

Appendix 1

Analytical Methods Available for Detecting and Quantifying Melamine and its Analogues (Ammeline, Ammelide and Cyanuric Acid) in Food (and Feed)

A. Milk and Milk Products

| Method | Used for | Limit of Quantification of Melamine | Limit of Detection Melamine | Analogues Detected | Reference |
|------------|--|---|---|----------------------------|--|
| ELISA | Milk and milk powder Also for other products (See Part B below) | 2-50 ppm for milk and 10-250ppm for milk powder | 2 ppm for milk and 10 ppm for milk powder | Melamine | ELISA AgraQuant kit from Romer Labs http://www.romerlabs.com/pdts_kits.html |
| LC / MS-MS | Infant formula (US FDA) | 0.25 ppm | | Melamine/ Cyanuric Acid | http://www.cfsan.fda.gov/~frf/lib4421.html |

B. Other Products

| Method | Used for | Limit of Quantification of Melamine | Limit of Detection Melamine | Analogues Detected | Reference |
|---------|---|-------------------------------------|-----------------------------|----------------------------------|---|
| GC / MS | screening for dry protein materials (wheat gluten, rice | | 10 ppm | Melamine Ammeline Ammelide | http://www.fda.gov/cvm/GCMSMelamine.htm |

| Method | Used for | Limit of Quantification of Melamine | Limit of Detection Melamine | Analogues Detected | Reference |
|---------------|--|--|---|---------------------------|---|
| | protein, corn gluten, and soy protein), wet and dry pet foods, and dry animal feeds (USFDA) | | | Cyanuric Acid | |
| ELISA | Wheat gluten, moist pet food, dried pet food Also for milk and milk powder (see Part A above) | 10-250 ppm for wheat gluten, 2-50 ppm for moist pet food, 4-100 ppm for dried pet food | 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 Validation for other foods and lower detection limits in progress | Melamine | ELISA AgraQuant kit from Romer Labs http://www.romerlabs.com/pdts_kits.html |
| | Validation for foods and low detection limits in progress by Abraxis | | | Melamine | info@abraxiskits.com http://www.abraxiskits.com/index.html |
| HPLC/UV | Meat (USDA) | 50 ppb(poultry) 100 ppb(beef) | 25 ppb | Melamine / Cyanuric Acid | http://www.fsis.usda.gov/ophs/clg/Cyromazine.pdf |
| | Wheat gluten and moist pet food | | | Melamine | http://www.fda.gov/cvm/melamine04022007.ht |

| Method | Used for | Limit of Quantification of Melamine | Limit of Detection Melamine | Analogues Detected | Reference |
|---------------|--|--|---|---|---|
| | | | | | m |
| | Used for wheat Gluten and rice protein concentrate (USFDA) | 400 ppm | 100 ppm | Melamine, Ammeline, and Cyanuric acid | http://acs.confex.com/acs/mwrm07/techprogram/P51682.HTM |
| | Used for beverage | 50 ppb | | Melamine | http://www.ncbi.nlm.nih.gov/pubmed/3610957 |
| | Used for cereal flour | | 5 ppm for Melamine, Ammeline, Ammelide, 90ppm for Cyanuric acid | Melamine, Ammeline, Ammelide, Cyanuric Acid | http://www.ncbi.nlm.nih.gov/pubmed/18027188 |
| LC/MS | Used for meat and pet food | | 10 ppb | Melamine, Cyanuric acid | http://www.ncbi.nlm.nih.gov/pubmed/18608503?ordinalpos=3&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum |
| LC/MS-MS | swine and poultry tissue (USDA) | 50 ppb (screening) | | Melamine | http://www.fsis.usda.gov/PDF/FERN_CHE_0003.pdf |
| | atfish tissue (US FDA) | | | Melamine, | http://www.cfsan.fda.gov/~frf/lib4396.html |

| Method | Used for | Limit of Quantification of Melamine | Limit of Detection Melamine | Analogues Detected | Reference |
|---------------|--|--|------------------------------------|--|---|
| | NZFSA (modified Applied Biosystems method) for pet food and other matrices | | | Melamine/Cyanuric Acid | http://marketing.appliedbiosystems.com/mk/get/FOODBEV_APP_MELAMINE |
| | Used for chard | 50 ppb | | Melamine | http://cat.inist.fr/?aModule=afficheN&cpsidt=16514561 |
| | Used for kidney tissue | | | Melamine, Ammeline, Ammelide Cyanuric acid | http://www.ncbi.nlm.nih.gov/pubmed/18652475?ordinalpos=2&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum |
| | Used for muscle tissue | | 1.7ppb | Melamine | http://www.ncbi.nlm.nih.gov/pubmed/18000837?ordinalpos=16&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum |

| Method | Used for | Limit of Quantification of Melamine | Limit of Detection Melamine | Analogues Detected | Reference |
|--------|---|-------------------------------------|-----------------------------|--------------------|---|
| | Used for catfish, trout, tilapia, salmon and shrimp | | 3.5 ppb | Cyanuric acid | http://www.ncbi.nlm.nih.gov/pubmed/18494486?ordinalpos=7&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum |

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.

ELISA- Enzyme-Linked ImmunoSorbent Assay

GC- Gas Chromatography

HPLC- High-Pressure Liquid Chromatography

LC- Liquid Chromatography

MS- Mass Spectrometry

UV- Ultraviolet