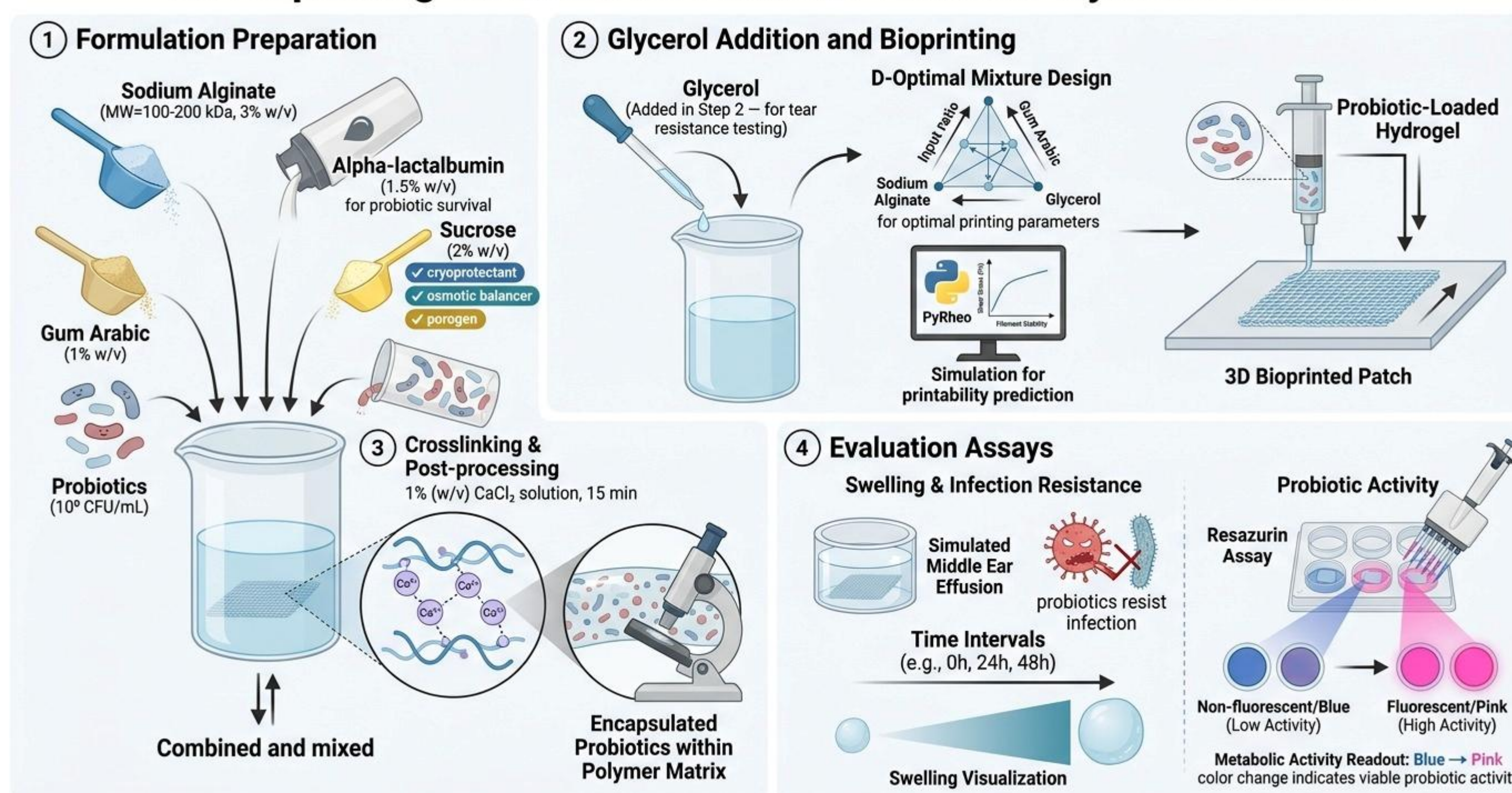


Figure 2: Methodological workflow

RESULTS & DISCUSSION

