ZIVAK®
TECHNOLOGIES

PRODUCTS CATALOGUE

FUTURE OF ANALYSIS

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ABOUT ZIVAK

UNIQUE SOLUTION FROM ONE COMPANY

Zivak Technologies is an international special company providing ready to use LC-MS/MS and HPLC analysis kits in the clinical diagnostics field. The Research&Development company also supplies its own fully automated sample preparation and injection systems which enables laboratories around the globe to make efficient use of their chromatography instruments as well as their employees in a fast, accurate and cost efficient way.

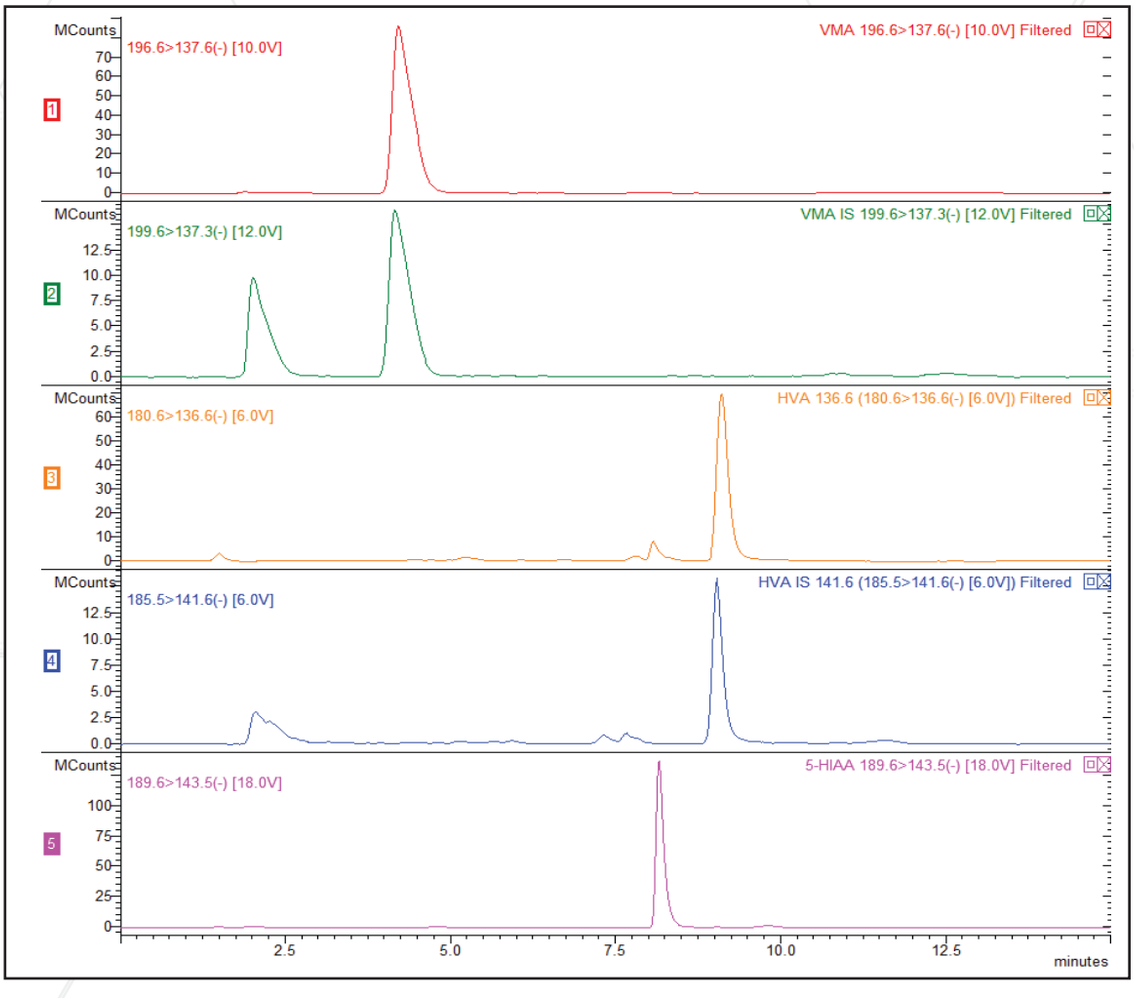
VMA, HVA, 5-HIAA LC-MS/MS Analysis Kit

SUMMARY AND EXPLANATION

Vanillylmandelic acid (VMA) and homovanillic acid (HVA) are final products of the catecholamine metabolism in human body. Urinary concentrations of VMA and HVA are used for screening of neuroblastoma, one of the most important tumors in children. 5-hydroxyindoleacetic acid (5-HIAA) is a metabolite of serotonin and is used for the diagnosis of carcinoid tumors.

