Detecting the emerging contaminant amphetamine in the apex predator Alligator mississippiensis: a novel study

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Abstract: The Gulf of Mexico is a vast area that includes many different habitats such as mangroves, estuaries, and swamp lands. This area includes both highly urbanized areas and more remote areas. Many studies of environmental contaminants cover substances such as pesticides, pharmaceuticals, and personal care products. However, in more recent years a new class of contaminant is starting to surface: illicit drugs. This study focuses on the detection of such contaminants, specifically amphetamine, MDA, MDEA, MDMA, and methamphetamine, in the keystone species Alligator mississippiensis collected from the Houston, TX area and the Rockefeller Wildlife Refuge in Grand Chenier, LA. A. mississippiensis are of particular interest as they are not only apex predators, but they are considered environmental indicators as well as trophic regulators. Given that this species is a highly opportunistic predator, it is suggested that there may be a potential of this chemical transferred to this apex predators through environmental exposure and/or trophic transfer through contaminated prey items. This study utilizes tissues adipose, liver, and scutes collected from alligators in the Houston, TX area and the Rockefeller Wildlife Refuge in Grand Chenier, LA. Tissues were homogenized and processed using QuECHERS salt extraction methods. Chemical analysis using liquid chromatography-mass spectrometry (LC-MS) indicate that amphetamine was found in alligator adipose, liver and scute tissue at both locations in the range of 2-17 ppb. This study will highlight the use tissue in determining narcotic concentrations in an apex species.

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