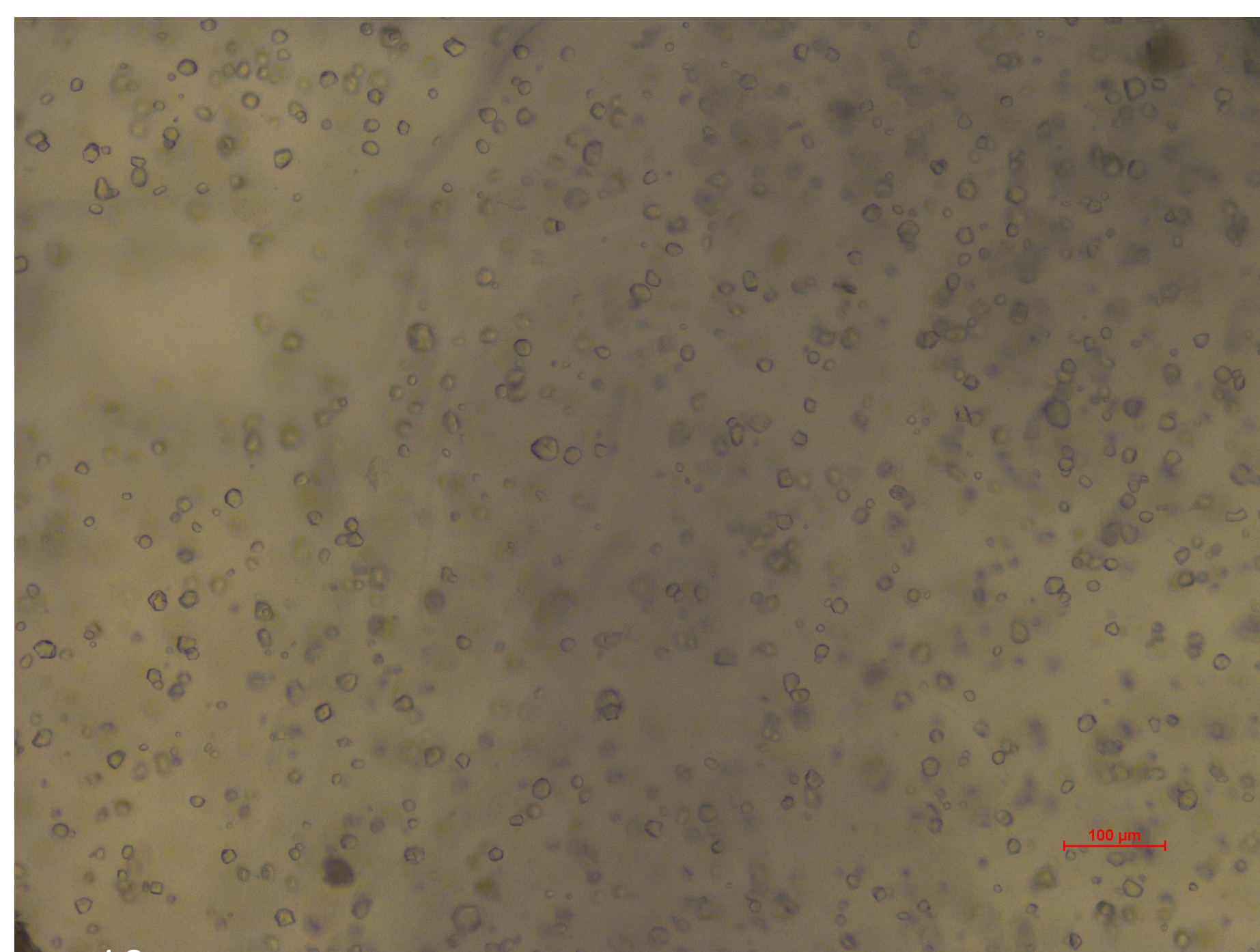


Figure 3: Optical microscopy images of probiotic-loaded membranes after 3D bioprinting

