

# AMS Leucidal Liquid

<b>Code Number:</b>	<b>M15008</b>
<b>INCI Nomenclature:</b>	<b>Leuconostoc/Radish Root Ferment Filtrate</b>
<b>INCI Status:</b>	<b>Approved</b>
<b>Suggested Use Levels:</b>	<b>0.2 - 2.0%</b>
<b>Suggested Applications:</b>	<b>Antimicrobial, Preservative</b>

Public opinion, increasingly strict chemical inventories, sensitization, and the specter of microbial resistance are just some of the factors driving the movement towards natural alternatives to product preservation. Fortunately, nature has provided us with a multitude of solutions.

As is apparent from our product line, Active Micro Systems has an ongoing interest in harnessing the natural mechanism used by plants and various microorganisms in protecting themselves from their environment. In the case of AMS Leucidal® Liquid we are looking at the Leuconostoc bacteria trying to restrict competition by other microorganisms. Like many Lactic Acid Bacteria (LAB) Leuconostoc spp. restrict microbial growth by acidifying its environment. The particular bacillus we use Leuconostoc kimchii, is one of the 15 species of Leuconostoc typically found in the Korean dietary staple Kimchii. Like many organisms, Leuconostoc kimchii is not content to limit itself to one defensive option, also producing a novel antimicrobial peptide. Using modern biotechnology we are able to isolate the peptide from a pure Leuconostoc kimchii culture. **AMS Leucidal® Liquid**, as we have named the isolated peptide shows a wide range of utility in preserving cosmetic formulations.



Figure 1. pH activity of AMS Leucidal Liquid

Challenge testing reveals that 2% **AMS Leucidal® Liquid** in a cream base is able to successfully inhibit microbial growth. Samples were inoculated with *S. aureus*, *E. coli*, *P. aeruginosa*, *C. albicans*, *A. niger*, *K. pneumoniae*, *B. cepacia*, following 28 days of incubation samples were then re-inoculated for an additional 28 days.

Minimum Inhibitory Concentrations (MIC) were determined using a standard agar dilution method. A variety of bacteria and fungus were tested to evaluate the ability of **AMS Leucidal® Liquid** to protect against microbial contamination. The results indicate that **AMS Leucidal® Liquid** can provide effective protection for a cosmetic system.

As with all biological materials some attention must be paid to the conditions under which **AMS Leucidal® Liquid** can be used. Preliminary investigation shows that the material is stable with regard to temperature, removing some of the difficulties encountered when manufacturing product or conducting accelerated stability. Additionally, our testing has shown that the peptide remains active under both the acidic and basic conditions with the exception of a loss in activity at a pH of 9.

For many cosmetic formulations **AMS Leucidal® Liquid** can function as a natural alternative to synthetic preservatives. It may also be useful to consider potential applications for **AMS Leucidal® Liquid** as a topical antimicrobial when addressing problem skin or specific scalp conditions.

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	<i>S. aureus</i>	<i>E. coli</i>	<i>P. aerugi- nosa</i>	<i>C. albicans</i>	<i>A. niger</i>	<i>K. pneu- moniae</i>	<i>B. cepacia</i>
Inaculum Level (initial)	2.02E+06	2.37E+06	2.33E+06	9.46E+05	2.97E+05	2.79E+06	1.98E+06
Day 0	+1.485%	5.485%	28.755%	39.535%	87.542%	6.810%	>99.999%
Day 1	>99.999%	>99.999%	>99.999%	>99.999%	90.404%	>99.999%	>99.999%
Day 2	>99.999%	>99.999%	>99.999%	>99.999%	92.256%	>99.999%	>99.999%
Day 3	>99.999%	>99.999%	>99.999%	>99.999%	94.108%	>99.999%	>99.999%
Day 7	>99.999%	>99.999%	>99.999%	>99.999%	99.663%	>99.999%	>99.999%
Day 14	>99.999%	>99.999%	>99.999%	>99.999%	99.663%	>99.999%	>99.999%
Day 21	>99.999%	>99.999%	>99.999%	>99.999%	99.789%	>99.999%	>99.999%
Day 28	>99.999%	>99.999%	>99.999%	>99.999%	99.987%	>99.999%	>99.999%
Inaculum level (re-inoculated)	1.16E+06	2.57E+06	2.212E+06	7.03E+06	2.48E+05	1.23E+06	2.18E+06
Day 0	50.690%	38.132%	42.453%	37.127%	13.306%	7.317%	>99.999%
Day 1	>99.999%	>99.999%	>99.999%	>99.999%	17.339%	>99.999%	>99.999%
Day 2	>99.999%	>99.999%	>99.999%	>99.999%	37.500%	>99.999%	>99.999%
Day 3	>99.999%	>99.999%	>99.999%	>99.999%	84.879%	>99.999%	>99.999%
Day 7	>99.999%	>99.999%	>99.999%	>99.999%	94.758%	>99.999%	>99.999%
Day 14	>99.999%	>99.999%	>99.999%	>99.999%	96.371%	>99.999%	>99.999%
Day 21	>99.999%	>99.999%	>99.999%	>99.999%	96.371%	>99.999%	>99.999%
Day 28	>99.999%	>99.999%	>99.999%	>99.999%	99.113%	>99.999%	>99.999%

Table 1. Challenge Test results for 2% AMS Leucidal Liquid in O/W emulsion inoculated on day 0 and re-inoculated on day 28.

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