

## Amino acid analysis, biogenic amines and Maillard reaction products

### Introduction

Ansynth, a specialist in amino acid analyses, has been part of Qlip since June 1, 2022 and integrated at its main location in Zutphen. This has expanded Qlip's portfolio to include amino acid analyses in food, feed and medical devices. Also, with the integration of Ansynth, Qlip has in-house expertise on Maillard reaction products, biogenic amines, impurities and the EP method (European Pharmacopoeia). In this information sheet we give you an overview of the amino acid and the related analyses we can perform for you.

### Amino acid composition

These analysis provides you a lot of interesting information about the products you buy, produce and sell, such as the total amino acid composition of the products and the presence or absence of essential amino acids. The amino acid composition affects the final nutritional value of the product. This is important to both animal- and plant-based products and combinations thereof.

Test (ENG)	Amino acids	Article code	Pre-processing
<b>Protein bound amino acids:</b>			
* total package of 29 acidic amino acids and related compounds	$\alpha$ -Aminoadipic acid, $\alpha$ -Aminobutyric acid, $\beta$ -Aminoisobutyric acid, $\gamma$ -Aminobutyric acid, $\beta$ -Alanine, Alanine, Arginine, Asparagine + Aspartic acid, Citrulline, Ethanolamine, Glutamic acid + Glutamine, Glycine, Histidine, Hydroxylysine, Hydroxyproline, Isoleucine, Leucine, Lysine, 1-Methylhistidine, 3-Methylhistidine, Ornithine, Phenylalanine, Proline, Sarcosine, Serine, Taurine, Threonine, Tyrosine, Valine	AN4001e	acid hydrolysis
* total package of 15 acidic amino acids (standard)	Alanine, Arginine, Aspartic acid + Asparagine, Glutamic acid + Glutamine, Glycine, Histidine, Isoleucine, Leucine, Lysine, Phenylalanine, Proline, Serine, Threonine, Tyrosine, Valine	AN4015e	acid hydrolysis
* Cysteine and Methionine	For hydrolysis, Cysteine and Methionine are oxidised to Cystic acid and Methionine sulphone	AN4040e	Oxidation and acid hydrolysis
* Tryptophan	Tryptophan	AN4070e	basic hydrolysis
<b>Free amino acids:</b>			
* Complete package of 42 free amino acids and related compounds	$\alpha$ -Aminoadipic acid, $\alpha$ -Aminobutyric acid, $\beta$ -Aminoisobutyric acid, $\gamma$ -Aminobutyric acid, $\beta$ -Alanine, Alanine, Anserine, Arginine, Asparagine, Aspartic acid, Citrulline, Carnosine, Cystathionine, Cysteine, Cystine, Ethanolamine, Glutamine, Glutamic acid, Glycine, Histidine, Homocitrulline, Homocystine, Hydroxylysine, Hydroxyproline, Isoleucine, Leucine, Lysine, 1-Methylhistidine, 3-Methylhistidine, Methionine, Ornithine, Phosphoethanolamine, Phosphoserine, Phenylalanine, Proline, Sarcosine, Serine, Taurine, Threonine, Tyrosine, Ureum, Valine	AN4020e	-
* Total package of 20 free amino acids (standard)	Alanine, Arginine, Aspartic acid, Asparagine, Cystine, Cysteine, Glutamine, Glutamic acid, Glycine, Histidine, Isoleucine, Leucine, Lysine, Methionine, Phenylalanine, Proline, Serine, Threonine, Tyrosine, Valine	AN4030e	-
* free Tryptophan	free Tryptophan	AN3201e	-
<b>Impurities</b>	Determination	AN4400e	acid hydrolysis
	Identification	AN4415e	acid hydrolysis
	Concentration	AN4410e	acid hydrolysis
	Free amino acids	AN4420e	-
EP-method (amino acids according to European Pharmacopoeia method)	EP ammonium	AN4500e	-
	EP Arginine	AN4510e	-
	EP Aspartic acid	AN4520e	-
	EP Cystine	AN4530e	-
	EP Glycine	AN4540e	-
	EP Histidine	AN4550e	-
	EP Histidine, HCL, H2O	AN4560e	-
	EP Isoleucine	AN4570e	-

These analysis are performed using a proprietary method based on the Biochrom technique, HPLC or LC/MS.