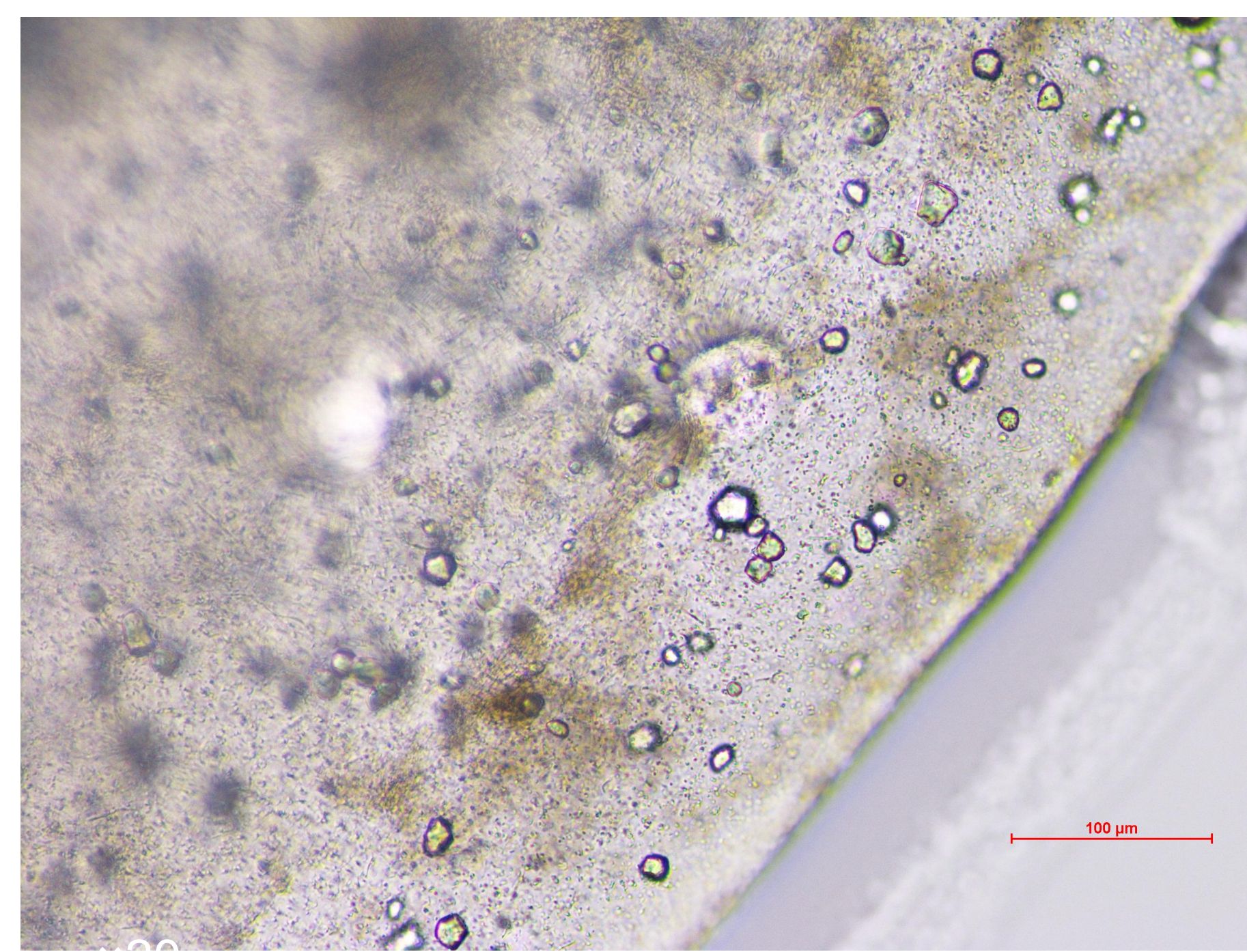


Figure 4: Optical microscopy images of probiotic-loaded membranes after 24 h incubation in SMEE

