

Osmoregulasi Ikan Kerapu Hibrid Cantang (*Epinephelus fuscoguttatus* x *Epinephelus lanceolatus*) yang Diaklimasi ke Air Tawar dengan Perlakuan Kalsium

INTISARI

Ikan kerapu adalah salah satu komoditas perikanan budidaya laut dan payau bernilai ekonomis tinggi, tetapi masih terbatas dalam pembudidayaannya. Diversifikasi lokasi budidaya dapat dilakukan apabila ikan dapat adaptif di air tawar. Konsentrasi kalsium dalam air berperan penting terhadap sintasan ikan air laut yang diadaptasikan ke air tawar. Penelitian ini bertujuan untuk mempelajari pengaruh konsentrasi kalsium dalam air terhadap sintasan dan osmoregulasi ikan kerapu hibrid cantang (*Epinephelus fuscoguttatus* x *Epinephelus lanceolatus*) di air tawar. Penelitian menggunakan ikan juvenil berukuran sekitar 8 cm. Ikan dibagi menjadi 5 perlakuan dengan 3 replikasi: 1 kelompok tetap di air laut (kontrol negatif) dan 4 kelompok diadaptasi ke air tawar dengan laju penurunan salinitas 10%/hari dan variasi penambahan kalsium (dalam CaCl_2) yaitu 0 (kontrol positif), 100, 500, dan 1000 mg/L. Penelitian dilakukan dalam 2 tahap: penelitian sintasan dan osmoregulasi. Pada penelitian sintasan, ikan diamati sintasannya setiap hari hingga mencapai air tawar, selanjutnya pengamatan di air tawar dilakukan 4 jam sekali pada 24 jam pertama dan 24 jam sekali pada hari berikutnya hingga semua ikan uji, selain kontrol negatif, mati. Pada penelitian osmoregulasi, dilakukan pengamatan osmolalitas serum, kadar air otot, dan aktivitas $\text{Na}^+ - \text{K}^+ - \text{ATPase}$ (NKA) insang pada 24 jam setelah penurunan salinitas ke 80, 60, 40 dan 20% SW (*seawater*), serta 1 dan 6 jam setelah penurunan salinitas ke air tawar (0%). Hasil menunjukkan konsentrasi kalsium berpengaruh signifikan terhadap sintasan ikan di air tawar dimana konsentrasi 500 mg/L adalah konsentrasi optimum. Osmolalitas serum memiliki korelasi positif dengan salinitas sedangkan efek kalsium hanya terlihat ketika ikan mencapai air tawar. Aktivitas NKA terpengaruh dengan konsentrasi kalsium saat ikan di air tawar dengan kelompok 500 dan 1000 mg/L CaCl_2 memiliki aktivitas tertinggi dan kelompok kontrol positif dan 100 mg/L CaCl_2 memiliki aktivitas terendah. Tidak ada korelasi antara salinitas maupun osmolalitas serum dengan kadar air otot. Berdasarkan penelitian ini dapat disimpulkan bahwa konsentrasi kalsium dalam air mempengaruhi sintasan dan parameter osmoregulasi yang diuji, kecuali kadar air otot, terutama saat ikan di air tawar.

Kata kunci: *ikan kerapu, salinitas, kalsium, osmolalitas, $\text{Na}^+ - \text{K}^+ - \text{ATPase}$*

Osmoregulation of Hybrid Grouper (*Epinephelus fuscoguttatus* x *Epinephelus lanceolatus*) that Acclimated to Freshwater with Manipulated Calcium

ABSTRACT

Grouper is important marine and brackish water aquaculture commodity with high economical value but its culture was currently limited. Diversification in culture location from marine to freshwater could be done only if the fish has ability to adapt to freshwater. Calcium concentration in water has correlation with survival of freshwater-adapted marine fish. Thus, the aim of this research is to study the effect of water calcium concentration on the survival and osmoregulation of hybrid grouper (*Epinephelus fuscoguttatus* x *Epinephelus lanceolatus*) that adapted to freshwater. This study used juvenile grouper (about 8 cm of total length) that divided into 5 treatments with triplicate: 1 group do not adapted to freshwater as a negative control and 4 groups adapted to freshwater gradually (at a rate 10%/day) with varied calcium supplementation (with CaCl_2) that is 0, 100, 500, and 1000 mg/L. The study was divided to survival trial and osmoregulation trial. During survival trial, survival was monitored each day until reaching freshwater. After reaching freshwater, survival monitoring was done every 4 hour during the first 24 hour and every 24 hour for the next 24 hour until all surviving freshwater-adapted fish dead. In osmoregulation trial, serum osmolality, muscle water content, and gill $\text{Na}^+\text{-K}^+\text{-ATPase}$ activity were monitored at 24 hour post transfer to 80, 60, 40, and 20% sea water (SW) and at 1 and 6 hour after reaching freshwater (0% SW). Result from survival trial indicates significant effect of calcium concentration on freshwater survival of fish with 500 mg/L CaCl_2 being optimum concentration. Result from osmoregulation trial indicates correlation between salinity and serum osmolality whereas correlation between calcium concentration and serum osmolality only apparent at 0% SW. NKA activity affected by water calcium concentration only when fish has reached freshwater with 500 and 1000 mg/L CaCl_2 group has highest value whereas 0 and 100 mg/L CaCl_2 group has lowest value. There are no apparent correlations between muscle water content with either serum osmolality or salinity. It can conclude that water calcium concentration affect fish survival and osmoregulation, except muscle water content, when fish reaching freshwater.

Keyword: *grouper, salinity, calcium, osmolality, $\text{Na}^+\text{-K}^+\text{-ATPase}$*