- Accurate analysis of VMA, HVA and 5-HIAA in urine samples
- Gives results in 15 minutes.
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

Sample Chromatogram



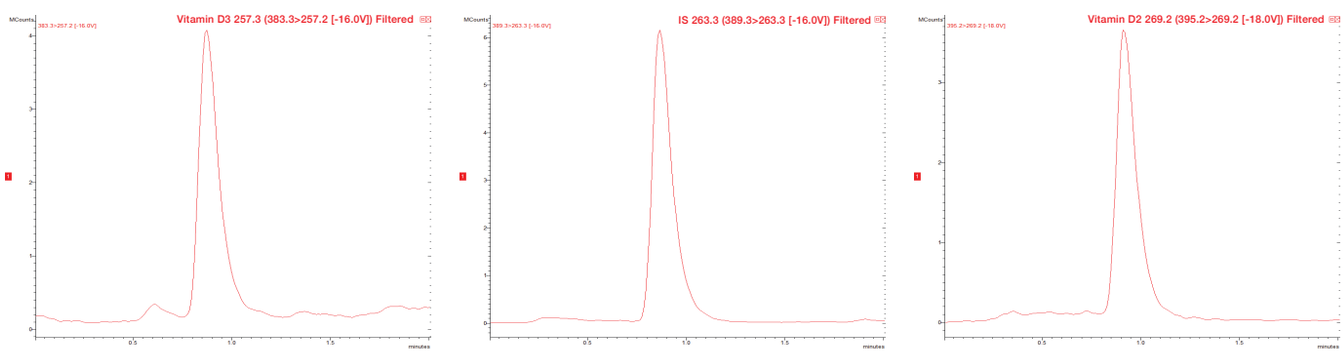
25-Hydroxyvitamin D2/D3 Serum LC-MS/MS APCI Analysis Kit

SUMMARY AND EXPLANATION

Vitamin D, commonly known as the “sunshine vitamin”, is essential for maintaining calcium metabolism and bone health. The major physiologic function of Vitamin D is to maintain the blood calcium and phosphorus levels within the normal range in order to maintain metabolic functions that are essential for most life processes, Vitamin D3 and Vitamin D2 are metabolized to 25-OH-Vitamin D3 and 25-OH-Vitamin D2 in the liver by the 25-OHase enzyme. The quantitation of these metabolites is widely used for determining of vitamin D status in human. The Vitamin D status has a clinical significance in a variety of disorders which are related to hormones. The measurements of the serum concentration of 25-OH-Vitamin D3 and 25-OH-Vitamin D2 have been used for differential diagnosis of hypocalcemic and hypercalcemic metabolic bone disorders.

- Rapid, sensitive and reliable quantitative detection of the 25-OH Vitamin D2-D3
- It gives results in 2 minutes with full automated Zivak MULTITASKER sample preparation and injection system.
- No time-consuming sample preparation via on-line SPE
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

Sample Chromatogram



ANALYTICAL PERFORMANCE

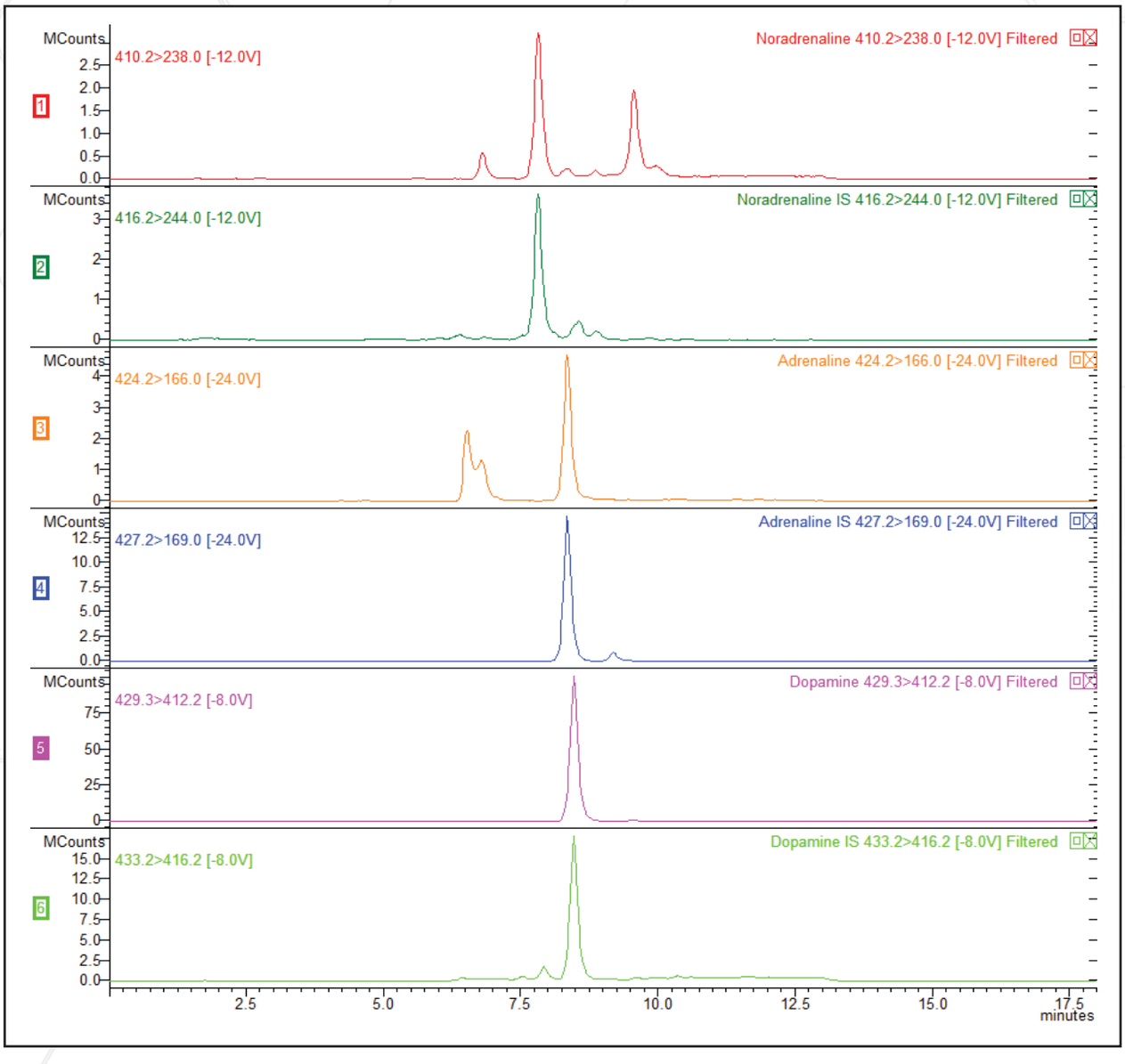
No	Analyte	LOD (µg/L)	LOQ (µg/L)	Accuracy (%)	Intra-assay Precision (%CV)	Inter-assay Precision (%CV)	Linearity (R^2)
1	25-OH Vitamin D2	1.06	3.5	96.4	4.60	4.74	0.992
2	25-OH Vitamin D3	1.48	4.9	94.7	2.16	2.74	0.993

