Anthelmintic Effect of Red Ginger to control Myxobolus-Infected in Koi Fish

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Abstract

This study aims to determine the effect of red ginger (*Zingiberoffichinale*Rosc.) juice on the blood glucose level and assess the correct red ginger juice dose for koi fish (Cyprinuscarpio koi) infected with *Myxobolus*. The average results of blood glucose examination with different doses were negative control (61,50 mg/dl), positive control (119,25 mg/dl), dose 0,1% (95,75 mg/dl) 0.2% (87.75 mg/dl), 0.3% (79.50 mg/dl) and 0.4% (63.75 mg/dl). This study concludes that the juice of red ginger can affect the blood glucose level in koi fish (*Cyprinuscarpio* koi) infected with *Myxobolus* koi.

Key words: *Zingiberofficinale*Rosc, *Myxobolus* koi, Blood glucose, Koi fish

Koi fish *(Cyprinuscarpio koi)* is an ornamental fish with attractive colours. Marine ornamentals are mainly collected from the Indo-Pacific and Caribbean waters and supplied world-wide (Rhyne *et al*., 2012). *Myxobolus* is one of the most dangerous parasites, because it can cause death in 80% of its host (Mahasri and Kismiyati, 2011). Fish infected by *Myxobolus* has difficulty to breathe, as oxygen is blocked by nodules. This causes stress, even death, in fish (Isfandi, 2011). Currently, there are many traditional plants that have been found to contain anti-parasite for fish. One of the medicinal plants is red ginger *(Zingiberofficinale*Rosc.) Ginger grows in areas with humidity up to 80%, pH 5.5-7.0 and high nutrients (Agoes, 2010). Red ginger has a red colour and coarse fibre, while other types of ginger have a white colour (Latief, 2012). This article presents the results of research on the effect of red ginger (*Zingiberoffichinale*Rosc.) juice on the blood glucose level and the exact dose of red ginger juice for koi fish *(Cyprinuscarpio koi)* infected with *Myxobolus* koi.

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Materials and Methods

The main materials used in this study were red ginger rhizome (ZingiberoffichinaleRosc.), 240 koi fish (Cyprinuscarpio koi) originated from Blitar Regency infected with Myxobolus koi parasite with the same size and infection (medium infection) were used in the study. Moderate infection happens if there are 1-4 nodules (Titis *et al.*, 2009). Before treatment, koi fish seeds were acclimatised for 24 hours. Red ginger juice was prepared by washing and cleaning the ginger rhizomes and draining. The ginger rhizome (100 grams) was cut into small bits and mixed with 100 ml of distilled water to get 1:1 ratio for weight and volume, both of which were then blended smoothly was filtered with gauze (Mujim, 2010). The koi fish seeds were then put into aquariums with 10 fish each. Immersion was conducted for three hours followed by blood glucose level examination. Measurement of blood glucose level was performed using Glucossure Star. The data was analysed using Analysis of Variance (ANOVA) to know the differences between treatment groups. This was followed with Duncan Multiple Range Test with 95% confidence level to know the best treatment among all treatments (Kusriningrum, 2015).

Results and Discussion

Analysis of variance on different treatments showed significantly different results ($p<0.05$) in each treatment. T1 showed significant difference from T2, T3 and T4, but not significantly different from T5 and T6. T2 showed significant difference from T1, T5 and T6, but not significantly different from T3 and T4. T3 showed significant difference from T1 and T6, but not significantly different from T2, T4 and T5. T4 showed significant difference from T1, but not significantly different from T2, T3, T5 and T6. T5 showed significant difference from T2, but not significantly different from T1, T3, T4 and

Table I. The average results of blood glucose levels

Treatment	Blood Glucose Level (mg/dl)
T1	$61,5^{d}$±10.47
T2	$119,25^{a}$±13.64
T3	$95,75^{ab}$±13.93
T4	$87,75^{abc}$±34.30
T5	$79,5^{bcd}$±9.28
T6	$63,75^{cd}$±15.92

Means bearing different superscripts in a row differ significantly ($p<0.05$).

T6. T6 showed significant difference from T2 and T3, but not significantly different from T1, T4, and T5. The highest blood glucose level was in the second treatment with an average value of 119.25 mg/dl and the lowest was in the first treatment with an average value of 61.50 mg/dl. Both treatments were positive and negative controls respectively. Treatment with ginger immersion of 0.4% dose had the lowest average value of blood glucose compared to other doses of 63.75 mg/dl. The average results of blood glucose levels is shown in Table I.

The decrease in blood glucose level is influenced by the decrease in the number of *Myxobolus* spores in koi fish seeds which is caused by the destruction of cell membranes due to protein denaturation and fat dissolution by phenol component in the red ginger (Purwanti *et al*., 2012). *Myxobolus* is one of the biological stressors that often infect fish. Stressed fish will have a higher blood glucose level. Reduced number of *Myxobolus* spores will affect blood glucose level of koi fish. This is in line with Mutiasari's (2013) statement that a higher level of blood glucose in fish can be interpreted that the stress level of the fish is getting worse.

Water quality in this study was normal with an average temperature of 29°C, pH of 6.5 and dissolved oxygen (DO) of 6 ppm. This is consistent with Soeprijanto and Noviati's (2008) statement that the optimum koi fish growth is at dissolved oxygen level between 5-7 mg/L, temperature of 15-32°C, and water acidity (pH) between 6.5 to 8.5. The results of water quality measurement during the research can be interpreted that red ginger juice can be used as herbal medicine to control the parasite *Myxobolus koi* in koi fish seeds, because the juice does not negatively affect the water quality.

Summary

Red ginger juice can be used as herbal medicine to control the parasite *Myxobolus* in koi fish seeds, and red ginger juice affects to reduce the blood glucose level in koi fish with the appropriate dose according to the body size.

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