

Effective and Rapid Canine Skin Disinfection

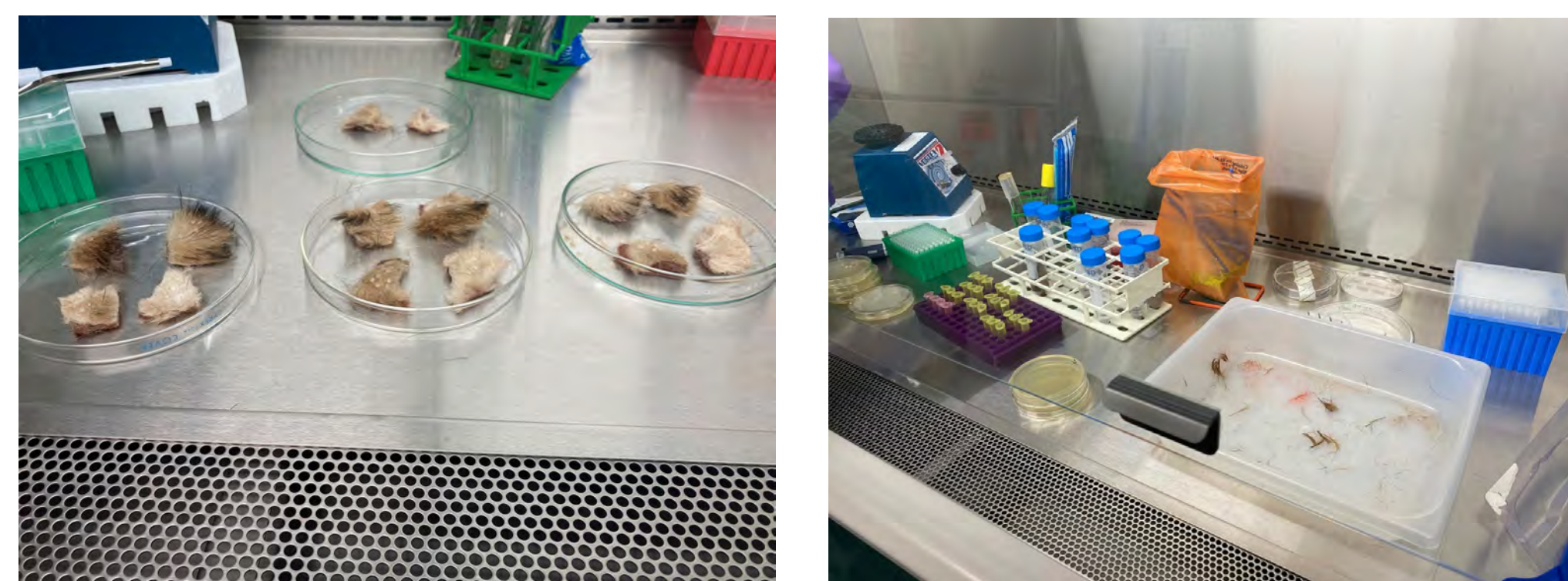
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ABSTRACT

Military working dogs (MWD) are deployed in conflict regions to detect CBRNE (chemical, biological, radiological, nuclear, and explosives) threat materials. MWD are at high risk of being exposed to Chemical & Biological Warfare (CBW) agents. Rapid decontamination is highly desirable, once MWD are exposed to BW agents, i.e., spores of *Bacillus anthracis*. Current protocols, rinse-wash-rinse and use of Chlorhexidine sponge wipe down, for bio-decontamination of MWD rely largely on mechanical removal and not inactivation. As a result, spores, remain in high number on dog skin. Furthermore, viable spores on sponges pose a serious risk to dog operators and the environment. This study was initiated to find effective approaches for spore disinfection on dog skin in the field.

Phase one of this program compared Chlorhexidine sponge efficacy relative to wipes soaked in 5% Bioxy (Atomes, Inc., Quebec, Canada) for inactivation of spores from non-pathogenic Sterne strain. Current practice yielded <3.5-log reduction in spore number on skin. Bioxy wipes resulted in a 5-log reduction in spore number on canine skin. In phase two, wipes soaked in 2%, 4%, or 6% Veriox (Armis BioPharma, Fort Collins, CO) were investigated for spore inactivation. A contact period of 60-min was effective for >5.5-log reduction of spores on dog skin. A 30-min contact period of 4% and 6% was fully effective in spore inactivation. However, only 6% Veriox was fully effective in spore inactivation after a contact period of 15-minutes. In conclusion, Veriox-wipes resulted in complete spore inactivation within 30-min on dog skin, and therefore offer a safer and more effective alternative for K9 handlers and operators protecting MWD.