Analytical Specificity (Cross Reactivity): No cross-reactivity was found with the typical substances tested

Catecholamines LC-MS/MS Analysis Kit

Catecholamines are hormones produced by the adrenal glands, which are found on top of the kidneys. They are released into the blood during times of physical or emotional stress. The major catecholamines are dopamine, norepinephrine, and epinephrine. The measurements of catecholamines are important for determination of pheochromocytomas in symptomatic patients like patients with persistent hypertension. It is also used in order to help monitor for recurrence when a pheochromocytoma has been discovered and removed.

Zivak Catecholamines LC-MS/MS Analysis Kit was developed for accurate analysis of Epinephrine, Norepinephrine and Dopamine in urine samples.

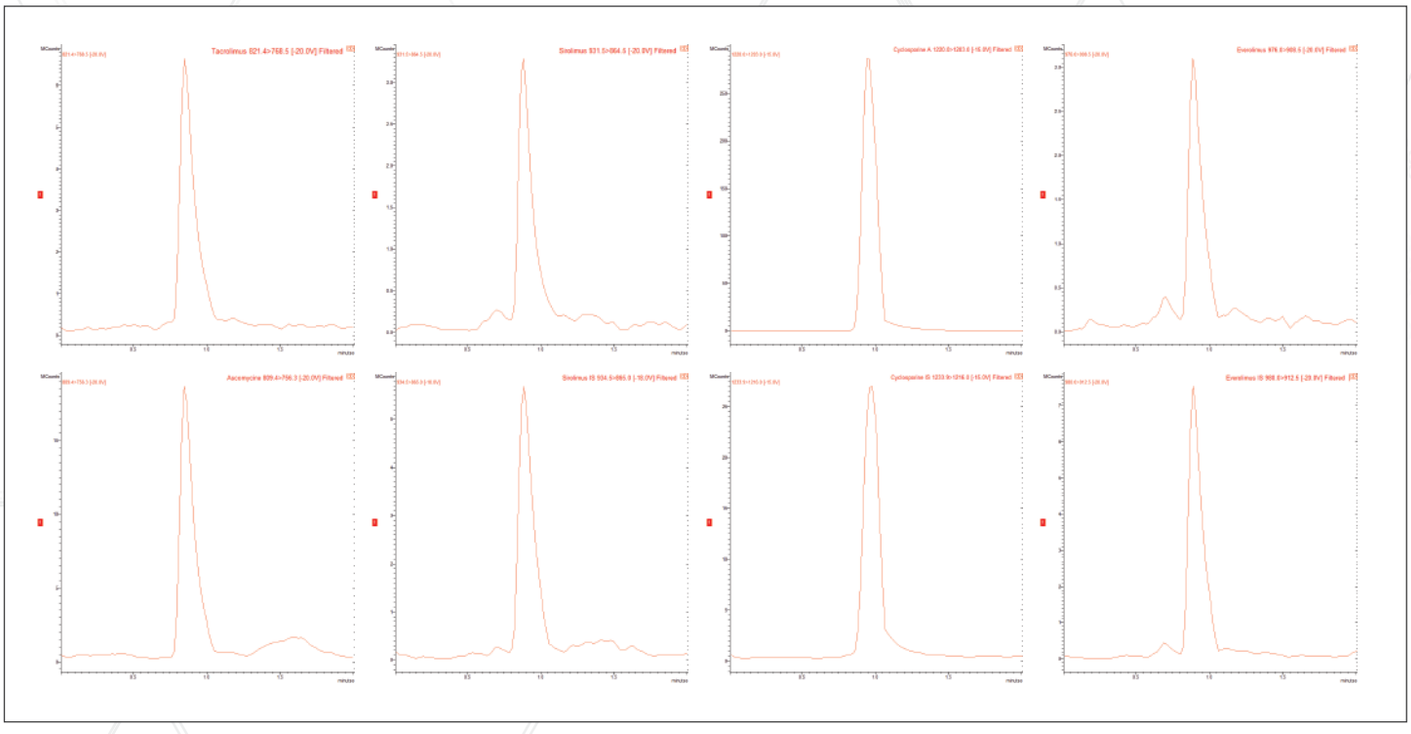


SUMMARY AND EXPLANATION

Immunosuppressants are drugs that inhibit or prevent activity of the immune system. They are used in immunosuppressive therapy to prevent the rejection of transplanted organs and tissues and treat autoimmune diseases or diseases that are most likely of autoimmune origin (e.g., rheumatoid arthritis, multiple sclerosis, myasthenia gravis, systemic lupus erythematosus, sarcoidosis, focal segmental glomerulosclerosis, Crohn's disease, Behcet's Disease, pemphigus, and ulcerative colitis). Immunosuppressants can also be used to treat some other non-autoimmune inflammatory diseases (e.g., long term allergic asthma control). Most of the immunosuppressants require monitoring blood concentrations, which is called as therapeutic drug monitoring (TDM), for dosage adjustment. LC-MS/MS is a powerful tool for the measurement of the blood concentrations of the immunosuppressants.

- Four immunosuppressants including Sirolimus, Tacrolimus, Everolimus and Cyclosporine A, with 4 Internal Standards
- Gives results in 2 minutes with full automated Zivak MULTITASKER sample preparation and injection system.
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

Sample Chromatogram



SUMMARY AND EXPLANATION

Quantitative analysis of amino acids in biological fluids is one of the most important parts of the clinical diagnosis of patients with inborn errors of amino acid metabolism or monitoring healthy people. Amino acid analysis in urine is important for diagnosis of disorders which are related with renal amino acid transport. In general, affected patients may experience failure to thrive, neurologic symptoms, digestive problems, dermatologic findings, and physical and cognitive delays. If not diagnosed and treated promptly, amino acid disorders can result in mental retardation and possibly death. Quantitative analysis of amino acids in plasma is preferred over urine for the diagnosis of aminoacidopathies which cause to accumulation or the deficiency of amino acids in biological fluids.

