

# In-Vitro Evaluation of the Safety and Efficacy of a Novel Silver-Containing Super Absorbent Dressing

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## Introduction

Silver is known to have excellent antimicrobial activity, which is useful in the practice of wound care and the prevention of infections. Its antimicrobial mechanism is based on the release of silver ions (Ag<sup>+</sup>), which disrupt bacterial cell membranes, interfere with metabolic enzymes, and prevent DNA replication, leading to cell death.<sup>1</sup> However, above certain thresholds, silver toxicity can occur, particularly to the keratinocytes and fibroblasts, which can affect wound healing.<sup>2</sup> Super absorbent dressings are advanced wound care products designed to manage moderate to heavily exuding wounds by absorbing large volumes of exudate while maintaining a moist wound environment. This study looked to evaluate the safety of a novel silver-containing super absorbent polymer (SAP) dressing intended for use in heavy exudate wounds.

## Methods

Triplicate samples of the silver SAP dressing and a silver non-super absorbent dressing, which acted as a control, were cut into 25 cm<sup>2</sup> pieces and were soaked with a simulated body fluid (SBF) for 2 minutes and then allowed to drip dry. The silver SAP dressing was then placed in a leaching basket and every 24 hours for a 7-day period, 50 mL of the SBF was poured onto the dressings. The dressings were then placed into a release solution and then the solution was examined by atomic absorption spectrophotometer to determine the rate of silver ion release.

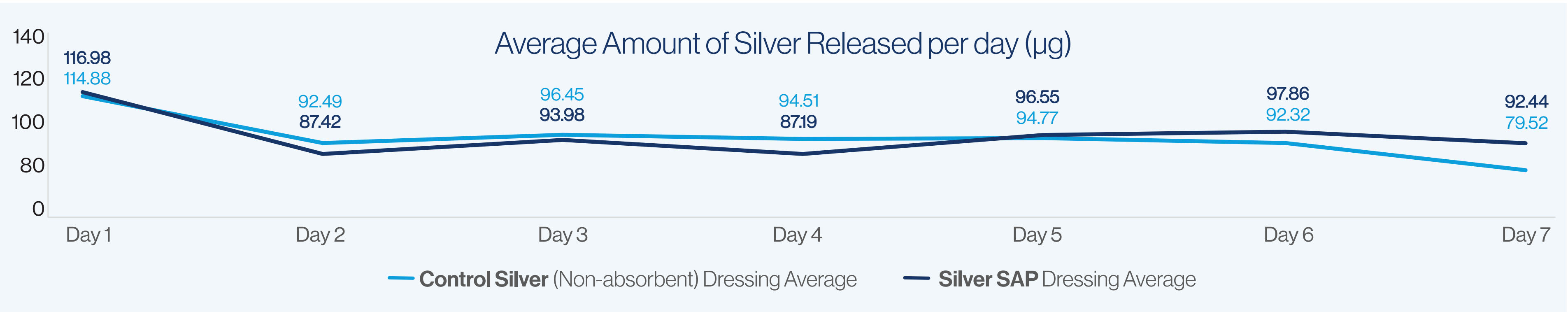
## Results

The maximum daily amount of silver that was released by the novel silver SAP dressing during the 7-day study period was 117 micrograms. This was comparable to the control silver non-SAP dressing, which released 115 micrograms, and both of these readings occurred on day 1. The cumulative dose of silver for the silver SAP dressing was 765 mcg, which again was comparable to the control silver non-SAP dressing, whose cumulative dose was 741 mcg.

## Conclusion

The silver-containing super absorbent dressing did not significantly increase risk for silver toxicity in non-intact skin; the daily maximum level that was released was well below the World Health Organization silver toxicity reference dose of 6.5 mcg/kg. This study suggests that the silver containing super absorbent dressing could be a preferable alternative to non-antimicrobial super absorbent wound dressings for the prevention of infection.

		Amount of Silver Released per day (µg)						
Sample		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Control Silver (non-absorbent) Dressing	#1	110.05	90.84	96.56	95.59	96.76	90.61	78.95
	#2	115.57	92.66	95.99	94.40	95.01	91.84	78.93
	#3	119.02	93.97	97.71	93.55	92.55	94.50	80.70
	Average	114.88	92.49	96.45	94.51	94.77	92.32	79.52
Silver SAP Dressing	#1	116.71	87.88	96.62	90.86	97.51	99.82	92.56
	#2	118.29	88.34	92.43	85.05	98.27	97.53	91.70
	#3	115.93	86.06	92.90	85.67	93.86	96.24	93.06
	Average	116.98	87.42	93.98	87.19	96.55	97.86	92.44



## References

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