Skin pieces

BSL2 hood space

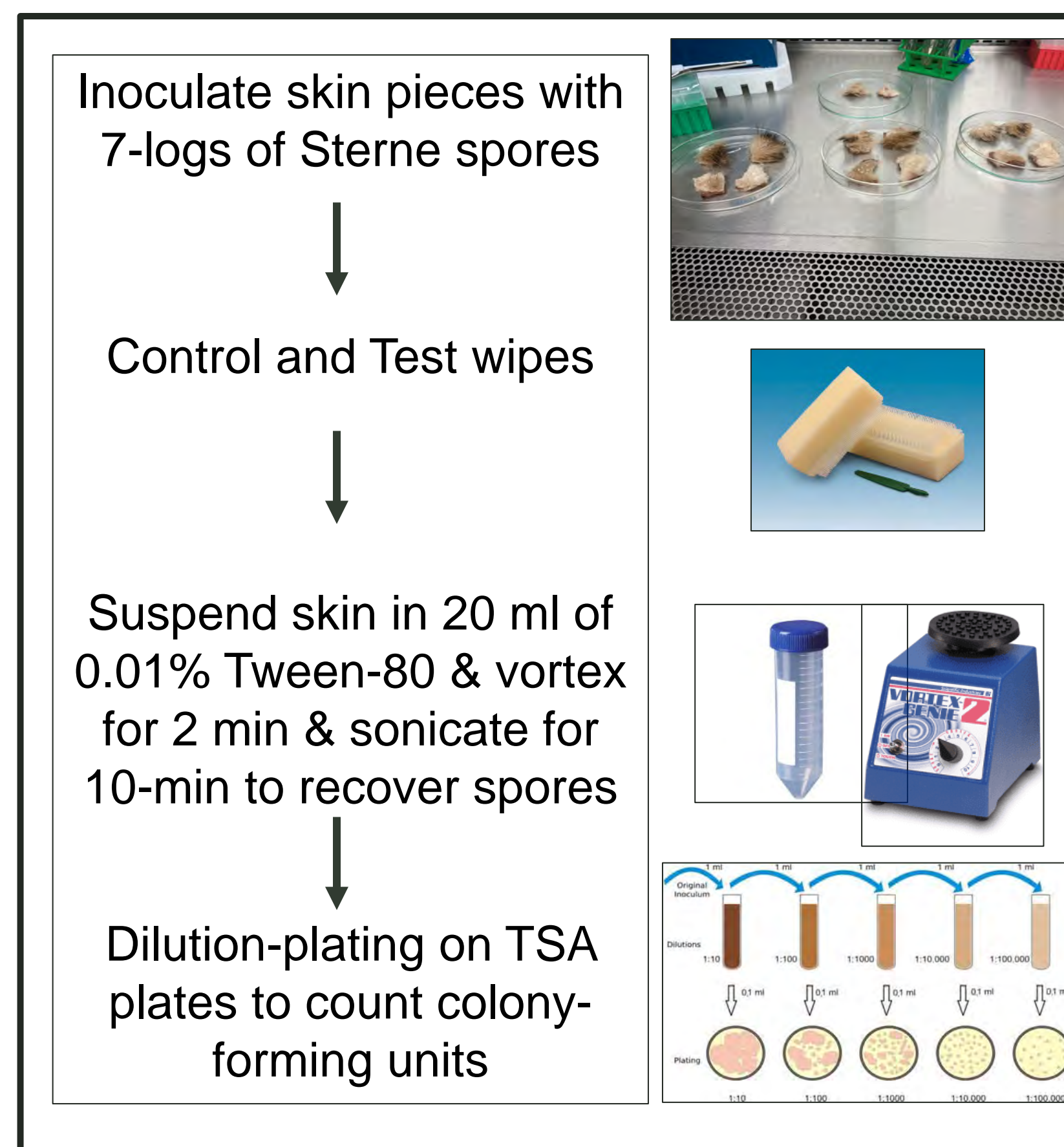


Analyst performing dilution-plating

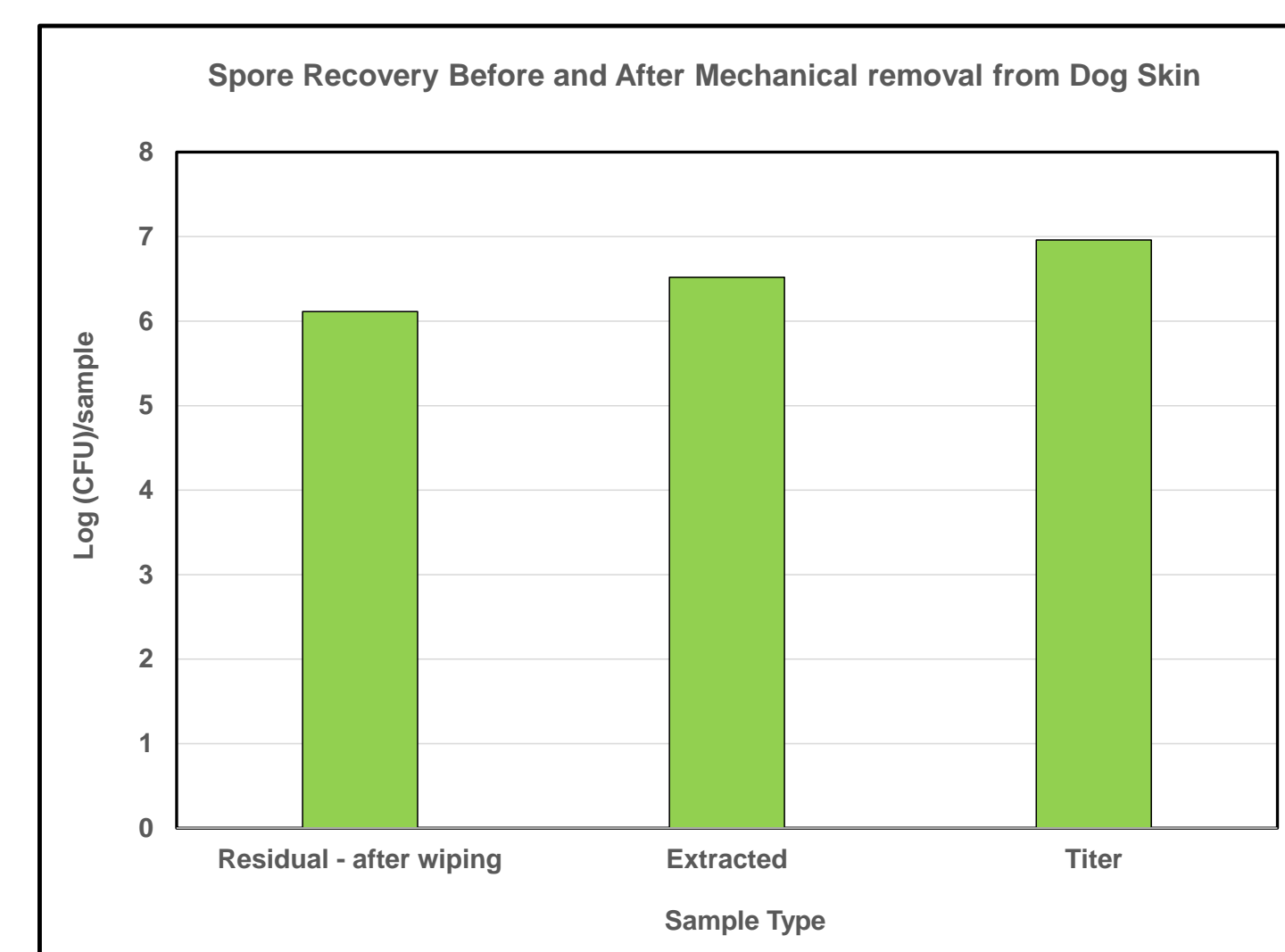
TEST CONDITIONS

Parameter	Specification	# Variables
Threat agents	<i>Bacillus anthracis</i> (Sterne strain)	1
Fur Length	Normal & short	2
Treatments	Bioxy-soaked wipes Veriox-soaked wipes	3
Spore Recovery	Polyester wipes	1