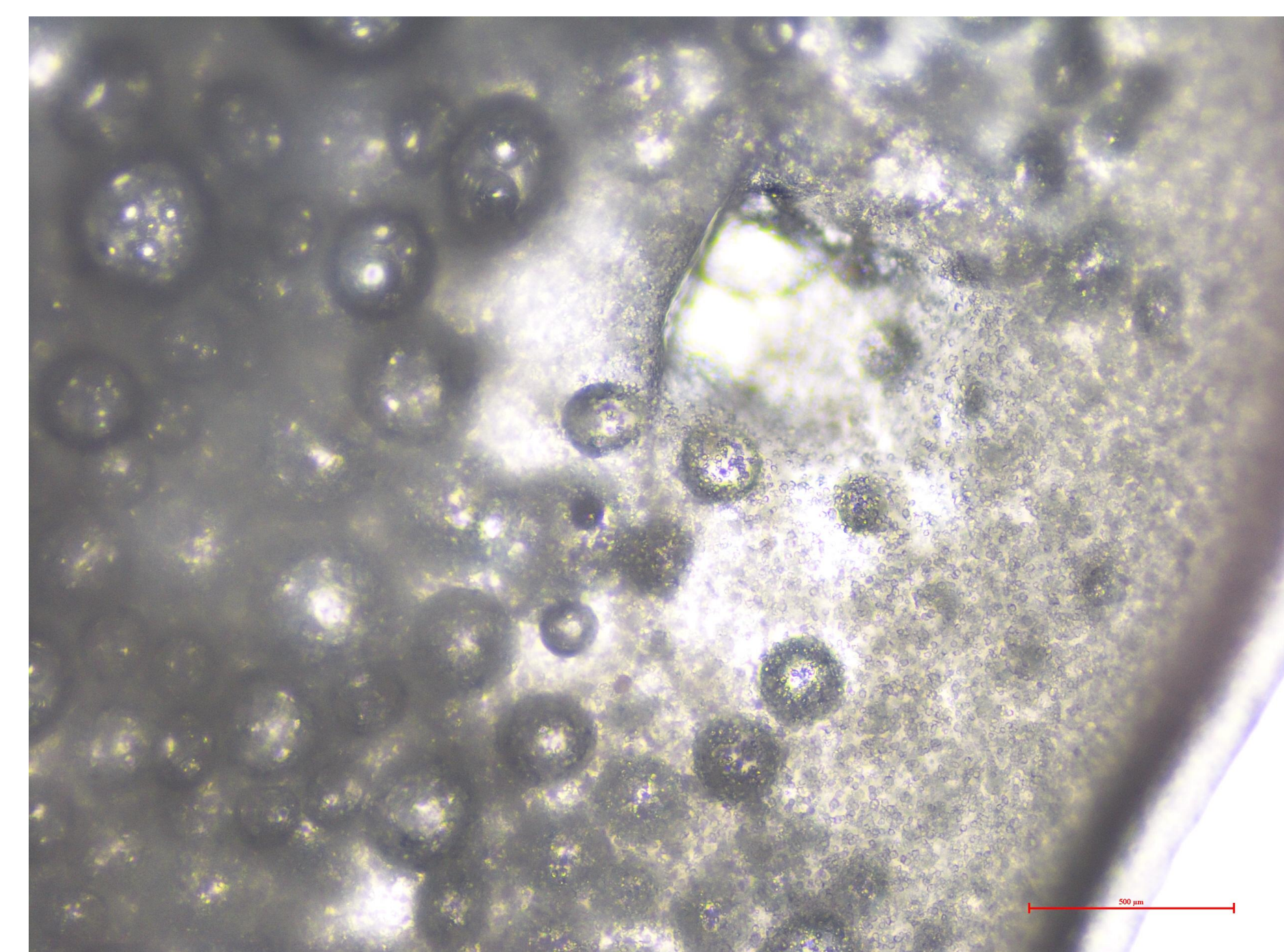


Figure 5: Optical microscopy images of probiotic-loaded membranes showing the tendency of probiotics to aggregates

