

Measurement uncertainty for Analytical Laboratory methods

This document contains MU information for both NATA accredited and general methods performed in the Analytical laboratory. Uncertainties are ordered by NATA accredited methods (prefixed with LM), general methods (prefixed with GM) then by method number. Methods not listed in this document do not have an applicable MU.

Measurement uncertainty (MU): the uncertainty in the reported result.

NATA accredited methods – methods accredited to ISO/IEC 17025 (2017)

METHOD #	ANALYTE & METHOD	RANGE	MU (95% CI)
LM02	Total Dry Extract and Sugar Free Extract – calc	All	± 2 g/L
LM02	Total acid as milli equivalents / L – calc	All	± 3 %
LM02	Total acid as Acetic acid – calc	All	± 3 %
LM02	Total acidity as Citric acid – calc	All	± 3 %
LM02	Total acid as Lactic acid in Beer (either % or g/L)	All	± 3 %
LM02	Total acidity as Malic acid – calc	All	± 3 %
LM02	Total acid as Sulfuric acid – calc	All	± 3 %
LM02	Volatile acidity as milli equivalents / mL – calc	0-20 meq/L	± 1 meq/L
LM02	Volatile acidity as milli equivalents / mL – calc	> 20 meq/L	± 5%
LM02	Volatile acidity as Sulfuric acid – calc	All	± 0.1 g/L
LM04	pH – autotitrator / electrode	All	± 0.05
LM04	Total acid – autotitrator / electrode	0.3 – 10.0 g/L	± 0.1 g/L
LM04	Total acid – autotitrator / electrode	> 10.0 g/L	± 1%
LM09	Free & Total Sulphur Dioxide – aspiration	5 - 60 mg/L	± 3 mg/L
LM09	Free & Total Sulphur Dioxide – aspiration	> 60 mg/L	± 5%
LM10	Volatile acidity – Steam distillation	0.04 – 0.8 g/L	± 0.04 g/L
LM10	Volatile acidity – Steam distillation	> 0.8 g/L	± 5%
LM13	Alcohol – NIR	0.1 – 20.0% v/v 35.0 – 65.0% v/v	± 0.1% v/v
LM13	Total alcohol (sugar < 15.0 g/L) - calc	All	± 0.1% v/v
LM13	Total alcohol (sugar ≥ 15.0 g/L) - calc	All	± 5%
LM15	Sorbic acid – UV-VIS	5 - 80.0 mg/L	± 4.0 mg/L
LM15	Sorbic acid – UV-VIS	> 80.0 mg/L	± 10%
LM23	Alcohol – distillation / densitometry	> 0.1% v/v	± 0.1% v/v
LM23	Alcoholic strength in Vinegar by distillation-NIR	> 0.1% v/v	± 0.1% v/v
LM24	Density – density meter	0.8100 – 1.2700 g/cm ³	± 0.00020 g/cm ³
LM24	Specific gravity – density meter	0.8115 – 1.2723	± 0.00020
LM28	Acetic acid – WineScan	0.25 – 1.00 g/L	± 0.05 g/L
LM28	Acetic acid – WineScan	1.01 – 1.34 g/L	± 5%
LM28	Alcohol – WineScan	10.0 – 16.5% v/v	± 0.1% v/v

