

ORL-F&HN-05**Silkworm Pupae meal: An Alternative Protein source for Fish meal in the Compound Diet of Rohu *Labeo rohita***

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Fish meal is a standard protein source in aqua-feed; however, its production is unsustainable. Hence, a suitable alternative protein source is essential. Incorporation of edible insect protein in the animal diet as an alternative source is of utmost importance and a priority for the sustainable growth of aquaculture. Silk pupae, a locally available by-product, is rich in crude protein and possess a balanced amino acid profile. Various studies have demonstrated the potential for partial or complete replacement of fish meal with insect protein in aqua-feeds, highlighting the effectiveness of incorporating silk pupae as a sustainable alternative. The present study evaluated the effects of substituting fish meal with Silkworm Pupae Meal (SPM) on the growth performances of *Labeo rohita* as an alternative insect protein source. The substitution rates were 0% 10% 20% 30% for each treatment designated as T₁, T₂, T₃ and T₄ respectively. The experiment was conducted in a pond with sixteen nylon cages (1m³ each) in a Completely Randomized Design (CRD) at the Paklihawa campus, IAAS, Rupandehi. A total of 192 fish (average initial weight of 4.17g) were distributed into 16 cages (12 fish fingerling per cage). The fish were fed four iso-nitrogenous (30% CP) compound diets at 8% 5% & 3 % by body weight for 112 days in the interval of 30 days (two times a day) throughout the research period. The growth performance parameters were observed on a fortnightly basis, whereas the water quality parameters were evaluated daily.

The temperature, pH and DO range of the pond water were 15.57 °C to 24.5 °C, 6 to 9 and 8.03 mg/L to 10.18 mg/L respectively. A significantly (p<0.05) higher total mean weight gain was observed in T₃ (13.47±0.24g) than control (12.34±0.37g). The highest survivable was observed in T₄ (0.70±0.02) at p<0.05. No significant difference was observed in relative weight gain, specific growth rate, FCR and PER (p>0.05). Additionally, SPM-incorporated diets performed significantly superior growth (p<0.05) to the control without any observable side effects on the fish. Overall, we can conclude that SPM can be used in partial replacement to fish meal up to 30% without any observable detrimental effect on *L. rohita*. However, more research is required to evaluate the effects of combination or replacement of fish meal protein with insect meal in the diets, as well its new prospective in animal feeding with other compound diets.

Table: Mean growth and survivable in different silkworm pupae incorporated feed.

Treatments	Mean stock weight (g)	Mean relative weight gain (g)	Mean daily weight gain (g)	Mean final weight gain (g)	Specific growth rate (SGR)	Survivable (%)
T ₁	5.14±0.52	2.45±0.28	0.098±0.002 ^b	12.34±0.37 ^b	1.55±0.058	0.56±0.05 ^b
T ₂	5.34±0.85	2.61±0.47	0.105 ±0.01 ^a	13.13±0.27 ^a	1.59±0.090	0.63±0.09 ^a _b
T ₃	4.48±0.57	3.14±0.53	0.106±0.001 ^a	13.47±0.24 ^a	1.70±0.092	0.64±0.09 ^a _b
T ₄	3.86±0.11	3.46±0.13	0.107±0.00 ^a	13.33±12.31 ^a	1.76±0.023	0.70±0.02 ^a