



Determination of Vitamins

Vitamins are a group of substances that are needed for normal cell function, growth, and development and they are classified as either fat-soluble or water-soluble. These nutrients are typically obtained through the consumption of food or dietary supplements, which are subject to vitamin testing in order to meet specific labelling requirements.

Neutron Proposal:

In view of the above Neutron aims to support clients with its expertise to put safe products in the market in order to guarantee human health and well-being: vitamins analysis consists in the determination of which vitamins are present and at what levels in different matrices such as food supplements, milk, juices, drink, baby food, cereals, feed and raw material.

Neutron performs vitamins analyses by HPLC-DAD, HPLC-FL and LC-MS/MS techniques, delivering reliable results (see table). Moreover, Neutron provides a complete and integrated analysis to monitor the degradation of the product over time. (Shelf life studies). www.neutron.it

ANALYTES	ANALYTICAL TECHNIQUE	LQ except liquid milk and infant formula (liquid)	LQ liquid milk and infant formula (liquid)
FAT-SOLUBLE VITAMINS			
SINGLE DETERMINATIONS			
Vitamin A (retinol)	HPLC-DAD/FL	0,01 mg/100 g	2 µg/100 ml
Vitamin E (value expressed as alpha-tocopherol acetate)	HPLC-DAD/FL	0,10 mg/100 g	0,01 mg/100 ml
Vitamin E (tocopherol equivalents)	HPLC-DAD/FL	0,10 mg/100 g	0,01 mg/100 ml
Vitamin D3	HPLC-DAD	0,2 - 1,0 µg/100 g	0,05 µg/100 ml
Vitamin D2	HPLC-DAD	0,2 - 1,0 µg/100 g	0,05 µg/100 ml
Vitamin K1	HPLC-DAD	2,0 µg/100 g	0,5 µg/100 ml
Vitamin K2 (Menaquinone MK-4) (CAS 863-61-6)	HPLC-DAD	2,0 µg/100 g	-
Vitamin K2 (Menaquinone MK-7) (CAS 2124-57-4)	HPLC-DAD	2,0 µg/100 g	-
Vitamin K3, expressed as Menadione	HPLC-DAD	1,0 - 50 mg/kg	-
Astaxanthin	HPLC-DAD	1,0 - 2,0 mg/kg	-
Lycopene	HPLC-DAD	0,1 - 1,0 mg/kg	-
Citranaxanthin	HPLC-DAD	-	-
VITAMIN A			
Beta-carotene	HPLC-DAD	0,02 - 0,50 mg/100 ml	2 µg/100 ml
Vitamin A (retinol)	HPLC-DAD/FL	0,01 mg/100 g	2 µg/100 ml
Vitamin A (retinol activity equivalents)	-	-	-
Vitamin A (IU activity)	-	-	-
CAROTENOIDS			
Beta-carotene	HPLC-DAD	0,02 - 0,50 mg/100 ml	2 µg/100 ml
Canthaxanthin (E161g)	HPLC-DAD	-	-
Ethyl ester of Beta-Apo-8'-Carotenoic acid (E160f)	HPLC-DAD	-	-
XANTHOPHYLLS			
Lutein	HPLC-DAD	0,02 - 0,1 mg/100g	0,002 mg/100g
Zeaxanthin	HPLC-DAD	0,02 - 0,1 mg/100g	0,002 mg/100g

ANALYTES	ANALYTICAL TECHNIQUE	LQ	
VITAMIN E - TOCOPHEROLS in vegetable oils			
alpha-Tocopherol	HPLC-DAD/FL	2,0 mg/100 g	
alpha-Tocopherol acetate	HPLC-DAD/FL	2,0 mg/100 g	
beta-Tocopherol	HPLC-DAD/FL	2,0 mg/100 g	
gamma-Tocopherol	HPLC-DAD/FL	2,0 mg/100 g	
delta-Tocopherol	HPLC-DAD/FL	2,0 mg/100 g	
alpha-Tocotrienol	HPLC-DAD/FL	2,0 mg/100 g	
Vitamin E (tocopherol equivalents)	-	-	
Vitamin E (IU)	-	-	
TOCOTRIENOLS in vegetable oils			
alpha-Tocotrienol	HPLC-DAD/FL	2,0 mg/100 g	
beta-Tocotrienol	HPLC-DAD/FL	2,0 mg/100 g	
gamma-Tocotrienol	HPLC-DAD/FL	2,0 mg/100 g	
delta-Tocotrienol	HPLC-DAD/FL	2,0 mg/100 g	
WATER-SOLUBLE VITAMINS			
ANALYTES	ANALYTICAL TECHNIQUE	LQ except liquid milk and infant formula (liquid)	LQ liquid milk and infant formula (liquid)
SINGLE DETERMINATIONS ON FOOD AND DIETARY SUPPLEMENTS			
Vitamin B1 (Thiamine base)	LC-MS/MS HPLC-DAD	0,020 - 0,1 mg/100 g	0,020 mg/100 ml
Vitamin B2 (Riboflavin)	LC-MS/MS HPLC-FL HPLC-DAD	0,020 mg/100 g	0,020 mg/100 ml
Vitamin B6 (as Pyridoxine base)	LC-MS/MS HPLC-FL	0,020 mg/100 g	0,020 mg/100 ml
Vitamin PP (sum of nicotinic acid and nicotinamide)	LC-MS/MS HPLC-DAD	0,050 mg/100 g	0,050 mg/100 ml
Pantothenic acid	GC-MS LC-MS/MS HPLC-DAD	0,10 mg/100 g	0,10 mg/100 ml
Folic acid	LC-MS/MS HPLC-DAD	5,0 µg/100 g	5,0 µg/100 ml
Vitamin H (Biotin)	LC-MS/MS HPLC-DAD	5,0 µg/100 g	5,0 µg/100 ml
Folates	MICROBIOLOGICAL	5,0 µg/100 g	5,0 µg/100 ml
Vitamin B12 (Cyanocobalamin)	LC-MS/MS HPLC-DAD	0,05 µg/100 g	0,05 µg/100 ml
Vitamin B12 (Methylcobalamin)	LC-MS/MS HPLC-DAD	-	-
Vitamin B12	MICROBIOLOGICAL	0,05 µg/100 g	0,05 µg/100 ml
Vitamin C (ascorbic acid)	HPLC-DAD	1,0 mg/100 g	1,0 mg/100 ml
Myo-inositol	HPAEC-PAD	50 mg/kg	50 mg/kg
Myo-inositol	GC-FID	5,0 mg/100g	1,0 mg/100 ml
Scyllo-inositol	HPAEC-PAD	50 mg/kg	50 mg/kg
Chiro-inositol	HPAEC-PAD	50 mg/kg	50 mg/kg
Inositol (acid hydrolysis)	GC-FID	5,0 mg/100g	-
TOTAL FOLATES AOAC 2011.06 IN DAIRY PRODUCTS			
10-Formylfolic acid	LC-MS/MS	2 µg/100 g	2 µg/100 ml
10-Methylfolic acid	LC-MS/MS	2 µg/100 g	2 µg/100 ml
5-Formyltetrahydrofolic acid	LC-MS/MS	10 µg/100 g	10 µg/100 ml
5-Methyltetrahydrofolic acid	LC-MS/MS HPLC-DAD	2 µg/100 g	2 µg/100 ml
Folic acid	LC-MS/MS	2 µg/100 g	2 µg/100 ml
Total Folates	-	-	-
Dietary folate equivalent (Reg. EU 127/2016)	-	-	-