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Soybean flowers photo by Gabriel Matzkin

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Addition of Chromium (Cr^{+3}) in the diets containing fermented yellow corn meal on jelawat, *Leptobarbus hoevenii*

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Abstract. *Yanto H, Junianto, Rostika R, Andriani Y, Iskandar. 2017. Addition of Chromium (Cr^{+3}) in the diets containing fermented yellow corn meal on jelawat,* Leptobarbus hoevenii. *Nusantara Bioscience 9: 214-219.* This experiment aimed to find the optimal level of Cr^{+3} in the diets containing fermented yellow corn meal to increase the growth of jelawat (*Leptobarbus hoevenii* Bleeker, 1851). The completely randomized design had five levels of Cr^{+3}, they were A0 (0.52), A1 (1.55), A2 (3.03), A3 (4.52) and A4 (6.04) mg kg^{-1} in the diet. The source of Cr^{+3} was $CrCl_3$ $6H_2O$ which was fermented by *Saccharomyces cerevisiae*. The results showed that Cr^{+3} in diets could activate the insulin and regulate the blood glucose. The fastest increase in blood glucose occurs 5 hours after feeding on Chromium 1.5 mg kg^{-1}. The liver and muscle glycogen, protein and lipid of bodies, protein and lipid retentions, daily growth rate, and feed efficiency were significant ($P<0.05$). The diet containing Cr^{+3} 1.55 mg kg^{-1} resulted in the highest for liver glycogen, body protein, body lipid, protein and lipid retentions, daily growth rate and feed efficiency. The Cr^{+3} level of 1.55 mg kg^{-1} in the diet contained 30% fermented yellow corn meal and 42.79% total carbohydrate was the best for the growth and feed efficiency of jelawat.

Keywords: Blood glucose, feed efficiency, growth rate, respiratory quotient

INTRODUCTION

Jelawat (*Leptobarbus hoevenii* Bleeker, 1851), a freshwater fish, has a good prospect for aquaculture development. It is one of the high economic value fish and Indonesia's export commodities (Warta Pasarikan 2010). Then jelawat had been spawned successfully by the induced breeding technology, so the fingerlings of jelawat have been available to support the its culture. As an omnivorous fish, jelawat may consume various sources of food easily. The food habit has potentials to utilize various diet made of plant materials efficiently.

The fish has the different ability in utilizing the carbohydrate. The omnivorous fish can utilize the carbohydrate only about 30 to 40%, and the carnivores are about 10% to 20% of the total diet formulation due to the ability of the fish in producing amylase and insulin activity are low (Anderson and De Silva 2003). The increasing of carbohydrate utilization and sensitivity insulin are important for jelawat.

Selection of carbohydrate sources and fermentation increase the use of carbohydrate in fish. One of the resources is yellow corn meal containing the high carbohydrate level as an energy source, so it is usually used an ingredient in formulating the fish diet. In another way, the nutrition number in yellow corn meal can be increased by using fermented technology. The use of fermented ingredients increased the amount of nutrient and feed digestibility, growth and feeding efficiency in common carp, *Cyprinus carpio* (Suprayudi et al. 2012) and nile tilapia, *Oreochromis* sp. (Mulyasari et al. 2013). The fermented yellow corn meal can be tried as the energy source in the diet for jelawat.

According to Gatlin III (2010), the addition of chromium (Cr^{+3}) in diet could increase the sensitivity of insulin, so it could transfer the blood glucose into cells. Feeding the optimal level of Cr^{+3} in the diet increased the activity of Glucose-6-Phosphate Dehydrogenase (G6PDH) and 6-Phospho-gluconate Dehydrogenase (6PGDP) enzyme in the liver of hybrid tilapia, *O. niloticus* x *O. aureus* (Pan et al. 2003); the protein retention in common carp, *C. carpio* (Mokoginta et al. 2004); regulation of blood glucose in tilapia, *O. niloticus* (Setyo 2006); daily growth rate and feed efficiency to the African catfish, *Clarias gariepinus* (Aryansyah et al. 2007) and the RNA/DNA ratio, the growth rate and feed efficiency for baung, *Hemibagrus nemurus* (Sari et al. 2009). Giving the chromium in the diet to jelawat according to the need is important to be done in order to increase the carbohydrate metabolism and growth of jelawat.

The need of Cr^{+3} is different for every fish. For the examples, gurami, *Osphronemus gouramy* needs 1.50 ppm Cr^{+3} (Subandiyono 2004), common carp, *C. carpio* needs 1.59-2.16 ppm Cr^{+3} (Mokoginta et al. 2004), and nile, *O. niloticus* 4.50 ppm Cr^{+3} (Setyo 2006), and African catfish, *C. gariepinus* needs Cr^{+3} of 2.60 mg kg^{-1} (Aryansyah et al. 2007), and baung fish, *H. nemurus* is 3.2 mg $kg^{-1}Cr^{+3}$ in the diet (Sari et al. 2009). Conversely, feeding in the diet contained Cr^{+3} as much as 2 mg kg^{-1} did not affect the growth of hybrid tilapia (Pan et al. 2003), and the addition