

Quick Reference Card

AOAC International formed an AOAC Stakeholder Panel on Infant Formula and Adult Nutritionals (SPIFAN) in 2010. Since then, this panel has developed standard method performance requirements (SMPR) for 25 priority nutrients in infant formula and adult nutritionals and adopted 43 standard methods.

Here is a summary of the most recent AOAC standard methods in which Waters technologies have been adopted.

Compound	AOAC Method	Status	Sample Prep	Technique	Equipment	Chemistry	Publication
Carnitine	2012.17	First Action	Filtration	LC-MS/MS	ACQUITY™ UPLC™, ACQUITY TQD, MassLynx™ MS Software	Symmetry™ C8, 3.5 µm, 2.1 x 50 mm, (p/n WAT200624)	J. AOAC Int. 96, 1082(2013)
Carnitine	2014.04	First Action	Microwave assisted hydrolysis, alkaline degradation, filtration	HILIC-UPLC/MS/MS	ACQUITY UPLC, ACQUITY TQD* or Xevo™ TQ-S, MassLynx MS Software	ACQUITY UPLC BEH HILIC, 1.7 µm, 2.1 x 100 mm, (p/n 186003461)	J. AOAC Int. 98, 1395(2015)
Choline	2012.18	First Action	Acidic hydrolysis and enzymatic hydrolysis (Phospholipase D), filtration	UPLC-MS/MS	ACQUITY UPLC, ACQUITY TQD*, MassLynx MS Software	ACQUITY UPLC BEH HILIC, 1.7 µm, 2.1 x 100 mm, (p/n 186003461)	J. AOAC Int. 96, 1396(2013)
Folate (Vitamin B9)	2011.06	Final Action	Enzymatic digestion (alpha-amylase, protease, rat plasma conjugase)	UPLC-MS/MS	ACQUITY UPLC, Quattro Premier™**, MassLynx MS Software	ACQUITY UPLC HSS T3, 1.8 µm, 2.1 x 150 mm, (p/n 186003540)	J. AOAC Int. 95, 1547(2012)
Mono-fluoroacetate in Powdered Nutritional Products	2015.04	First Action	Protein precipitation followed by derivatization of extract using 2-nitrophenylhydrazine (2-NPH) in the presence of 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide hydrochloride, followed by SPE clean up prior to analysis.	UPLC-MS/MS	ACQUITY UPLC, Xevo TQ-S, MassLynx MS Software	ACQUITY UPLC BEH C8, 1.7 µm, 2.1 x 100 mm, (p/n 186002352)	J. AOAC Int. 98, 1135 (2016)
Nucleotides	2011.21	First Action	Centrifugal ultrafiltration	LC-MS/MS	Alliance™ HPLC, Quattro Premier*, MassLynx MS Software	TSK gel NH2-100 3 µm, 2.0 x 150 mm	J. AOAC Int. 95, 603(2012)
Vitamin A and E	2011.07	First Action	Alcoholic saponification, SPE, and concentration	UPLC-UV/PDA	ACQUITY UPLC, UV/PDA, Empower™ CDS Software	ACQUITY UPLC BEH HILIC, 1.7 µm, 2.1 x 100 mm, (p/n 186003461)	J. AOAC Int. 95, 301(2012)
Vitamin B1, B2, and B6	2015.14	First Action	Enzymatic hydrolysis (papain and alpha-amylase)	RP-UPLC-MS/MS	ACQUITY UPLC, Xevo TQ-S, MassLynx MS Software	ACQUITY UPLC BEH C8, 1.7 µm, 2.1 x 100 mm, (p/n 186002352)	J. AOAC Int. 99, 776 (2016)
Vitamin B5 (Pantothenic Acid)	2012.16	Final Action	Extraction with 0.4 M ammonium acetate buffer and filtration	UPLC-MS/MS	ACQUITY UPLC, Xevo TQ-S, MassLynx MS Software	ACQUITY UPLC HSS T3, 1.8 µm, 2.1 x 100 mm, (p/n 186003539)	J. AOAC Int. 96, 497(2013)
Vitamin B12	2014.02	Final Action	Extraction using sodium acetate buffer in the presence of sodium cyanide. Extract are purified and concentrated with an immunoaffinity column.	UPLC-UV	ACQUITY UPLC, UV, MassLynx MS Software	ACQUITY UPLC BEH C8, 1.7 µm, 2.1 x 100 mm, (p/n 186002352)	J. AOAC Int. 97, 1397(2014)
Vitamin C	2012.22	Final Action	Extraction from sample using trichloroacetic acid in the presence of Tris[2-carboxyethyl] phosphine (TCEP)	UPLC-UV	ACQUITY UPLC-PDA, Empower CDS Software	ACQUITY UPLC BEH C8, 1.7 µm, 2.1 x 100 mm, (p/n 186002352)	J. AOAC Int. 96, 1065(2013)
Vitamin D	2012.11	First Action	Alcoholic saponification, LLE, concentration	UPLC-MS/MS	ACQUITY UPLC, Xevo TQ, MassLynx MS Software	ACQUITY UPLC HSS T3, 1.8 µm, 2.1 x 150 mm, (p/n 186003540)	J. AOAC Int. 96, 1387(2013)
Vitamin D2, D3	2016.05	First Action	Saponification followed by hexane extraction. Vitamin D is derivatized using PTAD and re-extracted in ACN prior to RP UPLC-MS/MS analysis	UPLC-MS/MS	ACQUITY UPLC, Xevo TQ-S micro, MassLynx MS Software	ACQUITY UPLC BEH C8, 1.7 µm, 2.1 x 50 mm (p/n 186002350)	J. AOAC Int. 99, 1321 (2016)

*Quattro Premier and Quattro Premier XE are succeeded by Xevo series tandem quadrupole mass spectrometers.

