

ANALYSIS OF METAL CONTENT OF SCALP HAIR AS A DIAGNOSTIC TOOL:
A STUDY OF SAMPLE PREPARATION TECHNIQUES

C.REILLY*

The analysis of levels of metals in hair has potential as a diagnostic tool. However, several factors affect results obtained, with consequent problems of interpretation of findings. In addition comparison of data from different laboratories is difficult due to lack of uniformity in methods of sample preparation.

This study was undertaken to investigate the effects of different sample preparation techniques on results. Scalp hair samples from three subjects were dry ashed and analysed by AA after the following preparations: (1) none; (2) washing in water only; (3),(4),(5) washing in solvent and detergent as described by Reilly & Harrison (1979), McKenzie (1979) and Petering *et al* (1971).

TABLE 1. Metal content of hair (mg/kg) following different pretreatments

Pretreatment:		None	Reilly & Harrison (1979)	McKenzie (1979)	Petering <i>et al</i> (1971)
Metal	Sample				
Zn	1*	311.5 ± 15.5	262.7 ± 16.2	203.0 ± 10.9	238.2 ± 19.8
	2*	208.0 ± 7.1	202.0 ± 9.9	178.2 ± 4.5	194.8 ± 4.6
	3*	243.8 ± 30.3	202.2 ± 25.4	193.7 ± 19.1	176.9 ± 36.4
Fe	1*	40.8 ± 2.4	24.1 ± 1.6	12.4 ± 0.6	20.0 ± 1.9
	2*	31.4 ± 2.8	23.1 ± 2.9	14.9 ± 0.7	17.6 ± 1.8
	3*	30.4 ± 1.1	24.6 ± 3.5	17.0 ± 3.2	19.1 ± 0.6
Cu	1*	26.9 ± 3.0	23.3 ± 2.7	19.4 ± 0.6	24.4 ± 4.7
	2*	114.0 ± 6.2	105.2 ± 10.9	45.8 ± 2.4	76.6 ± 2.2
	3*	25.9 ± 2.2	24.5 ± 2.6	19.2 ± 0.8	25.4 ± 8.7
Pb	1*	47.0 ± 4.0	40.5 ± 4.4	32.2 ± 3.8	39.2 ± 0.9
	2*	26.4 ± 7.0	26.5 ± 7.1	10.3 ± 0.7	18.2 ± 2.6
	3*	11.8 ± 1.9	10.6 ± 1.7	9.7 ± 1.3	10.0 ± 4.4

1*: Adult male; 2*: Adult female; 3*: child, male.

The table summarises results of the analyses. Statistical examination shows that the differences between results are significant in almost all incidents for adult samples, but not for those of the child.

It is concluded that the procedures used for washing remove different amounts of trace metals. The need for standardisation of procedure is apparent if the full potential of this technique is to be achieved.

MCKENZIE, J.M. *et al* (1979) *Am.J. Clin. Nutr.* 32:570

PETERING, H.G., YEAGER, D.W., and WITHERUP, S.O., (1971) *Arch. Environ. Health* 23: 202

REILLY, C. and HARRISON, F. (1979). *J. Hum. Nutr.* 33:248.

* Department of Public Health and Nutrition, Queensland Institute of Technology, Brisbane, G.P.O. Box 2434, Brisbane, Queensland, 4001.