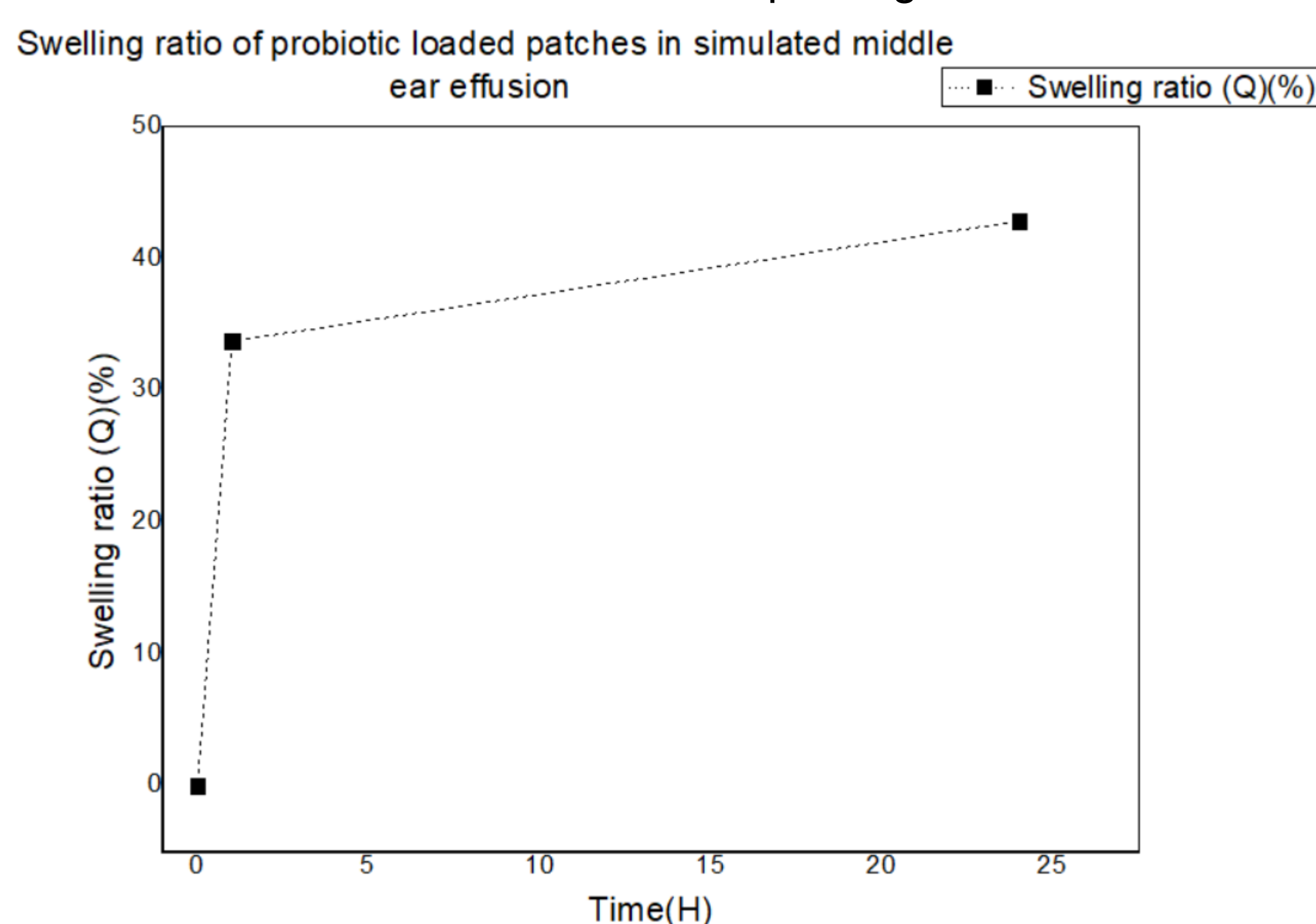


Figure 6: swelling test plot of probiotics loaded membranes after incubation in SMEE



Figure 7: Physical aspects of the probiotics loaded membranes showing the puncture and tear resistance potential

