Length-weight relationship, relative condition factor and growth of tinfoil barb (*Barbonymus schwanenfeldii,* Bleeker 1853) juveniles fed with varying levels of dietary carbohydrate

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Abstract

Growth and general wellbeing of fish are often deduced by its length-weight relationship (LWR) and condition factor. Intraspecific variation in growth patterns of fish raised under the controlled environment is substantially influenced by their nutritional status. Dietary carbohydrate as one of the cheapest macronutrients is prominently investigated to optimally incorporate in the aquafeed to spare expensive dietary protein sources *viz.* fishmeal without compromising the growth of farmed fishes. Tinfoil barb is an economically important freshwater food fish widely cultured in Southeast Asia. However, farmers feed this species with non-specific and conventional aquafeed due to lack of information available on its nutrient requirements. In this context, an experiment was conducted to analyze the optimum carbohydrate utilization level of tinfoil barb juveniles. Five isoproteic (40%) and isocaloric (15.5 kJ g^{-1}) test diets were prepared using corn starch as carbohydrate source to contain 15%, 20%, 25%, 30% and 35% of dietary carbohydrate. The diets were randomly assigned to five triplicate groups with 20 fish per 100 L glass aquarium (0.49±0.02 g $fish^{-1}$). The fish were fed to satiation twice daily for 8 weeks. Water quality parameters were maintained within the acceptable range. At the end of the trial, the mean body weight gain (BWG) of the fish was highest (621%) for 20%

carbohydrate which was significantly higher ($P<0.05$) than those of 30% (378%) and 35% carbohydrate (273%). Polynomial regression showed the optimal BWG at 19.1% dietary carbohydrate. The estimate of parameter *b* of LWR ($W=aL^b$) was equal to 3 for the fish fed on 15%, 20% and 35% dietary carbohydrate and showed isometric growth pattern. Negative allometric growth ($b<3$) was observed in other two groups. Isometric growth pattern implied that the juveniles grew with no change in shape of the body while those with negative allometric growth became skinny while growing. Nevertheless, the general wellbeing of the juveniles in all diet groups were similarly good as the relative condition factor $Kn \geq 1$. These findings suggested that tinfoil barb juveniles were able to optimally utilize carbohydrate at a moderate 19.1% and maximally up to 25%.

Keywords: *Barbonymus schwanenfeldii*, Carbohydrate; Length-weight relationship; Relative condition factor