- This kit was developed for quantitative detection of free amino acids in human serum, plasma, urine and cerebrospinal fluid LC-MS/MS is an influential device for the study of metabolic disorders.
- It gives results in 20 minutes with minimal sample preparation.
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

Analytes Name				
3-methyl-histidine	Aspartic Acid (ASP)	Glycine (GLY)	Methionine (MET)	Thiaproline (THPR)
Alanine (ALA)	Beta alanine (BALA)	Histamine (HISTA)	N-methyl-histidine (N-MeHIS)	Threonine (THR)
Alpha-aminoadipic acid (AAA)	Beta-aminoisobutyric acid (BAIB)	Histidine (HIS)	Ornithine (ORN)	Tryptophan (TRP)
Alpha-aminobutyric acid (ABA)	Citrulline (CIT)	Hydroxylysine (HYL)	Phenylalanine (PHE)	Tyrosine (TYR)
Alpha-amino pimelic acid (APA)	Cystathionine (CTH)	Hydroxyproline (HYP)	Proline (PRO)	Valine (VAL)
Anserine (ANS)	Gammaaminobutyricac id GABA)	Isoleucine (ILEU)	Sarcosine (SAR)	Carnosine (CAR)
Arginine (ARG)	Glutamic Acid (GLU)	Leucine (LEU)	Serine (SER)	Taurin
Asparagine (ASN)	Glutamine (GLN)	Lysine (LYS)	Serotonin (SRTN)	
Creatinine	5-Hydroxy-L-tryptophan	Homocysteine (HCYS)	Cystine (C-C)	
N-acetyl-L-tyrosine	Cysteine (CYS)	Homocystine (HC-CH)	O-Phospho-L-Serine	

SUMMARY AND EXPLANATION

Microbiota refers to the entire population of microorganisms that colonize a location; and includes not just bacteria, but also other microbes such as fungi, archaea, viruses, and protozoans. Significant interest has been shown to the gut microbiota in the recent years within the scientific community and the gut microbiota have been associated with a large array of human diseases ranging from luminal diseases such as inflammatory bowel diseases (IBD) and irritable bowel syndrome (IBS), metabolic diseases such obesity and diabetes, allergic disease to neurodevelopmental illnesses. It has been speculated for long that the gut microbiota bears significant functional role in maintaining the gut in the normal individual and human health.

Organic acids are metabolic residues found in mammalian urine. Metabolism is all the reactions in which the body breaks down molecules to produce energy, creates new molecules and breaks down molecules. Organic acids are organic compounds that are acidic. Organic acids consist of the elements carbon, hydrogen, oxygen, sulphur, and phosphorus. Bacteria and yeast profile in the body can be determined using Gut Microbiota Dysbiosis Marker kits. According to these results treatments, vitamins, antioxidants, and diet can be applied.

