Official methods for the determination of heavy metals in feed and food

1. **CEN published standards**

a) **Foodstuffs**

- **EN 13804:2002** Foodstuffs - Determination of trace elements - Performance criteria, general considerations and sample preparation
- **EN 13805:2002** Foodstuffs - Determination of trace elements - Pressure digestion
- **EN 13806:2002** Foodstuffs - Determination of trace elements - Determination of mercury by cold-vapour atomic absorption spectrometry (CVAAS) after pressure digestion
- **EN 14082:2003** Foodstuffs - Determination of trace elements - Determination of lead, cadmium, zinc, copper, iron and chromium by atomic absorption spectrometry (AAS) after dry ashing
- **EN 14083:2003** Foodstuffs - Determination of trace elements - Determination of lead, cadmium, chromium and molybdenum by graphite furnace atomic absorption spectrometry (GFAAS) after pressure digestion
- **EN 14084:2003** Foodstuffs - Determination of trace elements - Determination of lead, cadmium, zinc, copper and iron by atomic absorption spectrometry (AAS) after microwave digestion
- **EN 14332:2004** Foodstuffs - Determination of trace elements - Determination of arsenic in seafood by graphite furnace atomic absorption spectrometry (GFAAS) after microwave digestion
- **EN 14546:2005** Foodstuffs - Determination of trace elements - Determination of total arsenic by hydride generation atomic absorption spectrometry (HGAAS) after dry ashing
- **EN 14627:2005** Foodstuffs - Determination of trace elements - Determination of total arsenic and selenium by hydride generation atomic absorption spectrometry (HGAAS) after pressure digestion
- **CEN/TS 15506:2007** Foodstuffs - Determination of trace elements - Determination of tin in fruit and vegetables preserved in cans by flame atomic absorption spectrometry (AAS)
- **EN 15517:2008** Determination of trace elements – Determination of inorganic As in seaweed by hydride generation atomic absorption spectrometry (HGAAS) after acid extraction
b) Animal feeding stuffs

- **CEN/TS 15621:2007** Animal feeding stuffs - Determination of calcium, sodium, phosphorus, magnesium, potassium, sulphur, iron, zinc, copper, manganese, cobalt and molybdenum after pressure digestion by ICP-AES
- **EN 15510:2007** Animal feeding stuffs - Determination of calcium, sodium, phosphorus, magnesium, potassium, iron, zinc, copper, manganese, cobalt, molybdenum, arsenic, lead and cadmium by ICP-AES
- **EN 15550:2007** Animal feeding stuffs - Determination of cadmium and lead by graphite furnace atomic absorption spectrometry (GF-AAS) after pressure digestion

2. **AOAC Official methods of analysis**

a) Food

- **982.23** Cadmium and lead in food by anodic stripping voltammetry (ASV)
- **986.15** Arsenic, cadmium, lead, selenium, and zinc in human and pet foods by atomic absorption spectrometry (AAS) and anodic stripping voltammetry (ASV)
- **999.10** Lead, cadmium, zinc, copper, and iron in foods by glass furnace atomic absorption spectroscopy (GFAAS) and by flame atomic absorption spectroscopy (FAAS)
- **999.11** Determination of lead, cadmium, copper, iron, and zinc in foods by flame atomic absorption spectroscopy (FAAS) and by glass atomic absorption spectroscopy (GFAAS)
- **945.58** Cadmium in food (dithizone method-spectroscopy)
- **973.34** Cadmium in food by atomic absorption spectroscopy (AAS)
- **974.27** Cadmium, chromium, copper, iron, lead, magnesium, manganese, silver, zinc in food by atomic absorption spectroscopy (AAS)
- **971.21** Mercury in food by flame atomic absorption spectroscopy (FAAS)
- **977.15** Mercury in fish by flame atomic absorption spectroscopy (FAAS)
- **974.14** Mercury in fish by flame atomic absorption spectroscopy (FAAS)
- **952.14** Mercury in food (dithizone method-colorimetry)
- **983.20** Mercury (Methyl) in fish and shellfish by gas chromatography (GC)
- **988.11** Mercury (Methyl) in fish and shellfish by gas chromatography (GC)
- **990.04** Mercury (Methyl) in seafood by liquid chromatography-atomic absorption spectroscopy (LC-AAS)
3. **ISO Methods**

- **ISO 6561-1:2005** Fruits, vegetables and derived products -- Determination of cadmium content -- Part 1: Method using graphite furnace atomic absorption spectrometry
- **ISO 6561-2:2005** Fruits, vegetables and derived products -- Determination of cadmium content -- Part 2: Method using flame atomic absorption spectrometry
- **ISO 17239:2004** Fruits, vegetables and derived products -- Determination of arsenic content -- Method using hydride generation atomic absorption spectrometry
- **ISO 6634:1982** Fruits, vegetables and derived products -- Determination of arsenic content -- Silver diethylidithiocarbamate spectrophotometric method
- **ISO 6633:1984** Fruits, vegetables and derived products -- Determination of lead content -- Flameless atomic absorption spectrometric method
- **ISO 6637:1984** Fruits, vegetables and derived products -- Determination of mercury content -- Flameless atomic absorption method
- **ISO 15774:2000** Animal and vegetable fats and oils -- Determination of cadmium content by direct graphite furnace atomic absorption spectrometry
- **ISO 12193:2004** Animal and vegetable fats and oils -- Determination of lead by direct graphite furnace atomic absorption spectroscopy
- **ISO/TS 6733:2006** Milk and milk products -- Determination of lead content -- Graphite furnace atomic absorption spectrometric method

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