

STUDY OF THE PRESENCE OF STEROID STEROID HORMONES RESIDUES IN FISH TISSUES FROM GRAN CANARIA (SPAIN)



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INTRODUCTION

Steroid hormones are a worrisome group of compounds because of their toxic effects over aquatic biota. These compounds are considered as endocrine disrupting compounds because they can produce important changes not only in sexual systems of aquatic organisms but also in other biological systems [1]. These changes could be produced at very low concentrations, sometimes in the range of $\text{ng}\cdot\text{L}^{-1}$. This work presents an analytical method based in microwave-assisted extraction (MAE) coupled to ultra-high performance liquid chromatography and mass spectrometry detection (UHPLC-MS/MS) which constitutes a powerful procedure for the analysis of steroid hormones in solid and biological samples. The method was applied to three different types of tissue samples of two fishes of the coast of the Canary Islands (*Boops boops* and *Sphoeroides marmoratus*) exposed to the marine outfall of the Las Palmas de Gran Canaria city wastewater treatment plant.

MATERIAL & METHODS



Anton Paar Multiwave Microwave



Waters ACQUITY UHPLC-MS/MS

Fish collection, separation of tissues, freeze-drying, and crushing

100 mg. of fish tissue into MAE vessels

MAE for 7 minutes at 450W

Filtration and remove proteins by SPE (Phenomenex Phree cartridges)

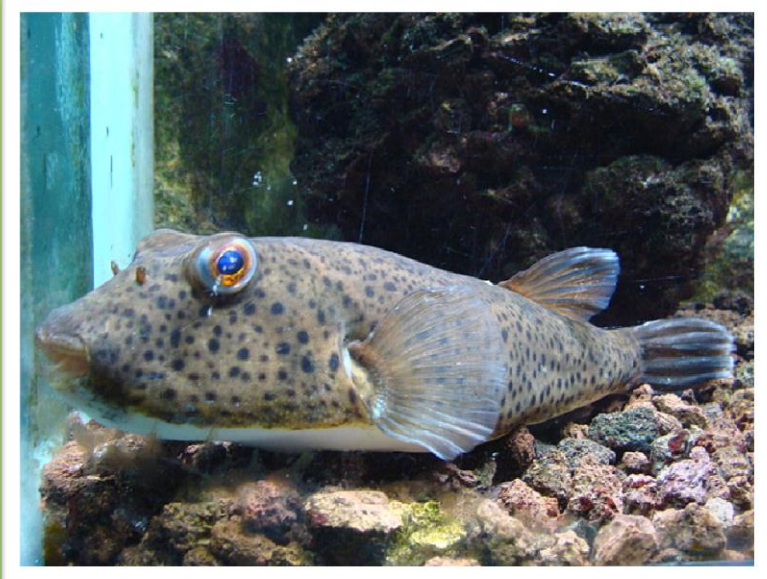
Analysis by UHPLC-MS/MS

RESULTS

Fish species analyzed

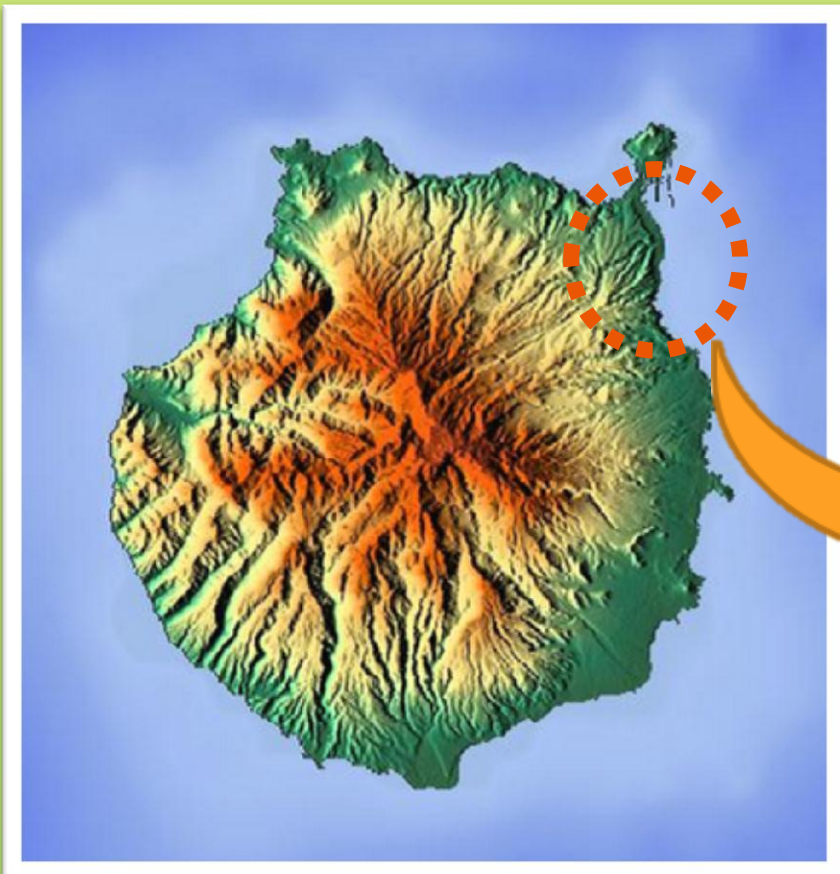


Boops boops



Sphoeroides marmoratus

Sample location



Marine outfall of Barranco Seco WWTP



Detected concentrations of hormones ($\mu\text{g}\cdot\text{g}^{-1}$)

Compound	<i>Boops boops</i>			<i>Sphoeroides marmoratus</i>		
	Muscle	Viscera	Skin	Muscle	Viscera	Skin
Norgestrel	< LOQ	2.71	n.d.	< LOQ	0.50	n.d.
Testosterone	< LOQ	n.d.	n.d.	< LOQ	n.d.	n.d.
Megestrol acetate	< LOQ	n.d.	< LOQ	< LOQ	n.d.	< LOQ
Prednisolone	n.d.	n.d.	0.09	n.d.	n.d.	n.d.
Boldenone	< LOQ	< LOQ	n.d.	< LOQ	< LOQ	n.d.
Norethisterone	< LOQ	n.d.	n.d.	< LOQ	n.d.	n.d.
Nandrolone	< LOQ	0.52	n.d.	n.d.	0.07	n.d.
Progesterone	< LOQ	3.22	1.77	0.56	3.26	3.95

CONCLUSIONS

The method developed (MAE-SPE-UHPLC-MS/MS) enables easy and quick determination of steroid hormones from fish tissue in less than 30 minutes. After application of the method to different fish tissues, concentrations detected in viscera and skin were higher than the concentrations in muscle tissue.

ACKNOWLEDGEMENTS

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REFERENCES

[1] Svensson J, *et al.*, 2014, Aquatic Toxicology, 147, 84–91.