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LM28	pH – WineScan	2.95 – 3.80	± 0.05
LM28	Total acid at pH 7.0 – WineScan	4.3 – 7.7 g/L	± 0.1 g/L
LM28	Total acid at pH 8.2 – WineScan	4.8 – 8.2 g/L	± 0.1 g/L
LM28	Specific gravity – WineScan	0.9800 – 1.0000	± 0.0002
LM28	Glucose/Fructose – WineScan	0.3 - 6.0 g/L	± 0.3 g/L
LM28	Glucose/Fructose – WineScan	6.0 – 30.0 g/L	± 5%
LM32	Reducing sugar, Sucrose & Total Sugar – Rebelein	0.5 - 40.0 g/L	± 0.5 g/L
LM32	Reducing sugar, Sucrose & Total Sugar – Rebelein	40.1 - 190 g/L	± 5%
LM35	Iron – ICP/MS (juice)	0.5 - 1 mg/L	± 0.1 mg/L
LM35	Iron – ICP/MS	0.3 - 1 mg/L	± 0.1 mg/L
LM35	Iron – ICP/MS	> 1 mg/L	± 10%
LM35	Copper – ICP/MS	0.1 - 0.5 mg/L	± 0.05 mg/L
LM35	Copper – ICP/MS	> 0.5 mg/L	± 10%
LM35	Potassium – ICP/MS	> 40 mg/L	± 10%
LM35	Sodium – ICP/MS	10 - 100 mg/L	± 5 mg/L
LM35	Sodium – ICP/MS	> 100 mg/L	± 5%
LM35	Calcium – ICP/MS	10 - 50 mg/L	± 5 mg/L
LM35	Calcium – ICP/MS	> 50 mg/L	± 10%
LM35	Manganese – ICP/MS	0.3 - 1 mg/L	± 0.1 mg/L
LM35	Manganese – ICP/MS	> 1 mg/L	± 10%
LM36	Free Sulfur Dioxide – Discrete analyser (Gallery)	3 - 10 mg/L	± 2 mg/L
LM36	Free Sulfur Dioxide – Discrete analyser (Gallery)	11 - 75 mg/L	± 3 mg/L
LM36	Total Sulfur Dioxide – Discrete analyser (Gallery)	3 - 10 mg/L	± 2 mg/L
LM36	Total Sulfur Dioxide – Discrete analyser (Gallery)	11 - 300 mg/L	± 3 mg/L
LM37	Acetic acid – Discrete analyser (Gallery)	0.05 - 1.00 g/L	± 0.05 g/L
LM37	Acetic acid – Discrete analyser (Gallery)	1.01 – 3.00 g/L	± 5%
LM37	Glucose – Discrete analyser (Gallery)	0.1 - 1.0 g/L	± 0.05 g/L
LM37	Glucose – Discrete analyser (Gallery)	1.1 - 160 g/L	± 5%
LM37	Glucose/Fructose – Discrete analyser (Gallery)	0.1 - 1.0 g/L	± 0.05 g/L
LM37	Glucose/Fructose – Discrete analyser (Gallery)	1.1 - 200 g/L	± 5%
LM37	Malic acid – Discrete analyser (Gallery)	0.05 - 1.00 g/L	± 0.05 g/L
LM37	Malic acid – Discrete analyser (Gallery)	1.01 - 10.00 g/L	± 5%
LM37	Citric acid – Discrete analyser (Gallery)	0.1 - 1.0 g/L	± 0.05 g/L
LM37	Citric acid – Discrete analyser (Gallery)	1.1 – 2.5 g/L	± 5%

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METHOD #	ANALYTE & METHOD	RANGE	MU (95% CI)
GM03	Brix (Refractometer)	All	± 0.2 °
GM07	Ascorbic acid by DCPIP titration	6 – 80 mg/L	± 4 mg/L
GM07	Ascorbic acid by DCPIP titration	81 – 200 mg/L	± 5%
GM09	Ascorbic acid by HPLC	4 - 79 mg/L	± 4 mg/L
GM09	Ascorbic acid by HPLC	≥ 80 mg/L	± 5%
GM09	Citric acid by HPLC	All	± 10%
GM09	Tartaric acid by HPLC	All	± 10%
GM09	Glucose by HPLC	All	± 10%
GM09	Malic acid by HPLC	All	± 10%
GM09	Fructose by HPLC	All	± 10%
GM09	Succinic by HPLC	All	± 10%
GM09	Lactic acid by HPLC	All	± 10%
GM09	Glycerol by HPLC	All	± 10%
GM09	Acetic acid by HPLC	All	± 10%
GM09	Malvidin Diglucoside (quantitative HPLC)	All	± 5% mg/L
GM14	Heat stability	0.1 – 0.99 NTU	± 0.10 NTU
GM14	Heat stability	≥ 1.00 NTU	± 10%
GM23	Total Phenolics	All	± 0.03 a.u.
GM23	Total Hydroxycinnamates	All	± 0.17 mg/L CAE
GM23	Flavonoids	All	± 0.03 a.u.
GM23	Relative Brown colour	All	± 5% a.u.
GM28	Malic acid (WineScan)	0.4 – 3.00 g/L	± 0.05 g/L
GM36	Turbidity	0.05 – 0.99 NTU	± 0.05 NTU
GM36	Turbidity	≥ 1.00 NTU	± 5%
GM43	Pinking colour and Pinking susceptibility	All	± 2
GM43	Pinking precursor	All	± 6
GM56	Extraction strength	All	± 10% N
GM107	Tannin (grape)	All	± 10 % mg/g
GM107	Total Phenolics (grape)	All	± 10% a.u.
GM107	Total Anthocyanins (grape)	All	± 10% mg/g
GM107	Tannin (wine)	All	± 0.16 g/L
GM107	Colour Density (wine)	All	± 5% a.u.
GM107	Hue (wine)	All	± 5%
GM107	Chemical Age 1 and Chemical age 2 (wine)	All	± 5%
GM107	Pigmented Tannin (wine)	All	± 5% a.u.

