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COMPARISION OF ACIDIC AND ALKALINE SAMPLE PREPARATION METHODS FOR DETERMINATION OF TRACE ELEMENTS IN HUMAN HAIR*

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The monitoring of trace elements in human hair has attracted the interest of researchers from the environmental chemistry and medicine fields [1]. Because occupational diseases, poisoning, and environmental diseases are accurately diagnosed by using trace elemental analysis of human biological samples and the state of health can be characterized with the analytical results. Therefore, it is very crucial to check regularly trace element concentrations in the body. For main and trace elements analysis, sample preperation is a important stage. Because of the large amount of organic substances in the samples, digestion or ashing is required prior to analysis and the low concentrations of the measured elements demand well-organized, special sample pretreatment and sensitive analytical methods and equipment [2]. Under the given conditions in this study, various digestion methods compared for determination of trace elements in human hair. For this reason, digestion methods like dry ashing, acidic wet ashing at low temperature, microwave digestion, and alkaline digestion in tetramethylammonium hydroxide at low temperature were used. Zinc and lead concentrations were determined in human hair samples digested with these digestion methods. The accuracy of the methods were tested by certificated reference standard material, CRM BCR–397 human hair. Flame atomic absorption spectroscopy was used for determination of zinc levels, and graphite furnace atomic absorption spectroscopy with Zeeman background correction was used for determination of lead levels. For real hair samples, analysis of variance test was used determination of difference between four digestion methods. According to the statistical evaluation of the results, there are no significantly difference between four digestion methods in 95 % confidence interval. Measurement of certificated reference standard material, CRM BCR–397 human hair, to show that deviation of certificated value percantage relative errors calculated. Relative errors were less than 10 % except for tetramethylammonium hydroxide digestion method.

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