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Magnetic dispersive solid phase microextraction coupled with on-line chemical vapor generation method to extraction/preconcentration of mercury from environmental samples and determination by graphite furnace atomic absorption spectrometry.

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Mercury (Hg) is classified as priority hazardous substances. Concentrations found in the aquatic environment are at trace levels as result of natural processes, such as erosion and volcanism, and anthropogenic discharges related mainly to industrial and mining activities. Mercury is one of the most potent neurotoxins known, showing a high number of adverse health effects in animals and humans.

For this reason, a simple and rapid method for the determination and preconcentration of mercury in environmental waters is proposed. This work is based on magnetic dispersive solid phase microextraction (MDSPME) coupled with on-line chemical vapour generation (CVG). Graphite furnace atomic absorption spectrometry (GFAAS) was employed for the quantification of Hg. In the preconcentration step, a shell structured Fe_3O_4@graphene oxide was suspended in the ionic liquid carrier (1-n-butyl-3-metilimidazolium tetrafluoroborate [BMIM][BF_4]), obtaining a stable colloidal suspension called ferrofluid. This sorbent possesses as large contact surface area and a high density of polar groups on its surface. The nanoparticles, when finely dispersed in the sample solution, result in almost complete extraction of Hg within a few seconds. All experimental and instrumental variables were optimized and the method was adequately validated by the analysis of certified reference materials of environmental waters.