

**TOTAL BODY WATER ESTIMATION BY BIOELECTRICAL IMPEDANCE ANALYSIS :  
A TWO METHOD CROSS-VALIDATION STUDY**

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Bioelectrical impedance (BEI) offers similar advantages to anthropometry with respect to portability and convenience when assessing body composition ( Diaz et al. 1989). Most equations for BEI depend on a relationship between resistance and under water weighing (Lukaski and Bolonchuck 1986).

This study aimed to validate the bioelectrical impedance (BEI) method for body composition estimation in healthy subjects. Total body water (TBW) determined by D<sub>2</sub>O were compared with BEI in 10 adult healthy volunteers ( five males and five females) aged between 22 to 51 years with BMI of 19 to 30. Plasma and saliva specimens were collected at one hour intervals over a five study period, during which time anthropometry and impedance measurements were performed.

The results of the two hour saliva and plasma D<sub>2</sub>O concentration, assayed by use of NMR-S, without any sample pretreatment are shown in the table. The linear regression equation between D<sub>2</sub>O dilution and BEI was  $Y=7.268+0.856X$  for TBW, SEE's 0.4 - 1.3 l (95% confidence interval).

Percent lean body mass (LBM), and the percent fat mass (FM) as calculated from the BEI and D<sub>2</sub>O dilution methods are not significantly different.

Gender	Weight	Age	%TBW(saliva)	% TBW (plasma)	% TBW BEI
F	45.8	50	60.0	57.4	53.7
F	62.1	51	58.1	56.8	56.4
F	81.8	22	50.9	51.0	52.3
F	53.6	27	60.3	63.1	61.0
F	70.7	23	56.4	54.2	52.5
M	81.4	22	59.5	59.3	59.0
M	74.0	41	59.0	58.0	60.0
M	59.0	30	62.9	62.7	62.8
M	72.5	30	62.5	68.5	65.0
M	73.6	37	58.0	57.3	57.0

The following can also be concluded from this study. Firstly, a minimum of two hours is required for D<sub>2</sub>O to equilibrate in the body. Secondly, untreated plasma or saliva specimens can be used as a sample in predicting TBW. Thirdly, in healthy volunteers, the BEI methods measure TBW with a high degree of accuracy.

Further studies are continuing to assess the validity of BEI in assessing body composition in subjects with various disorders of body composition.

DIAZ, E.O., VILLAR, J., IMMINK, M. and GONZALES, T. (1989). *Eur. J. Clin. Nutr.* 43:129.  
LUKASKI, H.C. and BOLOCHUCK, W.W. (1986). In International Symposium on In Vivo Body Composition Studies, Brookhaven National Laboratory, Upton, Long Island, New York.

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