- ZIVAK Quantitative Gut Microbiota Dysbiosis Markers Urine LC-MS/MS kit was developed for quantitative detection of the 26 organic acids in human urine samples.
- It gives results in 20 minutes with minimal sample preparation.
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

Analytes Name		
2-Hydroxybutyric Acid	Arabinose	Hippuric Acid
2-Hydroxyhippuric Acid	Citramalic Acid	HPHPA
2-Hydroxyphenylacetic Acid	Citric Acid	Orotic Acid
3-Indoleacetic Acid	Creatinine	Oxalic Acid
3-Oxoglutaric Acid	DHPPA	Pyroglutamic Acid
4-Hydroxybenzoic Acid	Furan-2,5-dicarboxylic acid	Tartaric Acid
4-Hydroxyhippuric Acid	Furancarbonylglycine	Tricarballylic Acid
4-Hydroxyphenylacetic Acid	Glyceric Acid	3-Hydroxybutyric Acid
5-Hydroxymethyl-2-Furoic Acid	Glycolic Acid	

SUMMARY AND EXPLANATION

Biogenic amines are important compounds that play a role in the metabolic processes of the organism, such as maintaining cell viability, protein synthesis, hormone synthesis and DNA replication. They are organic nitrogenous compounds formed as a result of decarboxylation of some amino acids. They are responsible for many biological events. However, if the concentrations of Biogenic amines exceed the normal levels, they can cause serious damage. They can cause toxic effects by accelerating the formation of cancer.

- 28 Biogenic amines can be analysed with a single run in 15 minutes. Creatinine also is quantified same run.
- Deuterated internal standard method is used for improving accuracy and reliability.
- Analysis can be done without using SPE well-plate.
- The life of the column can be increased by using the upper phase of the patient's samples.
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

Analytes Name		
3-Methoxytyramine	Glutamic Acid	Metanephrine
5-Hydroxy-L-Tryptophan	Glutamine	Norepinephrine
Creatinine	Glycine	Normetanephrine
Dopamine	Histamine	Serotonin
Epinephrine	Kynurenic Acid	Taurine (-)
Gamma-Aminobutyric acid (GABA)	Melatonin	Tyrosine
Vanillylmandelic Acid (-)	Xanthurenic Acid	Hydroxyproline
Tryptophan	Phenylalanine	Histidine
Arginine	Tyramine	
Ornithine	Lysine	

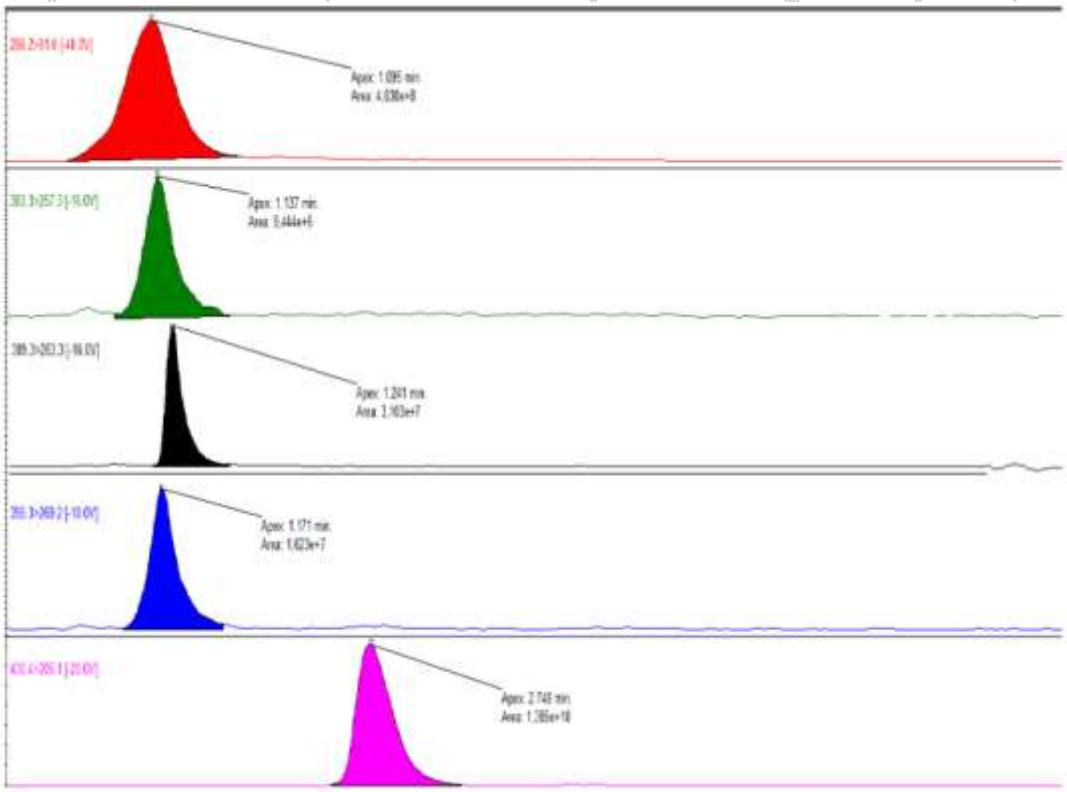
SUMMARY AND EXPLANATION

Vitamin D, commonly known as the “sunshine vitamin”, is essential for maintaining calcium metabolism and bone health. The major physiologic function of Vitamin D is to maintain the blood calcium and phosphorus levels within the normal range in order to maintain metabolic functions that are essential for most life processes.

Deficiencies of vitamins A and E may arise from poor nutrition or from intestinal malabsorption. People, especially children, at risk include those with bowel disease, pancreatic disease, chronic cholestasis, celiac disease, cystic fibrosis, and intestinal lymphangiectasia.

