

Dermaide Aloe[®]/Aloe vera Gel[®]: Comparison of the Antimicrobial Effects

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SUMMARY

The bactericidal effect of Aloe vera gel[®] was minimal when compared to the marked effect of Dermaide Aloe[®]. Concentrations as low as 60% of the Dermaide Aloe[®] demonstrated a 99.9% lethality; whereas the Aloe vera gel[®] achieved the same lethality at only 80% concentration.

The results in the treatment of burned patients attributed to the Mexican cactus—Aloe vera are so miraculous as to seem more like myth than fact. Not unlike the tonics of the early American medicine man, Aloe vera has been used as a panacea for all ills. However, it has maintained its status as a folklore remedy, while its curative tonic counterparts have fallen into disrepute (4).

In 1963, a group of investigators reported that a 1:5 dilution (or 20% concentration) of Aloe vera extract was ineffectual as an antimicrobial agent (2). However, when freshly extracted juice from the Aloe vera plant was employed directly, a marked antimicrobial effect was observed.

This activity was unstable at room temperature, but totally unaffected by refrigeration or heating for 15 minutes at 80°C (3). This antimicrobial activity was considered as bacteriostatic.

With the techniques of minimal inhibitory concentration (MIC) and minimum lethal concentration (MLC) (1) our laboratory compared the potential antimicrobial effects of the crude Aloe vera gel[®] and the commercially extracted Dermaide Aloe[®].

MATERIALS & METHODS

Aloe vera gel[®], a crude extract, and Dermaide Aloe[®], a commercially purified extract, both at 99.5% concentration were diluted by 10% increments to an approximate 60% concentration with Trypticase Soy broth (TSB). One tenth mL of an 18-24 hour culture (10⁹ CFU/mL) of 10 different species of organism were inoculated to each concentration. Seven of 10 organisms were selected for inoculation to Aloe vera gel and all of 10 species were inoculated to Dermaide Aloe[®]. A control tube of TSB was inoculated simultaneously. An aliquot of Dermaide Aloe[®] was sterilized (121°C for 15 minutes) and was processed as described above.

Clinical isolates of *Staphylococcus aureus*; *Streptococcus pyogenes*; *Streptococcus agalactiae*, *Escherichia coli*; *Serratia marcescens*; *Klebsiella sp*; *Enterobacter sp*; *Citrobacter sp*; *Bacillus subtilis* and *Candida albicans* were the 10 different species tested. Each was grown in TSB at 37°C for 18-24 hours. Tenfold serial dilutions were made to determine the exact CFU's/mL. As described above, 0.1 mL of a 10⁹ CFU/mL was inoculated for each concentration of the products test (1).

All tubes were incubated for 18-24 hours at 37°C then visually observed for growth. Tubes were then compared to their respective controls. Each tube which visually demonstrated no growth was subsequently serially diluted (10-fold) and plated on Sheep Blood Agar, Eosin Methylene Blue Agar, and Trypticase Soy Agar for evaluation of the MLC (1).

RESULTS

Aloe vera Gel[®] kept at room temperature (68°F) maintained its antimicrobial effectiveness at 90% concentration for all organisms. Whereas, *S. pyogenes* was the only organism inhibited by the 70% concentration (Table I).

The antimicrobial effects of both the nonsterilized and sterilized Dermaide Aloe[®] were far more remarkable. Virtually all organisms were inhibited by concentration of 70% or higher (10² CFU/mL), with a minimal 10-fold increase at the 60% concentration for the majority of organisms tested (Table II). *Bacillus subtilis* remained at 10⁴ CFU/mL through the 60% concentration (Table II).

DISCUSSION

It is apparent that the antimicrobial effects by the Aloe vera gel[®] are in fact bactericidal at concentrations as low as 80% in most instances. Whereas Dermaide Aloe[®] exhibits a marked bactericidal effect at 60% concentration as determined by the MLC. The antimicrobial activity resides in the residue which remains after fractional distillation.

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Table I. Antimicrobial Effects of Aloe vera gel®

ORGANISM TESTED	CFU/mL per concentration of Aloe vera Gel®			
	100%	90%	80%	70%
<i>Strep. pyogenes</i> Grp. A.	≤4	≤4	≤4	≤4
<i>Strep. agalactiae</i> Grp. B.	≤4	7.0 x 10 ³	2.7 x 10 ⁵	2.2 x 10 ⁷
<i>Citrobacter sp</i>	≤4	3.0 x 10 ⁴	4 x 10 ⁷	
<i>Serratia marcescens</i>	≤4	≤4	2.7 x 10 ⁵	3.4 x 10 ⁷
<i>Enterobacter sp</i>	2.4 x 10 ³	8.0 x 10 ⁵	6.0 x 10 ⁷	
<i>B. subtilus</i>	9.6 x 10 ³		3.4 x 10 ⁴	3.2 x 10 ⁵
<i>Klebsiella sp</i>	1.5 x 10 ⁵	1.7 x 10 ⁵		

Table II. Antimicrobial Effects of Dermaide Aloe®

ORGANISMS TESTED	CFU/mL per concentration of Dermaide Aloe® (nonsterilized)				
	100%	90%	80%	70%	60%
<i>Staph. aureus</i>	≤4	≤4	≤4	≤4	1.5 x 10 ²
<i>Strep. pyogenes</i> Grp. A.	≤4	≤4	≤4	2.8 x 10 ¹	4 x 10 ¹
<i>Strep. agalactiae</i> Grp. B.	≤4	≤4	≤4	≤4	≤4
<i>E. coli</i>	≤4	≤4	≤4	2.4 x 10 ³	8.0 x 10 ⁵
<i>Citrobacter sp</i>	≤4	≤4	≤4	≤4	≤4
<i>Serratia marcescens</i>	≤4	≤4	≤4	≤4	≤4
<i>Enterobacter sp</i>	≤4	≤4	≤4	≤4	2 x 10 ¹
<i>B. subtilus</i>	2.2 x 10 ⁴	2.5 x 10 ⁴	2.2 x 10 ⁴	1.9 x 10 ⁴	2.8 x 10 ⁴
<i>C. albicans</i>	≤4	≤4	10 ³	2.9 x 10 ³	2.7 x 10 ⁶
<i>Klebsiella sp</i>	≤4	≤4	≤4	≤4	≤4

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