APPLIED ORGANOMETALLIC CHEMISTRY
Appl. Organometal. Chem. 2005; **19**: 1271

Letters to the Editor

Sir—
With regard to the paper by Narukawa *et al.*[1] we wish to make the following comments.

The paper discussed the decomposition of arsenic-containing biological samples by using wet digestion. The authors claimed that arsenobetaine is decomposed to As(V) only at high temperature in mixtures containing H_2SO_4, $HClO_4$ and HNO_3. The studies were prompted by the apparent need to use hydride generation for total arsenic determination. The use of high temperature and $HClO_4$ can be avoided by carrying out the digestion at 250 °C employing a mixture of H_2SO_4, HNO_3 and H_2O_2. Cullen and Dodd reported on the HG-AAS analysis of a range of reference materials (e.g. NRCC-DORM-1 dogfish muscle and NRCC-DOLT-1 dogfish liver) using this mixture.[2] The method was also used for the analysis of a NIST 1566 oyster tissue reference sample by Lai *et al.*[3]

Having said this, in our laboratories we now try to avoid the use of HG-AAS for total arsenic analysis and find that digestion with H_2O_2 and HNO_3 is sufficient to decompose biological samples (150 °C heating block[4]) for analysis using ICP-MS.

We apologize for quoting only from our own experience: we are sure that others will be able to make similar observations.

Yours,

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DOI:10.1002/aoc.980

REFERENCES

1. Narukawa T, Kuroiwa T, Inagaki K, Takatsu A, Chiba K. *Appl. Organometall. Chem.* 2005; **19**: 239–245.
2. Cullen WR, Dodd M. *Appl. Organometall. Chem.* 1989; **3**: 79–88.
3. Lai VW-M, Cullen WR, Harrington CF, Reimer KJ. *Appl. Organometall. Chem.* 1997; **11**: 797–803.
4. Lai VW-M, Beach AS, Cullen WR, Ray S, Reimer KJ. *Appl. Organometall. Chem.* 2002; **16**: 458–462.

Reply to letter of Lai and Cullen

Dear Sir,
We would like to comment on the letter of Lai and Cullen above.

First, in our detailed discussion of arsenic analysis we knew that many reports have not investigated the accuracy and reproducibility of the procedure. We believe that complete decomposition of arsenobetaine is very difficult. Also, if decomposition of arsenobetaine is carried out, then how do we confirm the species that exists in the sample?

If the hydride method is used to measure the inorganic arsenic present, then the whole quantity, including that present in organisms, may not be accurately measured. However, when ICP-AES and ICP-MS are used for detection we can determine the concentration of arsenic in a sample that was subjected to acid decomposition. Also, when these techniques are used in the determination of arsenic, discussions may be focused on certified reference materials and not on arsenic species in sample solutions.

Then, we examined various analysis and pretreatment methods and we used that which had most generality.[1] We agree that high temperature and $HClO_4$ is not useful, but note the indispensability of $HClO_4$ reported by Jin and Ogawa.[2] We used H_2O_2, but it was not the best way.

Yours,

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DOI:10.1002/aoc.946

REFERENCES

1. Narukawa T, Kuroiwa T, Inagaki K, Takatsu A, Chiba K. *Appl. Organometal. Chem.* 2005; **19**: 239.
2. Jin K, Ogawa M. *Taga Bunseki Kagaku* 1983; **32**: E171, E259.