- Vitamin A-D3-D2-E Serum LC-MS/MS APCI Analysis Kit was developed for rapid, sensitive, and reliable quantitative detection of the Vitamin A-D3-D2-E concentrations in human serum samples.
- It gives results in 5.30 minutes minimal sample preparation.
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

Sample Chromatogram

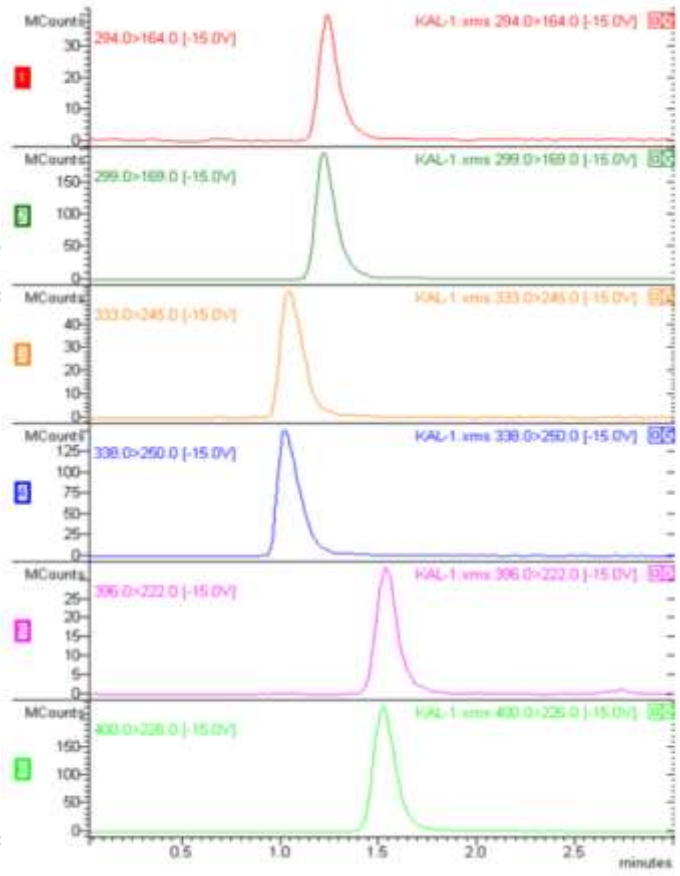


SUMMARY AND EXPLANATION

Phenylketonuria (PKU) is an autosomal recessive genetic disorder characterized by a deficiency in the enzyme phenylalanine hydroxylase (PAH). This enzyme is necessary to metabolize the aminoacid phenylalanine to the amino acid tyrosine.

- Zivak PKU LC-MS/MS kit developed for accurate analysis of Phenylalanine (PHE), Tryptophan (TRP), Tyrosine (TYR) in human serum, plasma and dried blood samples.
- It gives results in 2 minutes with minimal sample preparation.
- Main methods and procedures that is selected by Zivak are based on EN ISO 14971 .