[SELECTED WATERS FOOD QC TESTING APPLICATION NOTES]

Description	Technology	Literature Code
Vitamins		
Water-soluble vitamins in various food matrices	ACQUITY UPLC/ACQUITY QDa™ Mass Detector	720004960en
Vitamin D and previtamin D in food products	ACQUITY UPLC H-Class/Xevo TQ-S micro	720006064en
Vitamin K1 and K2 in dietary supplements	ACQUITY UPC ² /ACQUITY UPLC PDA	720004937en
Water-soluble vitamins in ready-to-feed and powdered formulations	ACQUITY UPLC/Xevo TQ-S	720004690en
Vitamins A and E in infant formula	ACQUITY UPC ² /ACQUITY UPLC PDA	720004538en
Fat-soluble vitamins in dietary supplements	ACQUITY UPC ² /ACQUITY UPLC PDA	720004394en
Water-soluble vitamins in infant formula	ACQUITY UPLC/Xevo TQ	720003694en
Amino acids		
Amino acids in wine	ACQUITY UPLC/TUV	720002044en
Amino acids in beer production	ACQUITY UPLC/UV	720002158en
Amino acids in pure protein and Hydrolysate	ACQUITY UPLC/TUV/PDA/FLR, AccQ-Tag™ Ultra	720002913en
Amino acids in food process control	ACQUITY UPLC/TUV, AccQ-Tag Ultra	720003357en
Amino acids in animal feed	ACQUITY UPLC/TUV, AccQ-Tag Ultra	720002804en
Sugars and sweeteners		
Sweeteners in various food products	ACQUITY Arc™ UHPLC/ACQUITY QDa	720005017en
Mono and disaccharides in milk and infant formula	ACQUITY Arc UHPLC/ACQUITY QDa	720005767en
Mono and disaccharides and selected alditols in juice, beer, wine, and whiskey	ACQUITY Arc UHPLC/ACQUITY QDa	720005609en
Sugars in fruit juices	Alliance HPLC/RI	720004552en
Sugars in fruit juices	Alliance HPLC/ELSD	720004548en
Sugars in fruit juices	ACQUITY UPLC/ELSD	720004404en
Sugars in fruit juices, corn syrup, and milk	ACQUITY UPLC/RI	720004677en
Sucralose in flavored waters	Alliance HPLC/RI	720005669en
Non-nutritional sweeteners in beverages and canned fruits	ACQUITY UPLC/ELSD	720004166en
Polyphenols		
Flavonoids in juices	ACQUITY UPLC H-Class/ACQUITY QDa	720004985en
Polyphenols in fruit juices	ACQUITY UPLC/UV/SQD	720004069en
Anthocyanidins in berries	ACQUITY UPLC/TUV	720001870en
Water-soluble vitamins and flavonoids in fruit juice and peels	ACQUITY UPLC/PDA	720004644en
Soy isoflavones in food and dietary supplements	ACQUITY UPLC/SQD	720004235en
Isoflavones in dietary supplements	ACQUITY Arc UHPLC/ACQUITY QDa	720005858en 720005814en 720005890en
Isoflavones in dietary supplements	ACQUITY UPLC H-Class/ACQUITY QDa	720006065en
Food dyes/pigments		
Carotenoids in dietary supplements	ACQUITY UPC ² /PDA	720004550en
Synthetic food dyes in foods	ACQUITY UPLC H-Class/PDA	720004658en
Artificial food dyes	ACQUITY UPLC H-Class/PDA	720005217en
Lipids		
Triacylglycerols (TAGs) in edible oils	ACQUITY UPC ² /PDA/QTof MS	720004809en
Extraction of fat from animal feed	MV-10 ASFE	720004446en
Triacylglycerols in oils	ACQUITY UPC ² /ELS/PDA	720004871en
Fatty acid profiling	UPC ² /Xevo TQ-S	720005726en
Fatty acids in oil supplements	DART/ACQUITY QDa	720005724en
Adulteration/Authenticity		
Fruit juices	ACQUITY UPLC/PDA/QTof MS	720004173en
Flavor analysis	DART/ACQUITY QDa	720006001en
Profiling and authentication of cinnamon samples	DART/ACQUITY QDa	720005725en
Beverage analysis (caffeine, sweetener, preservatives)		
Soft drink analysis	ACQUITY UPLC H-Class/TUV	720004016en
Soft drink analysis	ACQUITY Arc UHPLC/UV/ACQUITY QDa	720005474en
2- and 4-Methylimidazole in beverages	Alliance HPLC/ACQUITY QDa	720005200en

More food testing applications can be found in Waters Food Testing Application Notebooks ([720005049en](#)) and ([720004987en](#)), or visit Waters website: www.waters.com/food