

INTRODUCTION



Diagram of the multifunctional laser hair removal patch (optically transparent).

"A" refers to the hydrogel layer.
 "B" refers to the plastic film serving as the indicator sheet.
 "C" refers to the ink particles on the indicator.

Laser hair removal (LHR) enables permanent hair removal and is among the most commonly practiced laser procedures in medicine. We propose a patch that addresses several challenges encountered during LHR. The patch provides epidermal cooling, pain mitigation, plume control, and an indicator function.

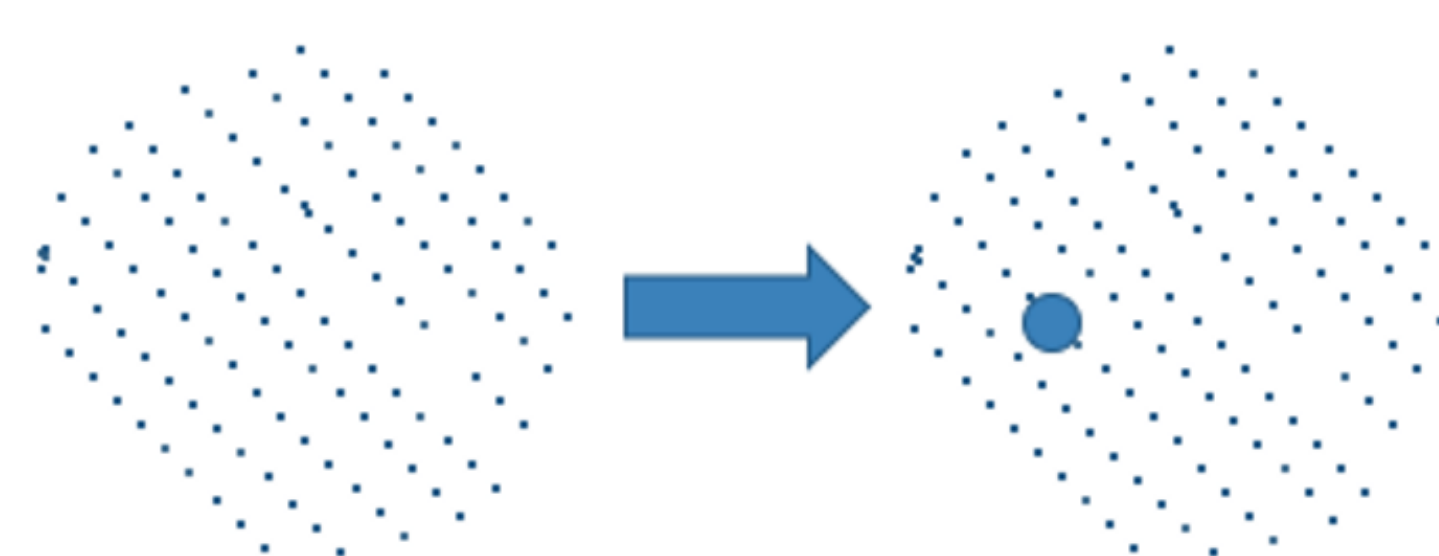
METHODS

The patch, comprising an optically transparent hydrogel fused to an indicator layer, offers epidermal cooling and pain control during laser hair removal.

Laser light passes through the patch into the skin, destroying hair follicles, while a portion is absorbed by indicator particles in the thermoplastic, altering its refractive index to indicate treated areas.

The optimized hydrogel composition and light transmission through the patch layers were investigated in this study.

Hydrogel Layer (Optically Transparent)
 Hydrogel layer is composed of a heated mixture of water, gelatin, and glycerol.



Indicator Sheet (Optically Transparent)
 Contains ink particles which serve as the indicator function
 Bonded to hydrogel with glue

Concentrations of gelatin and glycerol were varied in order to find a combination that would enable storage at -20C without crystallization or condensation. 3% gelatin in a mixture of 70% water and 30% glycerol produced the best results

RESULTS

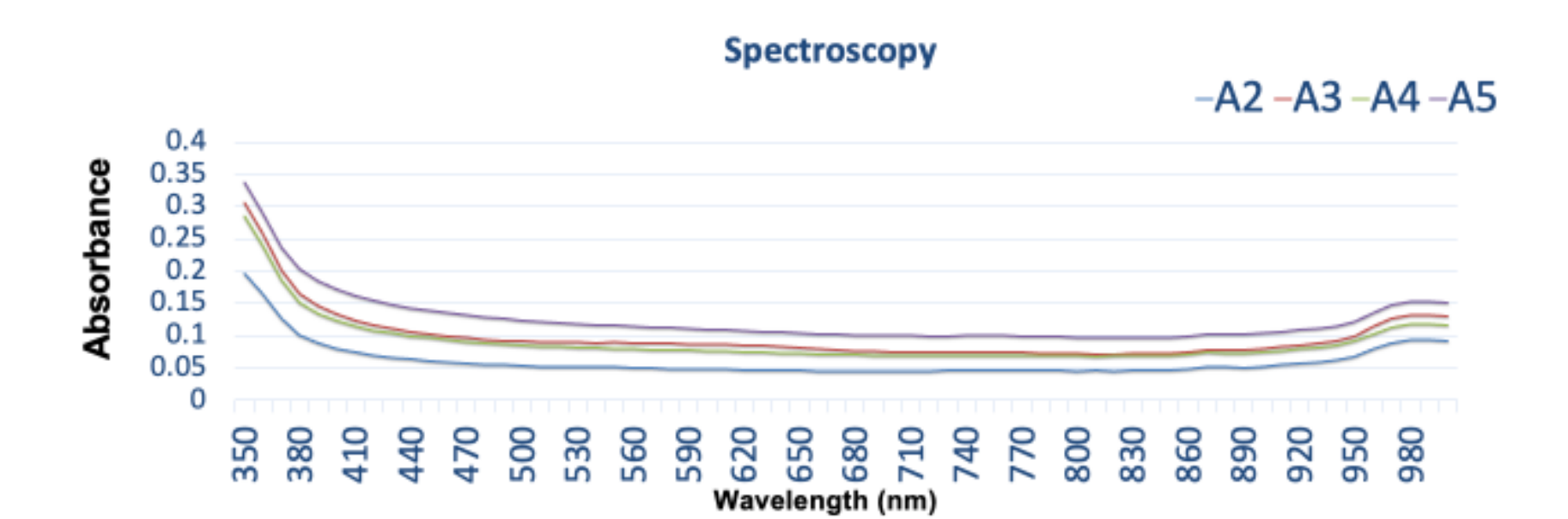


RESULTS

The results show the amount of light that was absorbed by the 0.5 mm, 10% gelatin, 30% glycerol and 70% water patches with just the: gel (A2), gel + plastic(A3), gel + plastic + ink (A4), gel + plastic + ink + glue (A5)

At 755 nm, there is absorbance is 0.1 of light by the patch A5. Even with the addition of glue, plastic sheet and ink to the gel, absorbance increases by only 0.05.

Enough light can be transmitted to reach the skin.



A2 blue, A3 green, A4 red, A5 pink

CONCLUSION

Several parameters of the multifunctional laser patch were optimized, and it was found that sufficient light could be transmitted through patch to enable follicular destruction.

ACKNOWLEDGEMENTS

Thank you to NSF grant for funding research