Notas Científicas

Eugenol as an anesthetic for juvenile common snook

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Abstract – The objective of this work was to evaluate the efficacy of eugenol as an anesthetic for juvenile common snook, and to determine the minimum effective concentration for use in handling procedures. In the first trial, juvenile common snook were subjected to immersion baths at 25, 50, 75, 100, 125, and 150 mg L^{-1} eugenol concentrations, after which induction and recovery times were evaluated. In the second experiment, the lethal exposure time (LT_{50}) at 75 mg L^{-1} was estimated. Minimum effective eugenol concentration was 50 mg L^{-1}, and the stage of deep anesthesia and recovery were, respectively, reached at 126.3 and 208.8 s. At 75 mg L^{-1}, LT_{50} was 1,314 s, and induction time and recovery were also satisfactory; however, fish cannot tolerate over 229 s exposure.

Index terms: *Centropomus undecimalis*, anesthesia, fish farming, fish handling.

Eugenol como anestésico para juvenis de robalo-flecha

Resumo – O objetivo deste trabalho foi avaliar a eficácia do eugenol como anestésico para juvenis de robalo-flecha e determinar a concentração mínima eficaz que pode ser utilizada em procedimentos de manejo. No primeiro experimento, juvenis de robalo-flexa foram submetidos a banhos de imersão com concentrações a 25, 50, 75, 100, 125 e 150 mg L^{-1} de eugenol; em seguida, o tempo de indução e a recuperação foram avaliados. No segundo experimento, o tempo de exposição letal (LT_{50}) a 75 mg L^{-1} foi estimado. A concentração de eugenol mínima e eficaz foi de 50 mg L^{-1}, e o estágio de anestesia profunda e a recuperação foram alcançados, respectivamente, em 126,3 e 208,8 s. A 75 mg L^{-1}, o LT_{50} foi de 1.314 s, e o tempo de indução e recuperação foram satisfatórios; entretanto, os peixes não toleram mais de 229 s de exposição.

Termos para indexação: *Centropomus undecimalis*, anestesia, piscicultura, manejo de peixes.

Anesthesia is a valuable tool for aquaculture management to minimize stress or physical damage caused during handling, transport, grading, weighing, induction of spawning, and tagging and, consequently, to reduce susceptibility to pathogens and infection (Ross & Ross, 2008).

Satisfactory anesthetic effect, rapid induction and recovery times, as well as safety margins are important properties of fish anesthetics (Ross & Ross, 2008). Chemicals such as tricaine methanesulfonate (MS-222), quinaldine, metomidate, 2-phenoxyethanol, menthol, and benzocaine are widely used to anesthetize fish (Pirhonen & Schreck, 2003). However, some of these anesthetics cause unwanted side-effects, such as loss of mucus, gill irritation, and corneal damage (Inoue et al., 2003).

Eugenol has been used as an alternative anesthetic in a large number of ichthyological studies because it does not have persistent or latent negative effects on fish physiology or behavior (Yamanaka et al., 2011), and it is more effective in reducing the short-term stress response induced by handling (Wagner et al., 2003). Eugenol (4-allyl-2-methoxyphenol) is the main active ingredient (70–90%) of clove oil; it is distilled from the stem, leaves, and buds of the clove tree *Syzygium aromaticum* (L.) Merr. & L. M. Perry (Ross & Ross, 2008). Low cost, high efficacy, a large margin of safety for fish, and a lack of toxicity to humans at commonly used concentrations are some of the characteristics that qualify it as a safe anesthetic (Roubach et al., 2005).

Common snook (*Centropomus undecimalis* Bloch, 1792) is a valuable commercial and recreational