The contamination of ground water with arsenic has been reported in many parts of the world, including Ron Piboon District, Nakhon Si Thammarat Province, Thailand. The excessive intake of arsenic compounds particularly the trivalent form eventually can damage DNA directly.

The purpose of this research was to develop a sensitive and accurate anodic stripping voltammetry method (ASV) at a gold electrode, to determine trace level of arsenic(III) in ground water samples. Arsenic(III) is determined at a deposition potential of -0.2 V vs Ag/AgCl, deposition time of 180 s, scan rate of 80 mVs^{-1} and modulation amplitude of 0.1 V. An artificial neural network (ANN) was utilized for the analysis of voltammogram data. A two layer back-propagation network was used with hyperbolic tangent transfer function. The learning rate and the momentum rate were 0.4 and 0.25, respectively. This neural network was trained with a maximum number of epochs equal to 8000. The linear calibration curve of pure arsenic(III) was obtained in concentration range between 0.25 and 50 ppb with correlation coefficient of 0.9998. Relative standard deviation at 5 ppb was 3% (n=10) and the limit of detection was 0.25 ppb which was lower than the maximum contaminant level(MCL) of EPA permit for dissolved arsenic in drinking water (10 ppb).

This proposed method was applied to determine arsenic(III) in ground water samples collected from Ron Piboon District, Nakhon Si Thammarat Province without elimination of the interferences. The results obtained from integrated ASV and ANN agree very well with those obtained from HG-AAS (EPA method 1632).

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