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**Abstract:** A comparative study was performed to assess the metabolism of the androgen precursor androstenedione (AD) in two gastropod species from the Muricidae family: *Bolinus brandaris* and *Hexaplex trunculus*. AD was mainly converted to 5 $\alpha$ -dihydrotestosterone by microsomal fractions isolated from *Bolinus brandaris*, whereas it was primarily metabolized to testosterone by *Hexaplex trunculus*. Sex differences in the metabolism of AD were only detected in *Bolinus brandaris* and attributed to higher 5 $\alpha$ -reductase activity in males. Thereafter, the effect of the organotin compounds, tributyltin (TBT) and triphenyltin (TPT), on the metabolism of AD was investigated. A significant interference was only detected in females, and differences between the modes of action of the two compounds were observed: TPT was a strong inhibitor of 5 $\alpha$ -reductase activity in *B. brandaris* at a concentration as low as 100 nM whereas only TBT (10  $\mu$ M) altered the metabolism of AD in *H. trunculus* by increasing the activity 17 $\beta$ -hydroxysteroid dehydrogenase (17 $\beta$ -HSD). Thus, this work shows that the metabolism of the androgen precursor AD strongly differs among gastropod species, both in terms of activity and metabolic profile, and further demonstrates the ability of TBT and TPT to interfere with key enzymatic pathways involved in androgen synthesis.

**Keywords:** Androstenedione metabolism; *Bolinus brandaris*; *Hexaplex trunculus*; 5 $\alpha$ -reductase; 17 $\beta$ -HSD; Tributyltin; Triphenyltin; Testosterone