

Intisari

Eksresi Gen *lh-fsh* dan Tingkat Keberhasilan Pemijahan Ikan Zebra (*Danio Rerio*, Hamilton 1822) Yang Diinduksi Dengan Hormon GnRH-III

Pemijahan pada beberapa jenis ikan sering mengalami permasalahan. Beberapa jenis ikan tidak dapat memijah secara alami dan perlu induksi hormon impor untuk merangsang pemijahan. Penggunaan hormon lokal berbasis GnRH-III berpotensi menjadi solusi untuk meningkatkan keberhasilan dan kemandirian budidaya perikanan. Ikan zebra dipilih sebagai hewan uji karena *handling* yang mudah, gen yang telah diurutkan secara lengkap, dan siklus hidup singkat. Penelitian ini bertujuan untuk mengetahui pengaruh pemberian hormon GnRH-III terhadap ekspresi gen *lh* dan *fsh* serta tingkat keberhasilan pemijahan pada ikan zebra. Data yang diamati meliputi keberhasilan pemijahan, waktu laten, dan ekspresi gen *lh-fsh*. Analisis data dilakukan secara deskriptif untuk data pemijahan, sedangkan data ekspresi gen *lh-fsh* dianalisis menggunakan metode Livak ($2^{-\Delta\Delta C_t}$). Perlakuan P2 dan P3 menghasilkan keberhasilan pemijahan (%) tertinggi yang setara dengan perlakuan P4 dan 2x lipat lebih tinggi bila dibandingkan dengan perlakuan control.. Waktu laten tercepat terjadi pada perlakuan P4, yaitu 127 menit setelah injeksi hormon. Perlakuan P4 menghasilkan ekspresi gen *lh* dan *fsh* tertinggi pada betina serta *lh* tertinggi pada jantan, sedangkan P2 menunjukkan ekspresi gen *fsh* tertinggi pada jantan. Perlakuan GnRH-III dosis tinggi, baik tunggal maupun kombinasi dengan domperidon, serta sGnRH α + domperidon, meningkatkan keberhasilan pemijahan ikan hingga dua kali lipat dibanding kontrol. Ekspresi gen *lh* tertinggi ditemukan pada betina dan jantan perlakuan sGnRH α + domperidon, sedangkan ekspresi gen *fsh* jantan tertinggi pada perlakuan GnRH-III dosis tinggi. Ini menunjukkan efektivitas perlakuan hormonal dalam merangsang sistem reproduksi ikan zebra.

Kata kunci : GnRH-III, Ikan zebra, keberhasilan pemijahan, ekspresi gen *lh-fsh*

Abstract

Expression of *lh-fsh* Genes and Spawning Success Rate in Zebrafish (*Danio rerio*, Hamilton 1822) Induced by GnRH-III Hormone

Spawning in several fish species often encounters challenges. Some species are unable to spawn naturally and require induction with imported hormones to stimulate reproduction. The use of local hormones based on GnRH-III has the potential to improve spawning success and enhance the self-sufficiency of aquaculture. Zebrafish (*Danio rerio*) were selected as the test organism due to their ease of handling, fully sequenced genome, and short life cycle. This study aimed to investigate the effects of GnRH-III hormone administration on the expression of *lh* and *fsh* genes and the spawning success rate in zebrafish. Observed parameters included spawning success, latency period, and *lh-fsh* gene expression. Spawning data were analyzed descriptively, while gene expression data were analyzed using the Livak method ($2^{-\Delta\Delta C_t}$). Treatments P2 and P3 resulted in the highest spawning success rates (%) equivalent to treatment P4, and were twice as high as the control. The shortest latency period was recorded in treatment P4, at 127 minutes after hormone injection. Treatment P4 also yielded the highest *lh* and *fsh* gene expression in females and the highest *lh* expression in males, whereas treatment P2 showed the highest *fsh* expression in males. High-dose GnRH-III treatments, both alone and in combination with domperidone, as well as sGnRH α combined with domperidone, increased spawning success up to two-fold compared to the control. The highest *lh* gene expression was found in both males and females treated with sGnRH α + domperidone, while the highest *fsh* expression in males was observed under high-dose GnRH-III treatment. These findings demonstrate the effectiveness of hormonal treatments in stimulating the reproductive system of zebrafish.

Key words: GnRH-III, zebrafish, spawning success, *lh-fsh* gene expressio