Silicone Adhesives Reduce Water Absorption and Delay Failure of Hydrocolloids

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Background

Hydrocolloid materials are designed to absorb perspiration but may also absorb excessive moisture when exposed to stoma output, causing significant swelling, softening, and premature adhesion loss.

This study evaluates whether coating hydrocolloid materials with silicone medical adhesive spray protects them from moisture-related degradation.

Methods

Hydrocolloid barrier rings were submerged 5 hours in simulated stoma effluent (distilled water, sodium chloride, bile salts)

Some samples were pre-coated with silicone medical adhesive spray; others untreated.

Measurements:
- Water absorption (gravimetric)
- Swelling (digital calipers)
- Hardness (OO-scale durometer)
- Peel strength (ASTM F225)

Results

Untreated Hydrocolloid Rings

Fluid absorption: 4.4 g

Thickness: 2.0 → 3.56 mm

Medical Adhesive Coated Rings

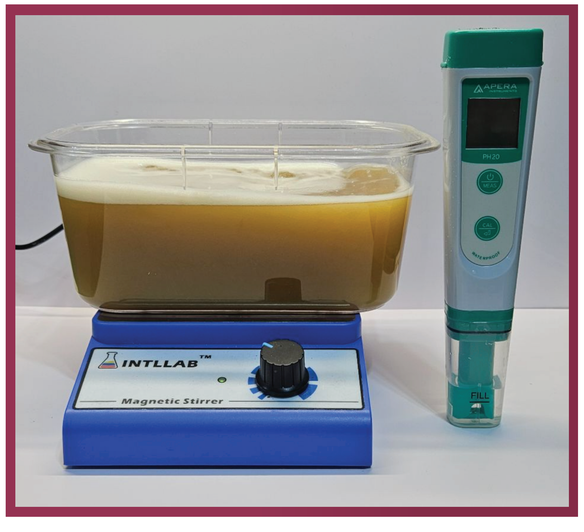
Fluid absorption: 0.8 g

Thickness: 2.0 → 2.16 mm

Effect of Medical Adhesive Coating

Liquid Absorption ↓ 82%

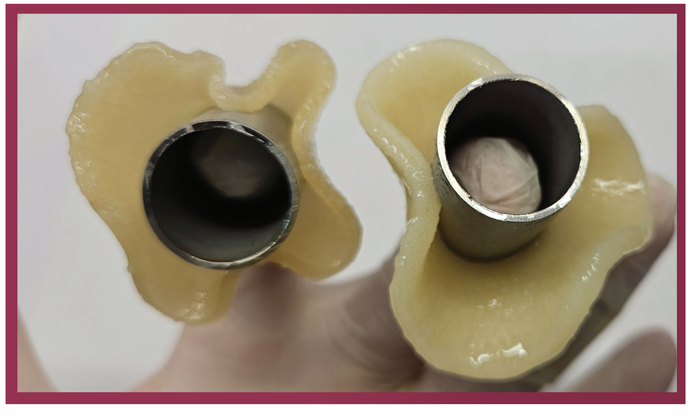
Swelling ↓ 90%



Simulated Stoma Output

Conclusions

- Coating hydrocolloid materials with silicone-based medical adhesive spray significantly reduced water absorption and swelling.
- Treated samples also showed less loss of Shore hardness and peel strength after immersion.
- Silicone medical adhesive spray may help preserve hydrocolloid material integrity in wet environments.



Left: Silicone medical adhesive coated ring
Right: Untreated ring, showing significant swelling

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