

**Analytical Methods Available  
for Detecting and Quantifying Melamine and Cyanuric Acid in Food (and Feed)**

NOTE: This is a compilation of available (published) analytical methods for detection of melamine (and cyanuric acid) in food products, based on publicly available information. This is not a complete list of all published papers, nor is it intended to recommend any specific method. This list is for information only.

Method	Used for	Limit of Quantification of Melamine	Limit of Detection Melamine	Analogues Detected	Reference
ELISA	Used for wheat gluten, moist pet food, dried pet food, milk and milk powder	10-250 ppm for wheat gluten, 2-50 ppm for moist pet food, 4-100 ppm for dried pet food, 2-50 ppm for milk and 10-250ppm for milk powder	10 ppm for wheat gluten, 2 ppm for moist pet food, 4 ppm for dried pet food, 2 ppm for milk and 10 ppm for milk powder	Melamine	ELISA AgraQuant® kit Romer Labs <a href="http://www.romerlabs.com/pdts_kits.html">http://www.romerlabs.com/pdts_kits.html</a>
	Milk, milk powder and other dairy products	Quantitation ranges from 0.1-5.0ppm for milk and 0.5-25ppm for milk powder	0.1ppm in Milk 0.5ppm in Milk powder	Melamine	Sensitive AgraQuant® ELISA Test Kit for Dairy Products Romer Labs <a href="http://www.romerlabs.com/pdts_kits.html">http://www.romerlabs.com/pdts_kits.html</a>
	Liquid milk	60 ppb	Validation for other foods at low detection limits in progress	Melamine	Abraxis <a href="mailto:info@abraxiskits.com">info@abraxiskits.com</a> <a href="http://www.abraxiskits.com/index.html">http://www.abraxiskits.com/index.html</a> (Communication received from Abraxis)

GC / MS	USFDA Screen USDA Various matrices		2 ppm	Melamine Ammeline Ammelide Cyanuric Acid	<a href="http://www.fda.gov/cvm/GCMSMelamine.htm">http://www.fda.gov/cvm/GCMSMelamine.htm</a>
GC-MS/MS	Food (Milk, milk powder, and other dairy products)	100 ppb	50 ppb	Melamine Ammeline Ammelide Cyanuric Acid	Laboratory LABERCA, Authority DGAI, Ministère de l'Agriculture et de la Pêche <a href="http://www.laberca.org">www.laberca.org</a>
HPLC/UV	USDA for meat	50 ppb(poultry) 100 ppb(beef)	25 ppb	Melamine / Cyanuric Acid	<a href="http://www.fsis.usda.gov/ophs/clg/Cyromazine.pdf">http://www.fsis.usda.gov/ophs/clg/Cyromazine.pdf</a>
	USFDA for wheat gluten and moist pet food			Melamine	<a href="http://www.fda.gov/cvm/melamine04022007.htm">http://www.fda.gov/cvm/melamine04022007.htm</a>
	Guangdong assay, China for Milk			Melamine/ Cyromazine	<a href="http://www.gov.cn/fwxx/sh/2008-09/23/content_1102713.htm">http://www.gov.cn/fwxx/sh/2008-09/23/content_1102713.htm</a> <a href="http://ms.newssc.org/system/2008/09/24/011136491.shtml">http://ms.newssc.org/system/2008/09/24/011136491.shtml</a> <a href="http://www.instrument.com.cn/news/2008/021386.shtml">http://www.instrument.com.cn/news/2008/021386.shtml</a>
	Used for wheat Gluten and rice protein concentrate	400 ppm	100 ppm	Melamine, Ammeline, and Cyanuric acid	<a href="http://acs.confex.com/acs/mwrm07/techprogram/P51682.HTM">http://acs.confex.com/acs/mwrm07/techprogram/P51682.HTM</a>
	Used for beverage	50 ppb		Melamine	<a href="http://www.ncbi.nlm.nih.gov/pubmed/3610957">http://www.ncbi.nlm.nih.gov/pubmed/3610957</a>
	Used for cereal flour		5 ppm for Melamine, Ammeline, Ammelide, 90ppm for Cyanuric acid	Melamine, Ammeline, Ammelide, Cyanuric Acid	<a href="http://www.ncbi.nlm.nih.gov/pubmed/18027188">http://www.ncbi.nlm.nih.gov/pubmed/18027188</a>

LC/MS	Used for meat and pet food		10 ppb	Melamine, Cyanuric acid	<a href="http://www.ncbi.nlm.nih.gov/pubmed/18608503?ordinalpos=3&amp;itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum">http://www.ncbi.nlm.nih.gov/pubmed/18608503?ordinalpos=3&amp;itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum</a>
LC / MS-MS	USDA for swine and poultry tissue	50 ppb (screening)		Melamine	<a href="http://www.fsis.usda.gov/PDF/FER_N_CHE_0003.pdf">http://www.fsis.usda.gov/PDF/FER_N_CHE_0003.pdf</a>
	US FDA for Catfish tissue			Melamine,	<a href="http://www.cfsan.fda.gov/~frf/lib4396.html">http://www.cfsan.fda.gov/~frf/lib4396.html</a>
	US FDA for Infant Formula	250 ppb for both analytes		Melamine, Cyanuric Acid	<a href="http://www.cfsan.fda.gov/~frf/lib4421.html">http://www.cfsan.fda.gov/~frf/lib4421.html</a>
	US FDA for residues in Foods (Tissue, liquid formula and dry infant formula powder)	For Melamine: 25 ppb for tissue and liquid formula 200 ppb for dry infant formula powder. For Cyanuric Acid: 50 ppb for tissue and liquid formula and 200 ppb for dry infant formula powder.		Melamine, Cyanuric Acid	<a href="http://www.cfsan.fda.gov/~frf/lib4422.html">http://www.cfsan.fda.gov/~frf/lib4422.html</a>

	NZFSA(modified Applied Biosystems method) for pet food and other matrices			Melamine / Cyanuric Acid	<a href="http://marketing.appliedbiosystems.com/mk/get/FOODBEV_APP_ME_LAMINE">http://marketing.appliedbiosystems.com/mk/get/FOODBEV_APP_ME_LAMINE</a>
	Used for chard	50 ppb		Melamine	<a href="http://cat.inist.fr/?aModele=afficheN&amp;cpsidt=16514561">http://cat.inist.fr/?aModele=afficheN&amp;cpsidt=16514561</a>
	Used for kidney tissue			Melamine, Ammeline, Ammelide Cyanuric acid	<a href="http://www.ncbi.nlm.nih.gov/pubmed/18652475?ordinalpos=2&amp;itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum">http://www.ncbi.nlm.nih.gov/pubmed/18652475?ordinalpos=2&amp;itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum</a>
	Used for muscle tissue		1.7 ppb	Melamine	<a href="http://www.ncbi.nlm.nih.gov/pubmed/18000837?ordinalpos=16&amp;itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum">http://www.ncbi.nlm.nih.gov/pubmed/18000837?ordinalpos=16&amp;itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum</a>
	Used for catfish, trout, tilapia, salmon and shrimp		3.5 ppb	Cyanuric acid	<a href="http://www.ncbi.nlm.nih.gov/pubmed/18494486?ordinalpos=7&amp;itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum">http://www.ncbi.nlm.nih.gov/pubmed/18494486?ordinalpos=7&amp;itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum</a>

**ELISA**- Enzyme-Linked ImmunoSorbent Assay

**GC**- Gas Chromatography

**HPLC**- High-Pressure Liquid Chromatography

**LC**- Liquid Chromatography

**MS**-Mass Spectrometry

**UV**- Ultraviolet