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Feasibility of supramolecular nanosized solvent based microsyringe-assisted liquid-phase microextraction for preconcentration and separation of Vitamin B₁₂ from infant formula, food supplement, and dairy products: Spectrophotometric analysis and chemometric optimization

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ABSTRACT

Here, a novel cheap and green analytical method based on supramolecular nanosized solvent based microsyringe-assisted liquid phase microextraction (SS MA LPME) was developed and validated for preconcentration and separation of trace Vit-B₁₂ in infant formula, food supplement, and dairy products prior to its spectrophotometric. The supramolecular (as green extraction solvent) was prepared by mixture of sodium dodecyl sulfate and tetrabutylammonium bromide. The microextraction conditions (volume of supramolecular, pH, and ionic strength) affecting SS MA LPME efficiency was evaluated and optimized using chemometric design. The interference effect of some cations and anions was also investigated. Using the optimized conditions, analytical data such as working range, detection limit, and preconcentration factor were 5–600 $\mu\text{g L}^{-1}$, 1.7 $\mu\text{g L}^{-1}$, and 200, respectively. Vit-B₁₂ recovery in the spiking experiments on infant formula, food supplement, and dairy products ranged 96–102%, 93–105% and 93–101%, respectively. The validation of the optimized procedure was carried out by analysis of two certified reference materials such as 3280-multivitamin tablet and 1846-infant formula. The optimized method was successfully applied to the separation and determination of Vit-B₁₂ in the selected samples with relative standard deviations range of 1.3–2.5%.