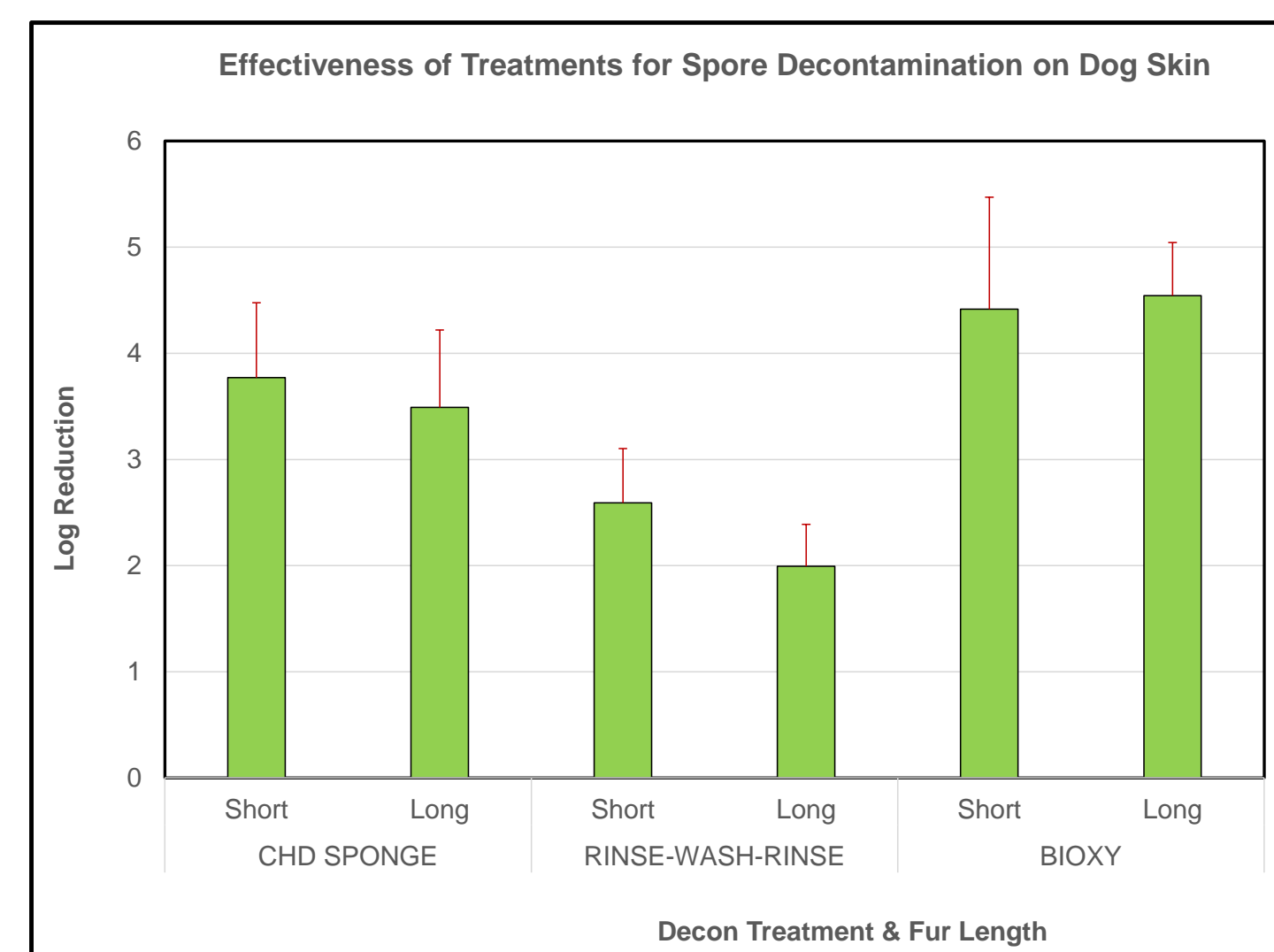
FLOW CHART



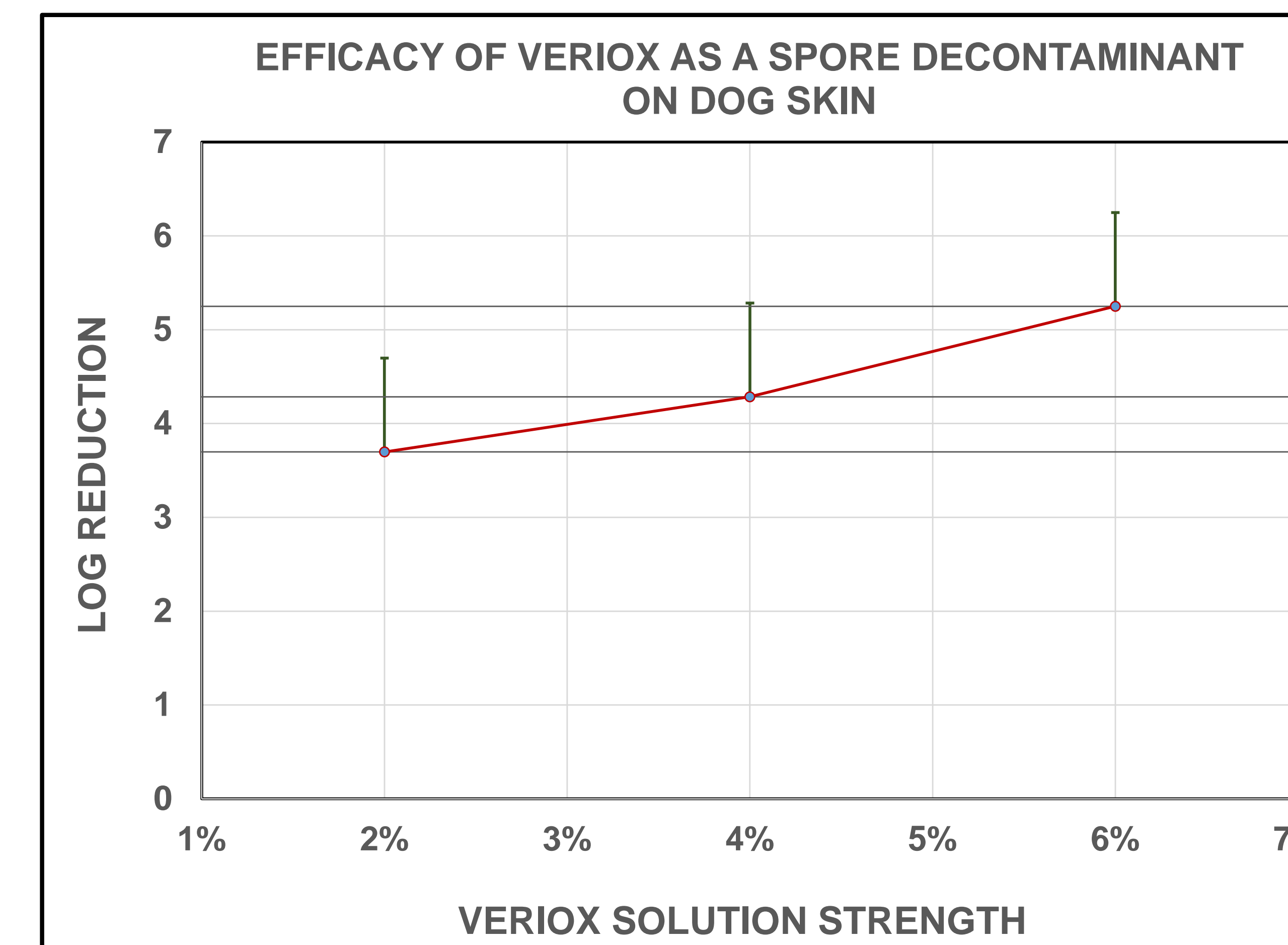
SPORE RECOVERY



CURRENT PRACTICE & BIOXY WIPES



EFFICACY OF VERIOX ON DOG SKIN



CONCLUSIONS & FUTURE RECOMMENDATIONS

1. High spore numbers were recovered from canine skin
2. Current practices are poorly effective in spore reduction on canine skin
3. Even though current practice reduces the spore number on skin, but it generates hazardous waste because spores removed by sponge or wipe remain viable
4. 5% Bioxy-soaked wipes are effective, since >5-log reduction in spore number was observed from canine skin
5. 6% Veriox wipes (Armis Biopharma) are very effective in canine skin decontamination, since >6-log reduction was recorded within 30 min
6. A robust set of data on optimization is recommended, along with evaluating other alternatives to using wipes, such as spray or mist option
7. Field trials with Veriox are recommended to assess any adverse side effects

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