Sample Chromatogram

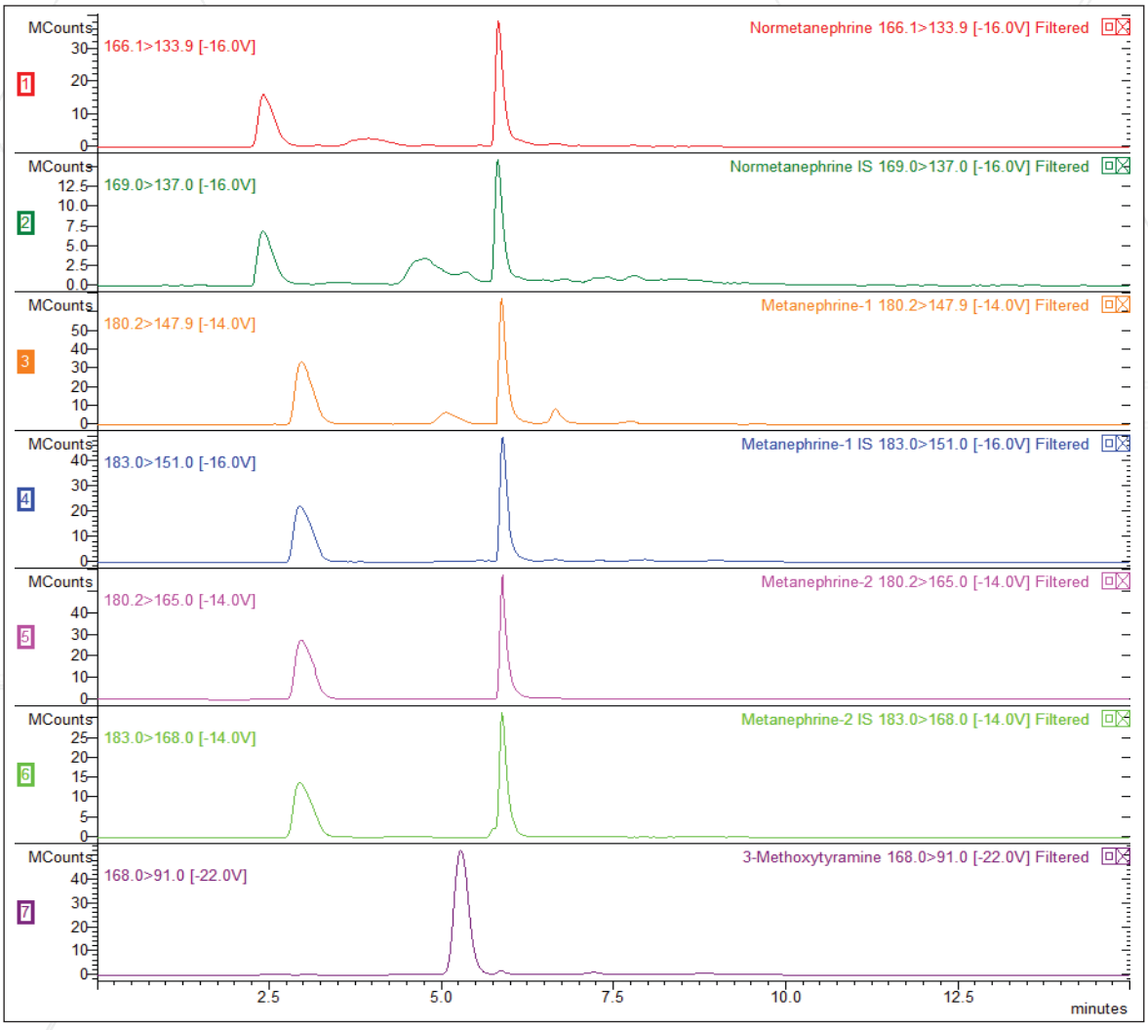


SUMMARY AND EXPLANATION

Metanephrine, Normetanephrine and 3-methoxytyramine are primary metabolites of the adrenaline, noradrenaline and dopamine catecholamines, respectively. Urinary concentration of metanephrines is used to evaluate suspected pheochromocytoma. Despite the rarity of pheochromocytoma, the dangers of uncontrolled severe hypertension and the very effective surgical treatment of this condition mean that diagnosis is important. Urinary or plasma catecholamines or catecholamine-derivatives are commonly used to screen for pheochromocytomas prior to imaging.

- accurate analysis of Metanephrine, Normetanephrine and 3-methoxytyramine in urine samples.
- It gives results in 13 minutes
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

Sample Chromatogram



SUMMARY AND EXPLANATION

Zivak Neurotransmitters LC-MS/MS Analysis Kit was developed for accurate analysis of Epinephrine, Norepinephrine, Dopamine, Serotonin, Gamma-aminobutyric acid, Glutamic Acid, Histamine, 5-Hydroxy-L-Tryptophan in urine samples.

- It gives results in 13 minutes with minimal sample preparation.
- 8 Analytes, 7 Internal Standards
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

No	Analyte	IS
1	Dopamine	Dopamine-IS
2	Epinephrine	Epinephrine-IS
3	Norepinephrine	Norepinephrine-IS
4	Seratonin	5-Hydroxy-L-Tryptophan-IS
5	Gamma-aminobutyric acid	Gamma-aminobutyric acid-IS
6	Clutamic acid	Clutamic acid-IS
7	Histamine	Histamine-IS
8	5-Hydroxy-L-Tryptophan	5-Hydroxy-L-Tryptophan-IS
9	Creatinine	Creatinine-IS

ANALYTICAL PERFORMANCE

No	Analyte	LOD (µg/L)	LOQ (µg/L)	Accuracy (%)	Intra-assay Prescion (%CV)	Inter-assay Prescion (%CV)	Linearity (R^2)
1	Dopamine	0,4	1,2	2,1	3,2	3,2	0,9989
2	Epinephrine	0,6	1,8	1,7	2,6	2,6	0,999
3	Norepinephrine	0,3	0,9	1,6	2,4	2,4	0,9985
4	Seratonin	1,33	4,39	4,72	5,5	5,5	0,991
5	Gamma-aminobutyric acid	3,3	10,89	4,21	5,3	5,3	0,995
6	Clutamic acid	1,33	4,39	5,42	6,4	6,4	0,994
7	Histamine	0,83	2,74	4,26	5,1	5,1	0,986
8	5-Hydroxy-L-Tryptophan	0,65	2,15	3,57	4,7	4,7	0,996
9	Creatinine	0,71	25,3	96,8	4,3	3,7	0,993

Analytical Specificity (Cross Reactivity): No cross-reactivity was found with the typical substances tested.

SUMMARY AND EXPLANATION

Organic acid disorders (organic acidemia) are a group of inherited metabolic conditions. Most of the organic acidemias caused by defective autosomal genes for various enzymes are for amino acid metabolism. Most are inherited as autosomal recessive diseases. Organic acid related disorders may affect many metabolic pathways including amino acid, lipid metabolism, fatty acid oxidation and the Krebs cycle.

Organic acidemias are usually diagnosed in infancy, characterized by urinary excretion of abnormal amounts or types of organic acids. These disorders vary in their prognosis, from manageable to fatal, and usually affect more than one organ system, especially the central nervous system.

Quantitative analysis of the organic acids in urine samples has clinical importance for determining organic acidemias and monitoring the organic acid concentrations in human urine.

- Developed for quantitative detection of the 73 major organic acids in human urine samples.
- Gives results in 20 minutes with minimal sample preparation.
- Main methods and procedures that have been selected are based on EN ISO 13485 and 98/79/EC.

