GreenGard™ LB

Multifunctional, Organic Acid Protection

INCI: Arginine Levulinate, Arginine Benzoate, Water

GREEN LINE INGREDIENTS

PRODUCT DESCRIPTION

GreenGard™ LB is an innovative, patent-pending preservation system that combines the power of natural levulinic acid and arginine to effectively combat gram-positive bacteria, gram-negative bacteria, yeast, and mold. Arginine Levulinate is a multifunctional compound which supports optimal skin moisturization, upregulates collagen I production, and surpasses organic acid ionic salt competitors by significantly reducing trans-epidermal water loss (TEWL).

KEY BENEFITS:

- 100% Biobased
- Multifunctional antimicrobial ingredients
- Additional skincare benefits with addition of arginine
- Challenge data available for variety of product types

PRODUCT FUNCTION

GreenGard™ LB is a cutting-edge, 100% biobased, multifunctional ingredient that offers a host of benefits for skincare and haircare formulations. In-vitro testing has confirmed the ability to provide additional skin advantages, such as reducing TEWL and upregulating collagen I production. This natural, organic acid preservation systems exhibit their utmost efficacy within a pH range of 4.5 and 5.5. GreenGard™ LB acts as a broad-spectrum antimicrobial, multifuntional ingredient in formulations.

FORMULATING TIPS

- Can be combined easily with other organic acids if needed
- Effective performance is given at pH range 4.5 and 5.5
- Can be incorporated into hot or cold process formulations

HOW TO USE— FORMULATING GUIDELINES

pH Optimum:	4.5 - 5.5
Use level:	1.5 - 2.5%
Claims:	100% USDA Biobased, Vegan, non-GMO, PEG-free, TEWL reduction, and Collagen I upregulation
Uses:	Toners, lotions, creams, balms, and wet wipe solutions
Efficacy spectrum:	gram+ ●● gram- ●● yeast ●● mold ●●

●● Very good | ● Sufficient | ● Insufficient

GreenGard™ LB

Multifunctional, Organic Acid Protection

INCI: Arginine Levulinate, Arginine Benzoate, Water

GREEN LINE INGREDIENTS

GREENGARD™ LB MICROBIOLOGY CHALLENGE

Testing Report Wet Wipe Solution Challenge

GreenGard™ LB had its preservation properties tested in a wet wipe formula. It was tested at 2.00% usage rate at pH 5.00. A 28-day PCPC Preservative Adequacy Test Test was performed, in which the formula was challenge tested against Gram (+) & Gram (-) bacteria, yeast and mold inoculations. Recommended minimum criteria was a 99.9% reduction in bacterial colony forming units (cfu)/mL and a 90% reduction in yeast and mold cfu/mL within 7 days of inoculation, with reduction maintained for the remainder of the trial.

Microbial species used for the challenge testing listed below:
Gram (+):*S. aureus*
Gram (-):*P. aeruginosa, E. coli,*
Yeast:*C. albicans*
Mold:*A. brasiliensis*
RESULTS: Sample met the criteria for the preservative adequacy test. The formula showed a 99.99% reduction in cfu/mL within 1 day of inoculation for the Gram (+) & (-) bacterial and yeast species, and within 7 days of inoculation for the mold species.

GreenGard™ LB - PCPC Preservative Adequacy Test (wet wipe , pH 5.00)

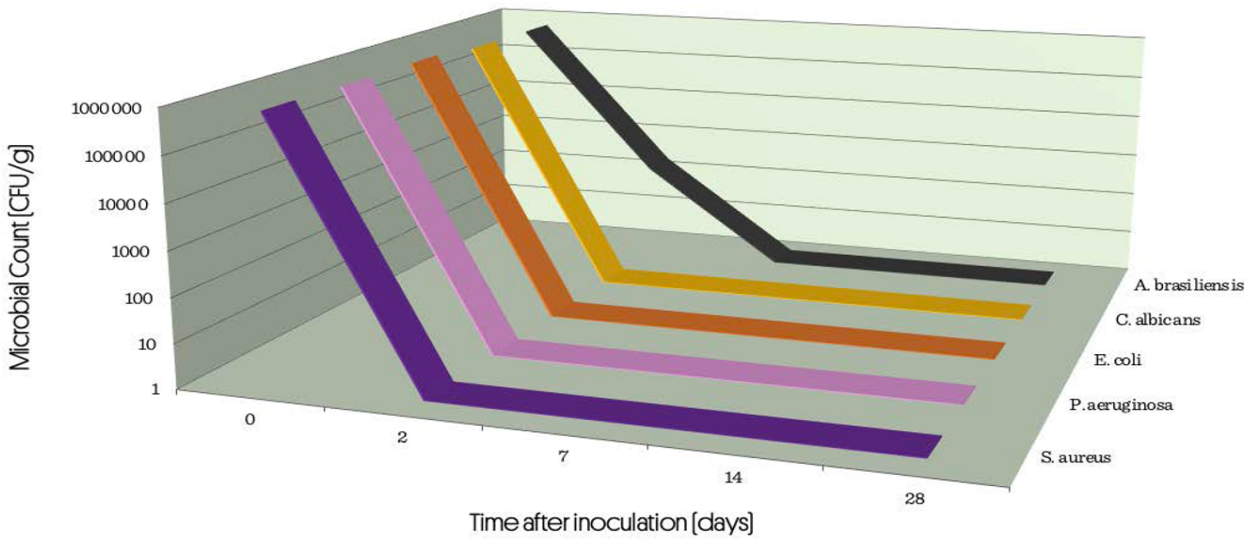

Figure 1: GreenGard™ LB reduction of cfu/mL against bacteria, yeast and mold. Total kill was observed for bacteria and yeast after 1 day, and was observed for mold after 14 days. However, a 99.99% reduction in cfu/mL for mold was still observed after 7 days. Reduction maintained for remainder of trial.

CONCLUSION: GreenGard™ LB, when used at 2.00% in a mostly aqueous O/W emulsion between pH 4.50 - 5.00, is a broad-spectrum, germicidal preservative. It is highly effective against Gram (+) & (-) bacteria and yeast, and effective against mold.