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Ref. No.: CML-HRM-3013A/01
Date of Issue: 22 May 2025

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL
HRM-3013A

Albumin in Human Urine

Batch Number
STY-0056-001
STY-0056-002
STY-0056-003
STY-0056-004
STY-0056-005

Foreword
A unit of the certified reference material (CRM) HRM-3013A consists of five vials of frozen human urine sample with different albumin concentration levels. Each vial contains 1 ml of frozen human urine. The urine materials appear as a light yellow or yellow liquid after thawing.

The CRM was produced with reference to the requirements set out in ISO/IEC 17025:2017 [1], ISO 17034:2016 [2] and ISO Guide 35:2017 [3].

Certified Concentration Values
The certified concentration values for albumin in HRM-3013A are provided in Table 1.

The certified concentration values for albumin with the unit of mg/L in Table 1 were calculated from the mass fraction value of mg/kg, the measured urine density at 23 °C (1.0164 g/mL for STY-0056-001, 1.0078 g/mL for STY-0056-002, 1.0149 g/mL for STY-0056-003, 1.0200 g/mL for STY-0056-004, and 1.0131 g/mL for STY-0056-005).

Table 1. Certified Concentration Values of Albumin in HRM-3013A

Batch Number	Certified Concentration (mg/L)
STY-0056-001	10.12 ± 0.70
STY-0056-002	29.2 ± 1.4
STY-0056-003	55.3 ± 2.7
STY-0056-004	120.2 ± 6.0
STY-0056-005	421 ± 20

Each certified value is the mean of measurements of six samples taken from three vials. The certified concentration values for HRM-3013A were determined using isotope dilution mass spectrometry (IDMS). A four-point calibration curve was used in the measurements.

The associated measurement uncertainty of each certified value was evaluated in accordance with ISO/IEC Guide 98-3:2008 [4]. The expanded uncertainty (coverage factor of 2) corresponded to a level of confidence of about 95%.

Validity

The certified values of HRM-3013A are valid within the specified measurement uncertainty until **22 May 2026**. The validity of HRM-3013A will be extended if it is tested to be sufficiently stable for continuous use. The certified values of HRM-3013A are invalid when the urine material has deteriorated or is mishandled.

Source of Materials

The urine materials were prepared by Solomon Park Research Laboratories (Kirkland, WA, USA).

Commutability

Commutability studies of albumin in HRM-3013A were conducted by analysing 36 patient urine samples and the CRM by both liquid chromatography-isotope dilution tandem mass spectrometric (LC-IDMS/MS) method and routine immunoturbidimetric methods using various clinical analysers, namely Roche Cobas c702, Roche Cobas c311, Siemens Atellica CH, Beckman AU5800, and Abbott Alinity C. The results demonstrated satisfactory commutability of albumin in HRM-3013A for these clinical analysers, which suggested that HRM-3013A is commutable for these clinical analysers.

Homogeneity

The homogeneity testing of HRM-3013A was performed on two subsamples taken from twelve vials using a Roche Cobas c311 chemistry analyser. The sample size taken for homogeneity testing was 6 µL for STY-0056-001 to STY-0056-004 and 15 µL for STY-0056-005. No significant differences in the between and within-vial variances were found using *F*-test (ANOVA) at 95 % confidence level. The u_{bb} was evaluated from the uncertainty due to between-vial inhomogeneity.

Stability

In accordance with ISO 17034:2016 [2], the assessment of stability for albumin in HRM-3013A stored at a temperature of below – 60 °C was based on prior experience from HRM-3004A. The stability of albumin in HRM-3004A stored at a temperature of below – 60 °C was evaluated on at least three occasions over a period of up to three months. The results showed that the analytes were stable when stored at below – 60 °C over the study period [3]. The u_{stab} was evaluated from the standard error of the slope.

Analytical Method

A fully validated LC-IDMS/MS method was used to determine albumin concentration [5]. The method involved spiking with isotope-labeled albumin, proteolysis of albumin using trypsin, separation using an Agilent Zorbax Eclipse Plus C18 column, followed by tandem mass spectrometric measurement of the signature peptides of albumin.

Metrological Traceability

The certified concentration values are traceable to the International System of Units (SI) through the use of albumin CRM 6202a from the National Metrology Institute of Japan (NMIJ).

Intended Use

HRM-3013A is a secondary measurement standard and is intended for use in the validation of methods or as trueness control for the determination of albumin in human urine. Users may refer to ISO 33403:2024 [6] for the recommended statistical treatment of the certified reference value and the

associated uncertainty of the CRM as control materials.

Warning and Safety Precautions for Users

HRM-3013A is intended for in-vitro use only and shall be handled as a biohazardous material with the potential of transmitting infectious disease. Hence, this material shall be handled using biosafety level 2 (or higher) practices, equipment, and facility [7].

Instructions for Use

HRM-3013A should be treated the same as patient specimens. Accordingly, these materials should be handled and disposed according to associated regional, national and local legislation and regulations for any potentially infectious human specimen.

Prior to use, the CRM should be thawed at room temperature (between 18 ^{o}C to 25 ^{o}C), then analysed immediately. The materials should be mixed well by gentle swirling before withdrawing any aliquots. The certified values may not be valid for re-thawed and opened bottles as the stability of albumin subjected to such conditions has not been investigated.

The recommended minimum sample size of HRM-3013A is 6 µL for STY-0056-001 to STY-0056-004 and 15 µL for STY-0056-005. The certified values may not be valid if smaller amounts are taken.

Transport and Storage

The CRM is transported in frozen state (in dry ice). Upon receipt, it should be stored at below – 60 ^{o}C. The CRM should not be exposed to sunlight or ultraviolet radiation. Storage of the thawed material at room temperature or in the refrigerator may result in changes in the certified values.

Further Information

Please direct all enquiries regarding this CRM to the contact in this Certificate.

References

[1] ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.
[2] ISO 17034:2016 General requirements for the competence of reference material producers.
[3] ISO Guide 35:2017 Reference materials – Guidance for characterisation and assessment for homogeneity and stability.
[4] ISO/IEC Guide 98-3:2008 Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM: 1995).
[5] Chen, Y. Z.; Liu, H.; Loh, T. P.; Liu, Q.; Teo, T. L.; Lee, T. K.; Sethi, S. K.; Clim. Chem. Lab. Med., 2021, 59(4), 711-720.
[6] ISO 33403:2024 Reference materials – Requirements and recommendations for use.
[7] U.S Department of Health and Human Services; Biosafety in Microbiological and Biomedical Laboratories, 5th ed.; HHS Publication No. (CDC) 21-1112.

Certificate Revision Records

Certificate Ref. No.	Date of issue	Reason for issuance
CML-HRM-3013A/01	22 May 2025	Issuance of first certificate

Note

HSA does not assume any liability with respect to any loss caused by improper use and/or storage of the CRM by the customer.

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