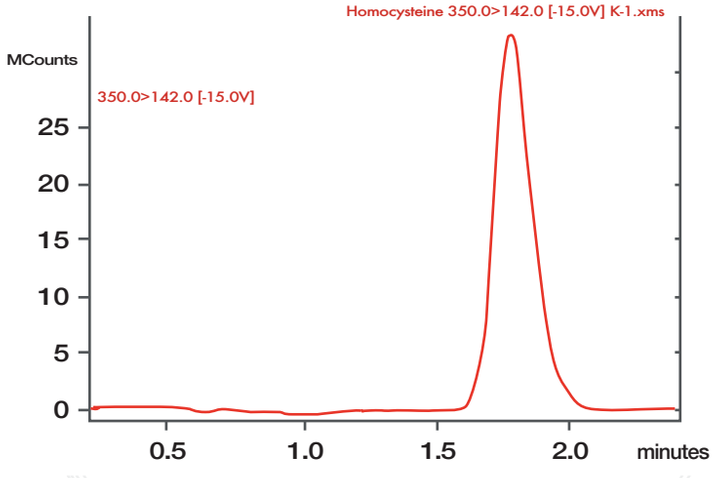
Analytes			
2-3-pyridine carboxylic	Adipic	Citric	Orotic
2-OH-phenylacetic	AKBM	Ethylmalonic	P-Hydroxyphenyllactic
2-me-hippuric	AKIC	Formimino glutamic	Phenylacetic
2-me-citric	AKIV	Fumaric	Phenylglyoxylic
2-me-glutaric	Alpha-OH-glutaric	Hexanoyl glycine	Picolinic
2-me-succinic	Alpha-OH-butyric	Hippuric	Pimelic
3-OH-propanoic	Alpha-OH-isovaleric	Homovanillic	Propyonil Glycine
3,4-dihydroxy-hidrocinnamic	Alpha-Ketobutyric	Iso-Citric	Pyroglutamic
3-phenyllactic	Alpha-Ketoglutaric	Iso-Valeryl Glycine	Pyruvic
3-indoleacetic	Benzoic	Kynurenic	Sebacic Acid
3-me-hippuric	Beta-OH-butyric	Lactic	Suberic
3-me-crotonyl glycine	Beta-OH-isovaleric	Malic	Suberyl glycine
3-me-glutaric	Glycolic Acid	Malonic	Succinic
3-OH-3-me-glutaric	Glyceric Acid	Mandelic	Succinyl Aceton
4-OH-benzoic	Glucaric	Methylmalonic	Tartaric
4-me-hippuric	Glutaric Acid	Mevalonolactone	Tiglyl glycine
4-OH-phenylacetic	Cis-aconitic	N-(-3-Phenylpropionyl)glycine	Tricarballyl
5-OH-indole-3-acetic	Citramalic	N-Acetyl-L-aspartic	Vanilmandelic
			Xanthurenic

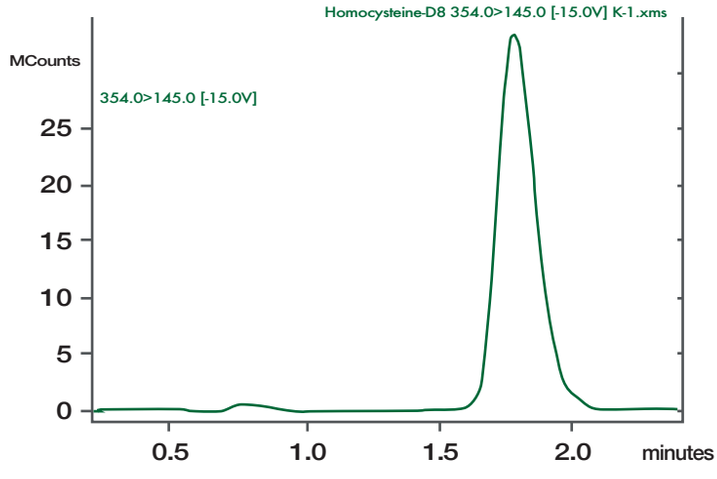
SUMMARY AND EXPLANATION

Homocysteine is a non-protein amino acid. It is biosynthesized from methionine by the removal of its terminal methyl group. Homocysteine can be re-cycled into methionine or converted into cysteine with the aid of B-vitamins. According to recent studies, the elevated plasma concentrations of homocysteine are related to cardiovascular and venous diseases. Dysfunctional enzyme as a result of genetic mutation or deficiency of the essential B vitamins folic acid, B12, and B6 can tend to hyperhomocysteinemia. Oxidized forms of homocysteine are 98–99% of total plasma homocysteine. Mildly increased homocysteine causes dysfunctional vascular endothelium. Intervention studies are urgently needed to determine if lowering homocysteine is effective in decreasing the morbidity and mortality of cardiovascular disease.

Liquid chromatography combined with mass spectrometry systems has gained a significant role due to very short analysis run time. These LC-MS/MS analysis systems decrease the run time, labor cost and give more reliable and sensitive results.

- Rapid, sensitive and reliable quantitative detection of the total homocysteine concentrations
- It gives results in 2.5 minutes with minimal sample preparation.
- Main methods and procedures that we selected are based on EN ISO 13485 and 98/79/EC.





ANALYTICAL PERFORMANCE

No	Analyte	LOD (µmol/L)	LOQ (µmol/L)	Accuracy (%)	Precision (%CV)	Linearity (R^2)
1	Homocysteine	0.06	0.18	98.5	3.5	0.997

Analytical Specificity (Cross Reactivity): No cross-reactivity was found with the typical substances tested

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