

The effect of Stress Coat® on the excretory loss of cortisol from the common goldfish *Carassius auratus* following a netting stressor



INTRODUCTION

Stress is an important issue in the successful husbandry of captive fish and is often used as an indicator of health and welfare. Husbandry practices can impose stress on fish including handling, grading, transportation and poor management of water quality. Exposure to stress evokes a series of physiological responses in fish, the primary response involving the release of stress hormones into the circulatory system. The principal corticosteroid released is cortisol. This is excreted via branchial and urinary pathways, and can therefore be measured using non-invasive methods through water sampling. Currently a commercial product STRESS COAT is available for use with ornamental fish (both in the trade and for pet owners). This product includes a botanical extract of the plant *Aloe barbadensis* and is frequently used during transportation, water changes and when setting up an aquarium. Its primary use is as a water conditioner; however, anecdotal evidence has suggested it may also have a role in managing the stress response in fish.

METHODS

- Twelve goldfish were graded into each of 15 x 50L aquaria, tank biomass ranged from 104.02 - 109.16g.
- During the trial fish were not fed and tanks were 'stand alone' held at 22°C.
- Three treatments were tested -
 - 1) Control, no netting stress and no STRESS COAT
 - 2) Post-treatment with STRESS COAT after netting stress
 - 3) Subjection to netting stress with no STRESS COAT
- The netting stressor consisted of aerial exposure for 30 secs followed by net confinement within the tank for 30 secs - repeated four times.

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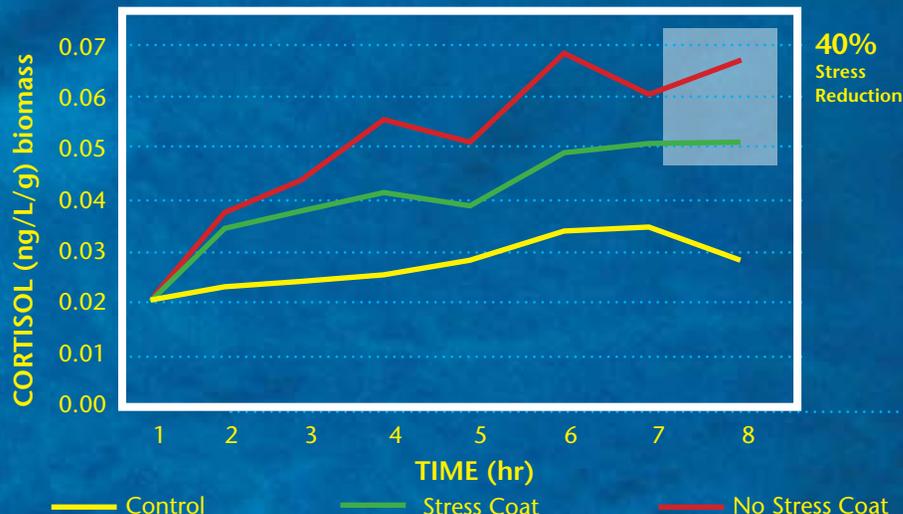
- Water samples were collected hourly for 8 hours and analysed via water extraction and RIA according to Ellis et al (2004).

RESULTS

- Recorded cortisol levels are cumulative.
- All treatments are statistically significantly different from each other.
- The control fish had the lowest excreted cortisol levels followed by those that were treated with STRESS COAT. Untreated stressed fish excreted the highest cortisol levels.

AIM

To assess the stress reducing properties of STRESS COAT by measuring water borne cortisol excreted from goldfish *Carassius auratus* following a netting stressor.



Effect of STRESS COAT® on the release of cortisol from goldfish following a netting stressor (each treatment being significantly different, ANOVA, P<0.05).

DISCUSSION

In the presence of STRESS COAT fish appeared to recover from the stress response faster than those not exposed. The initial response to a stressor is an increase in mucus production. However a few hours post-stress a reduction in the number of goblet cells can lead to a thinning of the mucus layer, possibly leaving the fish in homeostatic difficulty. Biochemical constituents of Aloe and fish mucus are similar both comprising of glycoproteins, monosaccharides and minerals. Molecules derived from the Aloe extract may deliver important mucin components that aid in the maintenance of the mucus layer possibly by providing a replacement protective layer on the fish during and following the stress response. The low cortisol levels in this study may be attributed to the elution liquid chosen for the water extraction. This study used ethyl acetate as opposed to alcohol, which extracts only free and not a combination of free and conjugated steroids from the water.

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