

TRACKING STEROID HORMONES IN WATER, SUSPENDED PARTICULATES AND SEDIMENT IN ICOAST PROJECT USING TARGETED MASS SPECTROMETRY

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Concerns about the presence of steroid hormones, including naturally occurring or synthetic hormones in rivers are increasing owing to their endocrine disrupting potentials. As part of the monitoring network of the iCoast project, surface waters were collected twice (May and June, 2019) from nine sites in the intracoastal stretch between Saint Augustine and the Whitney Laboratory for Marine Bioscience in Florida. Some sediment and deep-water samples were collected from a subset of sites to check for the presence of hormones in lower parts of the water column. Collected water was filtered through a glass fiber filter to separate the particulate and dissolved fraction. Steroid hormones were extracted from particulates using sonication in methanol: acetonitrile (1:1) with 1% formic acid. Hormones were extracted from the dissolved fraction using HLB columns. Freeze-dried sediments (1 g) were subjected to four rounds of sonication in methanol, methanol: water (1:1), acetone and methanol: water (1:2, pH=2), respectively, using a probe sonicator, followed by clean-up using HLB columns. All samples were spiked with deuterated internal standards of hormones before extraction to calculate the extraction efficiency. Fourteen hormones were quantified based on the individual calibration curves using targeted analysis by LC-MS/MS. Progesterone and estrone were commonly detected in all samples. Concentration of progesterone and estrone in water and particulates ranged between 0.02-0.19 ng/L and 0.004-1.2 ng/L, respectively. In sediments, however, the concentrations increased up to 4.6 ng/g and 1.1 ng/g at one of the sites. 17 β -estradiol was only detected in sediment, whereas, testosterone was detected in sediments and deep-water. Ethinylestradiol, a synthetic hormone, was found in the particulates, surface water or deep-water at four sites. Equilin, a horse estrogen that is used for hormone replacement therapy was uniquely detected in the particulate fractions at two sites. Detection of ethinylestradiol and equilin confirms the presence of human waste, the source of which is still unknown.

PRESENTER BIO: Dr. Nouri is an Assistant Scientist working on the analysis of various compounds using targeted mass spectrometry. He has developed methods for extraction of steroid hormones from water, particulates and sediments in the iCoast project of the University of Florida.