STRESS RESPONSES OF PIRARUCU *Arapaima gigas*

DURING TRANSPORTATION IN A CLOSED SYSTEM

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EXTENDED ABSTRACT ONLY - DO NOT CITE

Due to its recent use in aquaculture, there still be a lack of information available towards a standard and an efficient transportation method for pirarucu (*Arapaima gigas)*, mainly to the ones around 1 to 2kg fish size, which are transported in an effort for broodstock formation and for several fish farming towards pirarucu grown out operations. Since most fish transportation uses the closed system with polyethylene bags filled with oxygen (Gomes et al., 2002) these method should be a starting point to use with pirarucu. The intensity and duration of fish stress through physiological responses (cortisol and glucose) were measured along with the water quality after the operation, fish survival and feeding response within 96h.

Ten fish (weight 1,123 ± 322.5g) were individually placed in 30-L polyethylene bags with 10 L of water, at two different groups (5 fish per group): bags inflated with pure oxygen (Oxi group) and bags inflated with atmospheric air (Air group). Simulated transportation took 6 h. After transportation (AT), fish were transferred to two $1m^3$ fish cages. Water parameters were estimated before transportation and at the opening of the bags. Fish stress responses were evaluated using glucose and cortisol at different sample times.

There was no mortality after transportation. In both groups fish physiological responses were similar. Cortisol did not show any significant alteration during the sampled period (Fig. 1A). Immediately after transportation there was significant increase at plasma glucose concentrations, which were stable up to 12h AT. At 24h AT glucose level recovered the control group values (Fig. 1B). As expected, DO concentration was significantly higher for the Oxi group. All other water parameters did not change significantly in both groups.

The present paper give some baselines values for plasma cortisol and glucose, during its comfort zone (control) and during a stressful situation (transportation). Pirarucu values for plasma cortisol and glucose in the control group (80-97 ng/ml and 40-45 mg/dl, respectively) were similar to values found for other Amazonian species, as for tambaqui (*Colossoma macropomum*) (80 ng/ml and 45-70 mg/dl for plasma cortisol and glucose, respectively) (Wood et al., 1998; Gomes et al., 2001) and for matrinxã (*Brycon cephalus*) (100 ng/ml e 40 mg/dl for plasma cortisol and glucose, respectively) (Carneiro and Urbinati, 2001).

For most fish species, cortisol is the main hormone that activates glucose, which provides an increase on the energy supply, so fish can withstand the stress situation (Mommsen et al., 1999). This pattern was not observed with pirarucu, where cortisol levels maintained unaltered at both groups during sampling, while glucose presented a significant change up to 12 h after transportation.

Another important result was the observation of a not significant change in the pirarucu plasma cortisol levels even when fish were submitted to continuous sampling. This shows that pirarucu has a great capacity to keep cortisol at low levels even in successive stress occurring at situations during a short time interval (24 h).

Glucose results can be related to the continuous samplings, mostly during samplings at AT, 6 and 12 h AT. The glycemic rise after transport could be related to the stress inflicted during transportation procedures. However, the short time intervals at AT, 6 and 12 h AT for sampling the fish, can have an effect on the maintenance of high glucose values. Between 12 h AT and 24 h AT sampling procedures there was a bigger time interval, permitting the fish to return for normal glycemic levels. In such case, pirarucu did not presented an accumulative stress effect, even with successive samplings, blood glucose levels kept similar values from AT until 12 h AT sampling.

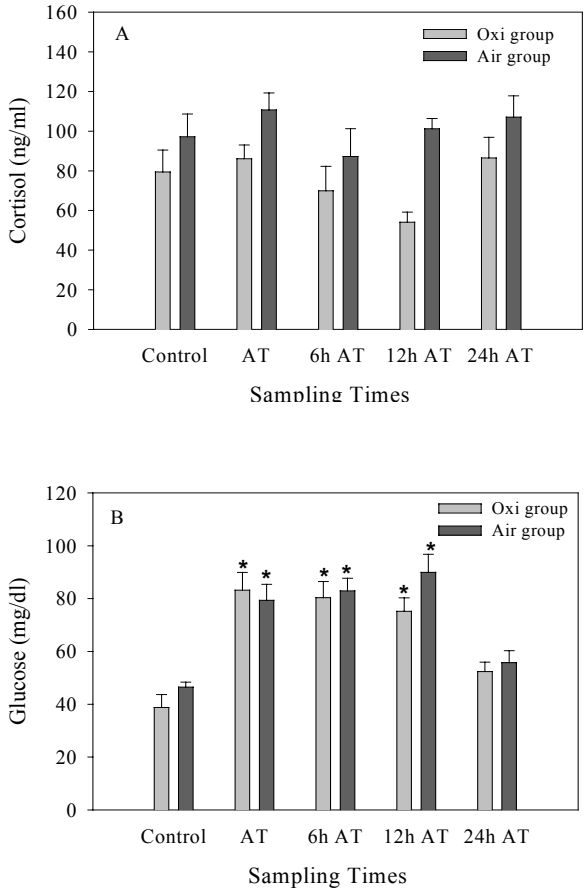

Figure 1. Cortisol (A) and glucose (B) during transportation. control - before transportation; AT - after transportation; 6h, 12h and 24h AT - 6, 12 and 24h after transportation. Columns marked with * are significantly different from the control (Dunnett's test; $P < 0.05$).

The results shown that pirarucu transportation using a closed system with plastic bags can be realized with atmospheric air or with pure oxygen, since fish physiology response to stress and water quality were similar between the two groups of fish.

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