



## Genemed Synthesis, Inc.

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### CERTIFICATE OF ANALYSIS Ethyl-N $\alpha$ lauroyl-L-arginate HCl

Components, Residuals and contaminants	Specifications
<b>Ethyl-N<math>\alpha</math> lauroyl-L-arginate HCl</b>	$\geq 85\%$
<b>Other related substances</b>	
N $\alpha$ lauroyl-L-arginine	$\leq 3\%$
Ethyl laurate	$\leq 3\%$
Lauric acid	$\leq 5\%$
Arginine HCl	$\leq 1\%$
Ethyl arginine 2HCl	$\leq 1\%$
<b>Residuals-Volatiles, solvents, etc.</b>	
Ethanol	$\leq 0.2\%$
<b>Ash</b>	$\leq 2\%$
<b>Water</b>	$\leq 5\%$
<b>Heavy metals, onorganics</b>	
Heavy metals (as lead)	$\leq 10\text{ppm}$
Arsenic (As)	$\leq 3\text{ppm}$
Lead (Pb)	$\leq 1\text{ppm}$
Cadmium (Cd)	$\leq 1\text{ppm}$
Mercury (Hg)	$\leq 1\text{ppm}$

Ethyl lauroyl arginate is synthesized by esterifying arginine with ethanol, followed by reacting the ester with lauroyl chloride. The resultant ethyl lauroyl arginate is recovered as hydrochloride salt and is a white, solid product which is filtered off and dried. The content of ethyl-N $\alpha$ -lauroyl-L-arginate is between 85-95%. It is stable for more than 2 years at room temperature when protected in a closed container. This substance is intended to be used as preservative for its anti-microbial activity. The products is also called lauric arginate ethyl ester, lauramide arginine ethyl ester, LAE, etc. The stability of ethyl lauroyl arginate aqueous solution decreases with increasing temperature. In general, strong inorganic acids affect its stability more than organic acids.

Ethyl lauroyl arginate has been evaluated for food safety as antimicrobial in food by the U.S. Food and Drug Administration (FDA) in 2005, and as a food preservative by the European Food Safety Authority (EFSA) in 2007.

#### Physicochemical characterization

Ethyl lauroyl arginate is a white powder and its solubility in water at 20°C is greater than 247 g/kg. Ethyl lauroyl arginate is soluble up to 20% in propylene glycol, glycerin and ethanol. The pH of 1 % aqueous solution is in the range of 3.64 to 4.25.

#### Chemical characterization

Ethyl-N $\alpha$ -lauroyl-L-arginate HCl is the active ingredient of ethyl lauroyl arginate and its contents are  $>85\%$ . Lauric acid, L-arginine HCl and ethanol are materials and their residual amounts are  $<3.0\%$ ,  $<1\%$  and  $<0.2\%$ , respectively. N $\alpha$ -Lauroyl-L-arginine, ethyl laurate and ethyl arginate 2HCl are by-products and their contents are  $<3\%$ ,  $3\%$ ,  $<1\%$ , respectively. Other three minor by-products share the structure of ethyl-N $\alpha$ -lauroyl-L-arginate HCl but have an additional lauroyl group. Water contents are  $<5\%$ . Ashes heated at 700° are mainly NaCl and their amounts are  $<2\%$ . Arsenic, cadmium, lead and mercury are not detected.



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### Functional uses

Ethyl lauroyl arginate is used as preservative. Ethyl-N $\alpha$ -lauroyl-L-arginate HCl which is a cationic surfactant has a wide spectrum of activity against Gram positive and negative bacteria, yeasts and moulds. It acts on cell membranes and the cytoplasm, and inhibits the growth of populations but in no case is cell lysis observed under the conditions studied. It can be used in a wide range of foods.

### Reaction and fate in foods

The stability of ethyl-N $\alpha$ -lauroyl-L-arginate HCl is evaluated in different food matrices. It is found to be stable throughout the duration of the study in all processed food matrices.

### References

Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration (2005) Agency Response Letter GRAS Notice No. GRN 000164, <http://cfsan.fda.gov/~rdb/opa-g164.html>  
Scientific Committee on Consumer Products, European Commission (2005) Opinion on Ethyl Lauroyl Arginate, COLIPA No P95, SCCP/0837/04.  
European Food Safety Authority, 2007. Opinion of the Scientific Panel on Food Additives, Flavourings, Processing Aids and Materials in Contact with Food on a request from the Commission related to an application on the use of ethyl lauroyl arginate as a food additive, The EFSA Journal, 511, 1-27.  
LAMIRSA, 2008. LAE Lauric Arginate "an innovative molecule for preservation".