

# Determinations of estrogens in water using novel reverse osmosis enrichment method with subsequent *in vitro* analysis

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## Abstract

Various compounds in the aquatic environment with potential estrogenicity may be present at very low (<ng/L) individual concentrations. Accurate and reliable information on the overall estrogenic effect in the complex matrix can be obtained if the whole water sample is analyzed. Present study describes applicability of a novel benchtop device based on reverse osmosis (RO) process that was used to increase the concentration of the estrogenic compounds (17 $\beta$ -estradiol, 17 $\alpha$ -ethinyl estradiol, estrone and estriol) in spiked tap water. Estrogenicity in RO-enriched whole water samples was measured using optimized *in vitro* bioassay based on transgenic hER $\alpha$ -HeLa-9903 cell line. The effectiveness of RO enrichment method was assessed by calculating recovery at ten-fold enrichment level. Observed recovery of 47 to 79 percent suggests that the novel RO device is promising method providing enriched whole water samples suitable for subsequent *in vitro* analysis.

*Keywords: reverse osmosis; endocrine disrupting compounds; sample concentration; in vitro bioassay*