

Determination of brilliant green in fish farming water using carbon nanotube assisted pseudo-stir bar solid/liquid microextraction combined with UV-vis spectroscopy–diode array detection

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In this research a new design of hollow fiber solid/ liquid phase microextraction (HF-SLPME) containing MWCNTs, as the solid adsorbent, combined with organic solvent 1-octanol, as the liquid phase, was developed for the determination of brilliant green (BG) in environmental water samples. BG is a dye in the



triphenylmethane family that has antifungal properties [1]. HF-SLPME was used for determination of BG residues in water fish ponds. In this method, a piece of polypropylene hollow fiber was filled with the mentioned mixture of organic solvent and MWCNTs and used for extraction of BG from aqueous solution. This membrane protected microextraction method [2, 3] was applied in the two phase's mode. In this mode; sample aqueous solution is donor aqueous phase, and acceptor phase is combination of MWCNTs in an organic solvent which is established into the hollow fiber. Thus analyte is trapped within the MWCNTs pores and the organic solvent and transferred into the acceptor phase. After microextraction procedure, analyte is desorbed from the fiber using 2 ml of methanol and introduced to UV-Vis spectrophotometer for further analysis. All microextraction experiments were supported using an Accurel Q3/2 polypropylene hollow fiber membrane. Calibration curve in the range of 0.001-10 $\mu\text{g}\cdot\text{mL}^{-1}$ was plotted with the correlation coefficient of 0.979. Under optimal conditions, low limits of detection (LOD = 0.55 $\text{ng}\cdot\text{mL}^{-1}$) was achieved and relative standard deviations (in the concentration levels; 5, 1 and 0.0050 $\mu\text{g}\cdot\text{mL}^{-1}$) were found 4.80%, 5.89% and 8.32% respectively. This method provided the low limit of detection with a relatively wide linear range. Also it is sensitive, fast, easy to use. Due to the use of disposable polypropylene fibers prevent sample contamination and possibility of carry over effects between analysis can be removed. All experiments were carried out at room temperature (25 \pm 0.5 °C).

Keywords: Brilliant green, Multiwalled carbon nanotube, Hollow fiber solid/ liquid phase microextraction, UV-Vis Spectrophotometry.

References

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