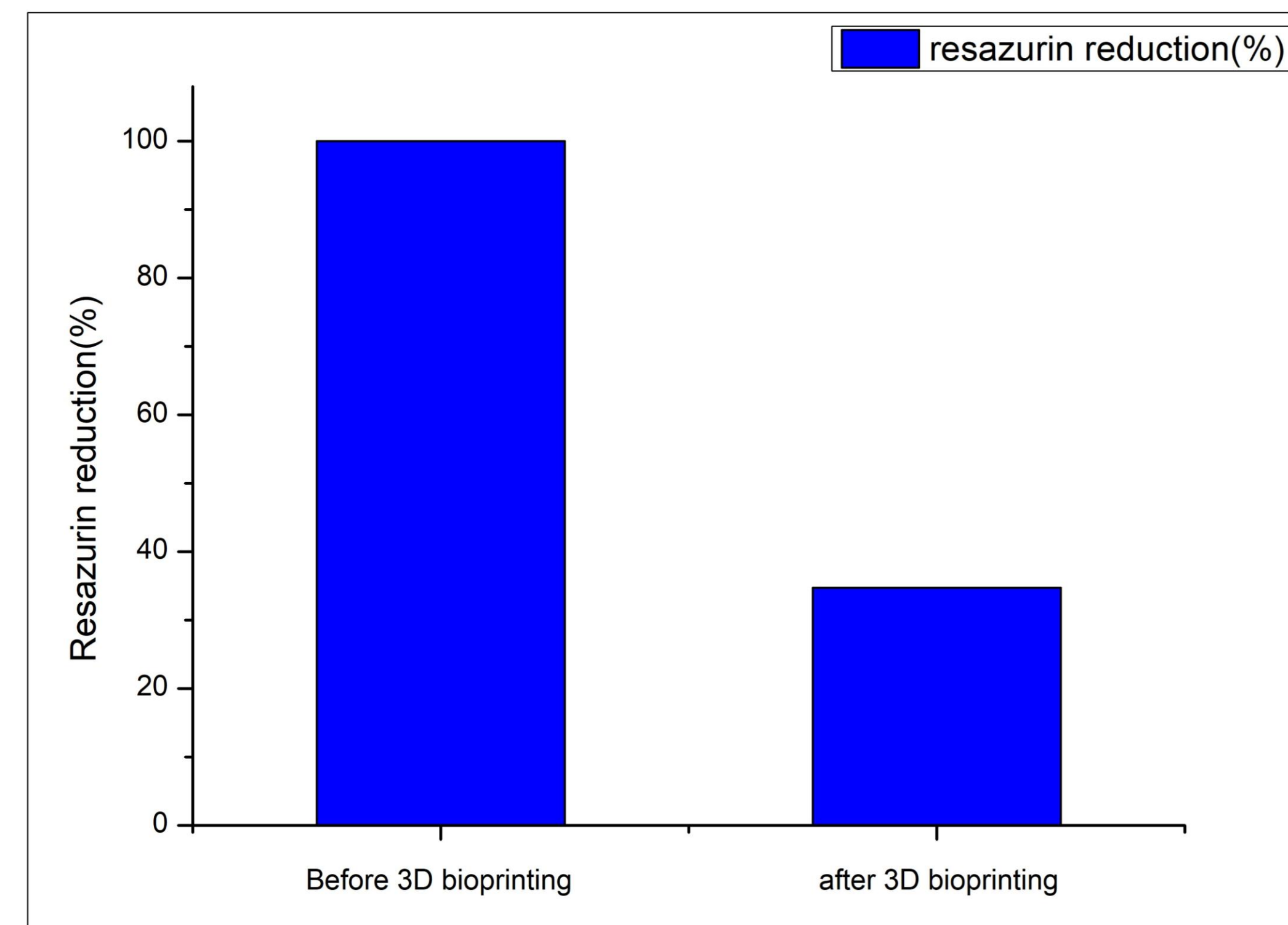


Figure 8: Resazurin dye assay showing a huge reduction of metabolic activity within the thick interpenetrating hydrogels

CONCLUSIONS

FUTURE WORK/ REFERENCES/ACKNOWLEDGMENT

Probiotic-loaded patches with mucoadhesive properties as a novel platform for otitis media delivery and sustained release of viable probiotics were successfully manufactured.

Future research should evaluate antibacterial efficacy, long-term viability, membrane mucoadhesive and tear resistance properties.

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