ANALYSIS OF LEAD IN INFANT MILK FORMULA BY DIFFERENTIAL PULSE ANODIC STRIPPING VOLTAMMETRIC TECHNIQUE

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ABSTRACT

ANALYSIS OF LEAD IN INFANT MILK FORMULA BY DIFFERENTIAL PULSE ANODIC STRIPPING VOLTAMMETRIC TECHNIQUE

Most of dairy products especially milk are very popular all over the world as a daily consumed by human as the nutritional balance food and has major sources of the nutrients especially for infant in the first six months of life. It is very important to determine the level of Pb content in infant milk formula either it is permissible to be consumed or not for the safety and quality purposed as it is neurotoxin for infants, reduces IQ, disables learning abilities and affects nervous system development. According to EC Regulation 446/2001, the limit of Pb in the infant milk formula is 20 µg/L. The differential pulse anodic stripping voltammetric (DPASV) technique using glassy carbon electrode (GCE) as a working electrode and acetate buffer at pH 4.6 as a supporting electrolyte has been proposed to be developed. The experimental voltammetric parameters were optimized in order to obtain a maximum response with analytical validation of the technique. The optimum parameters were initial potential (E_i) = -1.0 V, end potential (E_f) = -0.2 V, scan rate (v) = 0.04 V/s, accumulation time (t_{acc}) = 90 s, accumulation potential (E_{acc}) = -1.0 V and pulse amplitude = 0.075 V. The anodic peak was appeared at -0.5603 V. The curve was linear from 0.05 to 1.0 mg/L (R^2=0.09992) with detection limit of 10 µg/L. The precisions in terms of relative standard deviation (RSD) were 4.28%, 2.82% and 0.78% for consecutive three days. The satisfactory recoveries obtained were from 79.26 to 87.75% and 94.72 to 98.88% for respective 0.5 and 1.0 mg/L Pb standard solution in the pre-treated infant milk formula samples. It can be concluded that the developed technique is precise, accurate, rugged, robust, low cost, fast and has potential to be an alternative method for routine analysis of Pb in the infant milk formula.

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