

Growth-promoting Implants Increase the Toxicity of Cattle Wastes: You Gotta Beff with That?

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ABSTRACT: Recent publications in the popular literature have suggested that the growth-promoting steroidogenic compounds used on beef cattle pose a significant threat to aquatic ecosystems. The primary objective of this study was to compare the toxicity of wastes from trenbolone acetate: estradiol benzoate (TBA:E) implanted steers to that of wastes from unimplanted steers. To accomplish this, two experiments were conducted in which fathead minnows (*Pimephales promelas*) were exposed to urine or feces collected from TBA:E-implanted or unimplanted steers for seven days. In the first experiment, minnows were exposed to one of eight concentrations of fecal matter from either implanted or unimplanted steers, while in the second experiment, minnows were exposed to one of four concentrations of urine from either implanted or unimplanted steers. Following exposures, hepatic vitellogenin (vtg) mRNA expression was measured. Male minnows exposed to the highest concentration of fecal matter from implanted cattle experienced a significant increase in hepatic vtg mRNA expression relative to both unexposed minnows and minnows exposed to fecal matter from unimplanted cattle. This finding suggests that steroids associated with the implant have a feminizing effect on male fish. Exposure to urine caused a significant reduction in female vtg mRNA expression at each of the concentrations tested relative to unexposed females, regardless of whether the urine was from implanted or unimplanted cattle. Clearly this defeminization cannot be due to steroids in the implants, as it occurs in females exposed to urine from both implanted and unimplanted cattle. This defeminization is likely caused by an endogenous steroidal metabolite excreted via urine, such as progesterone. Overall, the findings of this study indicate the presence of endocrine-disrupting compounds in the urine and feces of cattle and suggest that implant history alters the steroidogenic activity of steer feces.

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