Dietary ginger (Zingiber officinale) enhance resistance of Nile tilapia (Oreochromis niloticus) against Aeromonas hydrophila

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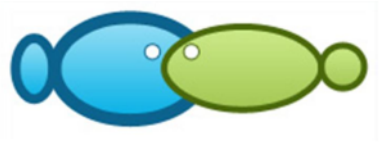

Dietary ginger (*Zingiber officinale*) enhance resistance of Nile tilapia (*Oreochromis niloticus*) against *Aeromonas hydrophila*

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Abstract. The objective of research was to evaluate the effect of ginger (*Zingiber officinale*) extract on the resistance of Nile tilapia (*Oreochromis niloticus*) challenged with *Aeromonas hydrophila*. Tilapia fingerlings measuring 10-12 cm in length were gathered from Board of Aquaculture Development and Training of Fish Farmer in Tateli Village, put in oxygenated plastic bags and transported to the Laboratory of Aquaculture Technology, Faculty of Fisheries and Marine Science, Sam Ratulangi University. The fish was first acclimatized for one week and then distributed into 15 aquaria with a density of 10 individuals per aquarium. Furthermore, the fish was fed treatment pellets supplemented with 0, 1.25, 2.5, 5, and 10 g of *Z. officinale* powder/kg of pellet for 30 days as much as 3%/body weight/day. The commercial pellet had a composition of 30% protein, 6% lipid, 5% fiber, 10% ash and 12% water. At day 31th, the fish was injected intraperitoneally with 0.2 mL of *A. hydrophila* suspension containing 5x10^{7} cfu/mL. Survival rate of fish was observed up to 8 days after challenge. The result showed that supplementation of *Z. officinale* extract significantly influenced the resistance of fish against *A. hydrophila* infection as compared to that of control treatment. The highest survival rate was observed in fish fed pellet containing 2.5 g *Z. officinale* extract.
Key Words: aquaculture, fish disease, immunostimulant, medicinal plant, intraperitoneal injection.

Introduction. Disease is one of the major problems encountered in aquaculture activity whether caused by bacteria, virus, parasites and fungi. The occurrence of disease usually is not caused by a single factor, but by a complete interaction between fish, environment and pathogen (Post 1987). Due to disease attack, many fish farmers had suffered significant economic losses, and even many of them had left the activity.

Many attempts have been implemented to increase the resistance of fish against various pathogen and to improve fish growth (Talpur & Ikhwanuddin 2013). Citarasu (2010) reported that hormone, antibiotic, vitamin and several chemical substances were used in aquaculture to control diseases. Even though these substances gave positive effect but they cannot be recommended because of their residual and other side effect. Babu et al (2013) reported that antibiotics and chemicals used in aquaculture may create various problems such as bioaccumulation, pollution, antibiotic-resistant pathogen, immunosuppression and high expenditure. Excessive use of antibiotic will be accumulated in fish body and is dangerous for human that consume the fish (Wu et al 2013).

In attempt to control the occurrence of diseases in aquaculture, scientists have focused on the use of immunostimulant to replace antibiotics (Galina et al 2009). A variety of immunostimulants that had been proved for its use including dietary nucleotide (Burrels et al 2001), baker's yeast (Abdel-Tawwab et al 2008; Tewary & Patra 2011; Manoppo et al 2015), life yeast *Hanseniaspora opuntiae* C21 (Ma et al 2013). Probiotics and biofloc had also been use in aquaculture to enhance immunity and growth of fish and shrimp (de la Banda et al 2010; Crab et al 2012).

In the past few years, medicinal plants began to be developed as an alternative for antibiotics and chemicals used in aquaculture (Fazlolahzadeh et al 2011). The

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