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GM107	% Pigmented Tannin (wine)	All	± 5%
GM107	Total Phenolics (wine)	All	± 10% a.u.
GM107	Free Anthocyanins (wine)	All	± 10% mg/L
GM107	Total Pigment (wine)	All	± 5% a.u.
GM107	Colour OIV	0.1 – 1.0 a.u.	± 0.02 a.u.
GM107	Colour OIV	> 1.0 a.u.	± 2 % a.u.
GM114	Optical rotation – L+ Tartaric acid	All	± 0.10°
GM114	Optical rotation – Potassium Hydrogen L+ Tartrate	All	± 0.10°
GM114	Optical rotation – L+ Ascorbic acid	All	± 0.20°
GM114	Optical rotation – L+ and DL Malic acid	All	± 0.10°
GM130	Filterability Index	All	± 0.1
GM132	Total milk protein by ELISA	0.25 – 10 ppm	± 0.1 ppm
GM133	Total egg white protein by ELISA	0.25 – 10 ppm	± 0.1 ppm
GM134	Volume determination	All	± 0.6 mL
GM135	Dry matter in grape berries	All	± 2%
GM136	Ascorbic acid – Purity titration	All	± 0.4%
GM136	Citric acid – Purity titration	All	± 0.1%
GM136	DAP – Purity titration	All	± 0.5%
GM136	Erythorbic acid – Purity titration	All	± 0.4%
GM136	Malic acid – Purity titration	All	± 0.4%
GM136	Potassium bicarbonate – Purity titration	All	± 0.4%
GM136	Potassium carbonate – Purity titration	All	± 0.3%
GM136	Potassium hydrogen tartrate (KHT) – Purity titration	All	± 0.2%
GM136	Potassium sorbate – Purity titration	All	± 0.5%
GM136	Tartaric acid – Purity titration	All	± 0.2%
GM144	Saturation temperature	1.0 – 50.0°C	± 1.0°C
GM144	Conductivity	0 – 2000 µS/cm	± 0.25 µS/cm
GM144	Conductivity	2001 – 3999 mS/cm	± 1.5%
GM149	Hop bitterness in Beer – UV-VIS	> 4 IBU	± 4 IBU
GM151	Carbon dioxide by CboxQC™	0.05 - 12.0 g/L	± 0.05 g/L
GM151	Dissolved oxygen by CboxQC™	0.35 - 4.0 ppm	± 0.35 ppm
GM156	Chill haze in Beer	0.3 – 2.4 EBC	± 0.2 EBC
GM156	Chill haze in Beer	2.5 – 34 EBC	± 10%
GM157	Colour in Beer – UV-VIS (SRM)	1 – 10 SRM	± 1 SRM
GM157	Colour in Beer – UV-VIS (SRM)	11 – 40 SRM	± 10% SRM

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GM157	Colour in Beer – UV-VIS (EBC)	2 – 10 EBC	± 1 EBC
GM157	Colour in Beer – UV-VIS (EBC)	11 – 78.8 EBC	± 10% EBC
GM158	Chloride in water (Hach test kit)	5 - 95 mg/L	± 5 mg/L
GM158	Chloride in water (Hach test kit)	100 - 400 mg/L	± 20 mg/L
GM159	Nitrate in water (Hach test kit)	8.8 – 176 mg/L NO ₃	± 8.8 mg/L NO ₃
GM160	Sulfate in water (Hach test kit)	50 – 200 mg/L	± 5 mg/L
GM161	Total alkalinity, carbonate and bicarbonate in water	All	± 6%
GM162	Total dissolved solids in water (TDS meter)	1 – 1000 mg/L	± 3 mg/L
GM163	°Plato and °Brix in Beer	> 0.20 °Brix / Plato	± 0.1 °Brix / Plato
GM167	Gluconic Acid in juice - Discrete analyser	50 to 5000 mg/L	± 5 %
GM170	Ammonia – Discrete analyser	10 - 100 mg/L	± 10 mg/L
GM170	Ammonia – Discrete analyser	101 - 300 mg/L	± 10%
GM170	Primary Amino Acid Nitrogen – Discrete analyser	10 - 100 mg/L	± 10 mg/L
GM170	Primary Amino Acid Nitrogen – Discrete analyser	101 - 300 mg/L	± 10%
GM186	Chloride (total)	15 – 150 mg/L	± 3 mg/L
GM186	Chloride (total)	> 150 mg/L	± 2%
GM186	Chloride (as NaCl)	25 – 247 mg/L	± 5 mg/L
GM186	Chloride (as NaCl)	> 247 mg/L	± 2%
GM192	Total Dry Extract in Spirits and Vinegar	4 – 30 g	± 3 g
GM192	Total Dry Extract in Spirits and Vinegar	> 30 g	± 10%
GM195	Moisture content in grape pomace and wine marc	1.0 to 100.0% m/m	± 1% m/m
GM197	EU Energy – calc kJ/100 mL (sugar ≤ 30 g/L & alcohol 5-20% v/v)	All	± 3%
GM197	EU Energy – calc cal/100 mL (sugar ≤ 30 g/L & alcohol 5-20% v/v)	All	± 3%
GM197	Carbohydrates g/100 mL (sugar ≤ 30 g/L)	All	± 5%