

Beryllium

Atomic number 4
Atomic weight 9.01

Collection

Urine 20 mL Sterile Universal

Reference ranges

| | | | Reference |
|--------------|----------------------|----------------|-----------|
| Serum/plasma | nmol/L | Less than 0.2 | 1 |
| Blood | nmol/L | Less than 0.33 | 1 |
| Urine | nmol/L | Less than 2.4 | 2,3 |
| | nmol/24 h | Less than 2.7 | 4 |
| | nmol/mmol creatinine | Less than 0.2 | 4,5,6 |

Notes

References

1. Cesbron A, Saussereau E, Mahieu L, Couland I, Guerbet M, Goulle. J-P Metallic profile of whole blood and plasma in a series of 106 healthy volunteers. *J. Anal Tox* 2013; 37: 401-405.
2. Hoet P, Jacquerye C, Deumer G, Lison D, Haufroid V. Reference values and upper reference limits for 26 trace elements in the urine of adults living in Belgium, *Clin Chem Lab Med*, 2013; 51: 839-849.
3. Heitland P, Köster H. Fast, simple and reliable routine determination of 23 elements in urine by ICP-MS. *J. Anal. At .Spectrom.* 2004, 19, 1552–1558
4. Sieniawska CE, Jung LC, Olufadi R, Walker V, Twenty-four hour urinary trace element excretion: reference intervals and interpretive issues. *Ann Clin Biochem* 2012; 49: 341-51.
5. Morton J, Leese E, Tan E, Cocker J. Determination of 61 elements in urine samples collected from a non-occupationally exposed UK adult population, *Toxicol. Letters* 2014; 231: 179-193.
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Clinical

High tensile strength beryllium alloys, resistant to corrosion, vibration and shock, are used extensively in the aerospace industry. Beryllium alloys and ceramics are used in electronic components and in nuclear reactors¹.

Toxicity

Beryllium is one of the most toxic metals and has an extremely low occupational exposure limit. Acute exposures to high levels of beryllium can cause inflammation of the entire respiratory tract and at lower levels exposure to airborne beryllium particulate can cause an immune system response known as beryllium sensitisation. Sensitised individuals can go on to develop chronic beryllium disease, a debilitating and potentially fatal lung disease characterised by granuloma lesions in the lungs with symptoms such as breathlessness, cough, chest pain, and consequent fatigue, weakness and weight loss². Effects on the lymph nodes, skin and other target organs have also been reported with the majority of these presenting as contact dermatitis and skin

lesions³.

Beryllium and beryllium compounds are classified by International Agency for Research on Cancer as carcinogenic (class 1) to humans (IARC 2012)⁴.

Laboratory Indices of Exposure

Beryllium is measured in urine.

1. References:

1. Stokinger HE Chapter 29 - Metals, in Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition, Volume 2A. Eds Clayton GD and Clayton FE. Wiley Interscience, 1981
2. Brisson MJ (2009) Overview of Beryllium Sampling and Analysis, Chapter 1. 'Beryllium-environmental analysis and monitoring, Ed. Brisson Mj and Ekechukwu AA., RSC Publishing, Cambridge, UK.
3. Maier LA, Gunn C, Newman LS (2006) Beryllium Disease in Environmental and Occupational Medicine. Ed. WN Rom and SB Markowitz Wolters Kluwer/Lippincott Williams&Wilkins, Philadelphia, US: 1021-1037.
4. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans (2012) Volume 100C, Arsenic, Metals, Fibres and Dusts.