## Biogenic amines

In protein-rich products such as dairy products, biogenic amines can be produced by fermentation or bacterial decarboxylation of amino acids. Therefore, any food produced by fermentation or exposed during processing or storage have been exposed to microbial contamination may contain biogenic amines. This can lead to mental and physical illnesses such as food intolerance (Histamine). Biogenic amines can also occur in large quantities in silage, which poses a risk to milk quality.

Biogenic amines		Article code	Pre-processing
* Total package of 13 biogenic amino acids and related compounds	1,3 Diaminopropaan, 1,7 Diamino-heptaan, Agmatine, Arterenol, Benzylamine, Putrescine, Cadaverine, Cystamine, Histamine, Phenylethylamine, Spermine, Spermidine, Tyramine, Phenylethylamine	AN4700e	Extraction if needed (cheese)

## Maillard reaction products

Maillard reactions occur during heating processes in a food production facility, as well as during long-term storage of products. The reaction rate during storage depends on water content, time and temperature, but especially the presence of reducing sugars is a requirement, as for example in the case of milk powder.

*The occurrence of Maillard reactions leads to:*

- Loss of safety; toxic and physiological effects have been reported on the presence of Maillard reaction products.
- Loss of nutritional quality due to the "non-availability" of Lysine, among others.

Furosine, Carboxymethyllysine (CML) and Hydroxymethylfurfural (HMF) are indicators of food quality, for example whether te product hasn't been overheated.

LAL (Lysinoalanine) is formed undesirably during food production with higher pH and temperature. This can reduce protein digestion and amino acid availability.

Maillardreaction products		Article code	Pre-processing
* Lysine blocked (Lysine + Furosine)	Lysine, Lysine as E-DLF, Lysine blocked, reactive (available) Lysine and total Lysine (blocked and reactive Lysine together) and Furosine	AN4130e	acid hydrolysis
* Carboxymethyllysine (CML)		AN4205e	acid hydrolysis
* Lanthionine (LAN)		AN4300e	acid hydrolysis
* vrij Hydroxymethylfurfural (HMF)	2-Furylmethylketon, 5-Methylfurfural, Furfural, Hydroxymethylfurfural	AN4350e	-
* Lysinoalanine (LAL)		AN4250e	acid hydrolysis
* free Lysinoalanine		AN4260e	-

## Collagen

Ansynth specializes in collagen-based medical device quality testing, supporting product development and product authorization through biochemical analysis & impurity profiling. In addition, Ansynth offers the ability to determine the content of native collagen and its purity (determination of hydroxyproline).

Collagen		Article code	Pre-processing
*6M	Alanine, Arginine, Aspartic acid + Asparagine, Cysteine, Glutamic acid + Glutamine, Glycine, Histidine, Hydrolysis revenue, Hydroxylysine, Hydroxyproline, Isoleucine, Leucine, Lysine, Methionine, Phenylalanine, Proline, Serine, Threonine, Tyrosine, Valine	6M: AN4120e	acid hydrolysis (1x)
*3M	Glucosamine, Galactosamine en Tyrosine	6M + 3M: AN4110e	acid hydrolysis (2x)
*native collagen	NCC, OH-PRO denatured	6M, 3M + native: AN4100e	acid hydrolysis (3x)

## Expertise

Ansynth has significant experience in amino acid analysis and the support of various research programs for the analysis of amino acid profiles in diverse matrices.

### Would you like to have these analyses performed?

You can easily request the analyses through the customer portal.

Please feel free to contact our sales department for the following reasons;

- The desired analysis is not listed in the customer portal
- Performing the analysis in a special matrix
- If you have any questions

You can reach us by mail or phone at the following number and/or e-mail address:

+0031 88-7547199 or [sales@qlip.nl](mailto:sales@qlip.nl)

### Your benefits:

- Reliable (analysis)/results through validated techniques
- Execution in an ISO17025:2017 accredited laboratory
- Easy to request by using Q-portal
- Clear reports
- Using the specialized knowledge available at Ansynth and Qlip